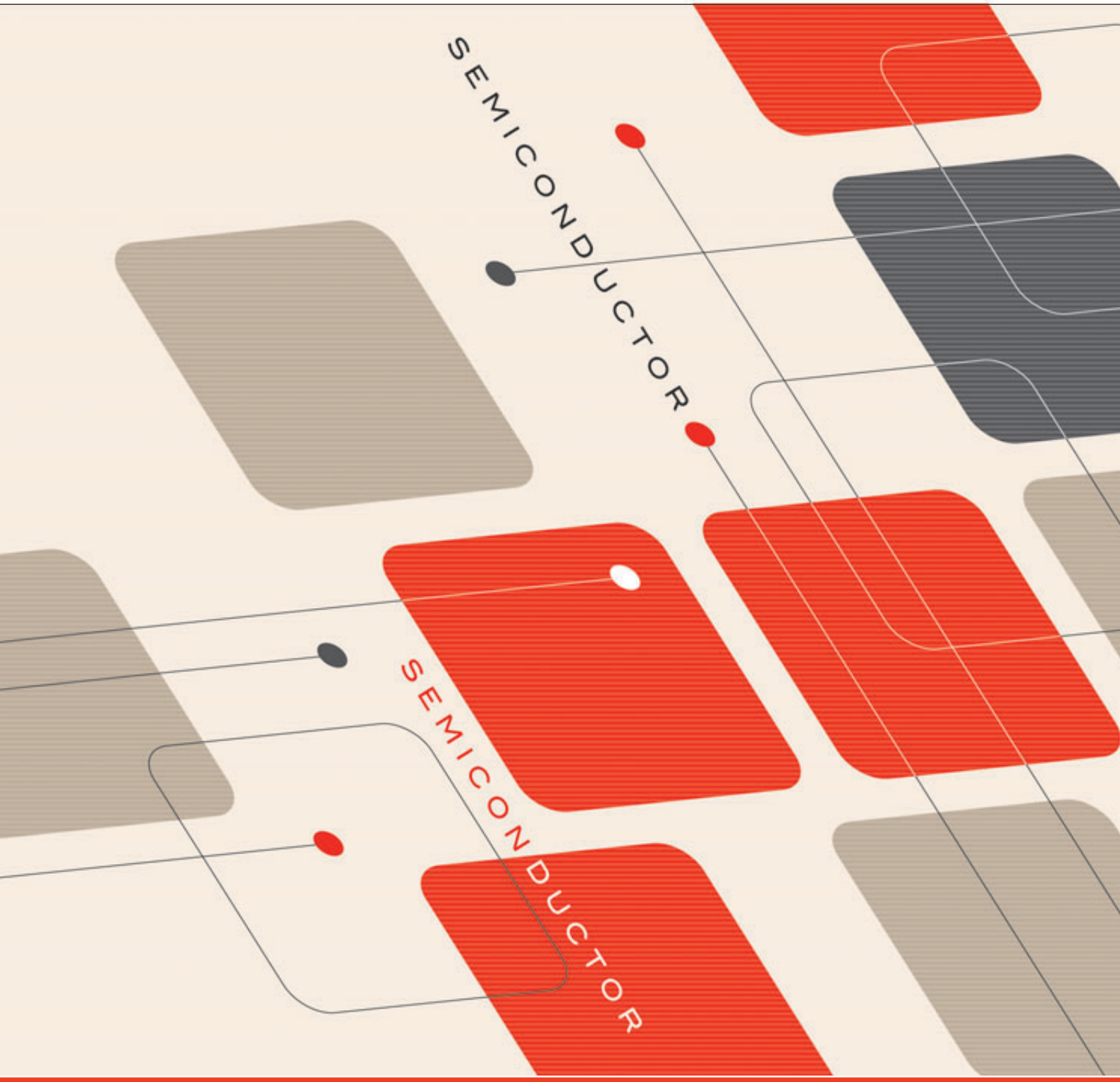
TOSHIBA
Leading Innovation

2011-3

PRODUCT GUIDE

Photocouplers and Photorelays



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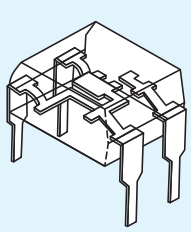
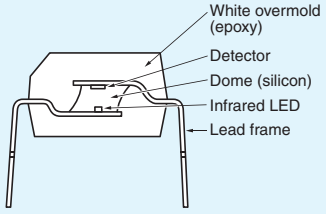
Preface

As a type of isolator favored by manufacturers, photocouplers now serve as noise protectors in many electronic devices. Toshiba's photocouplers consist of either a GaAs or GaAℓAs infrared LED(s) and a silicon photodetector(s) housed in a mold package. GaAℓAs LEDs are adopted in high-speed photo-IC types due to their high-speed and high-light output.



Perspective view of the TLP521-1



Cross section of the TLP521-1

Extensive Line of Products

To meet customers' various needs, we offer an extensive product portfolio shown below as well as general-purpose photocouplers.

1. Photo-IC couplers: High speed and advanced functions (highly integrated detectors)
2. Zero-crossing phototriac couplers: Phototriac-output devices with zero-crossing detection
3. Photovoltaic couplers: MOSFET gate drive (high voltage output achieved using a photodiode array)
4. Photorelays (MOSFET-output devices):
   AC-DC switches (MOSFET output)
   Mechanical relay replacement

Safety Standard Approvals

UL approval has been obtained under file number E67349 for most of our photocouplers. EN60747-5-2-approved photocouplers are also offered with a wide selection of output (transistor, thyristor, triac, IC output and photorelay). The designs of these devices meet other standards including IEC380/VDE0806, IEC60950/EN60950 and IEC60065/EN60065.

Small-Package Products

Toshiba offers a wide variety of photocouplers in a small package to meet the space-saving requirement of increasingly smaller and thinner end products. Packaging options include mini-flat packages (MFSOPs) and half-pitch (1.27 mm) mini-flat SOP packages.

Overseas Manufactured Photocouplers

Part of the general-purpose photocouplers with transistor and triac outputs are manufactured by Toshiba Semiconductor Thailand Co., Ltd. This will help customers procure components locally for overseas assembly of end products.

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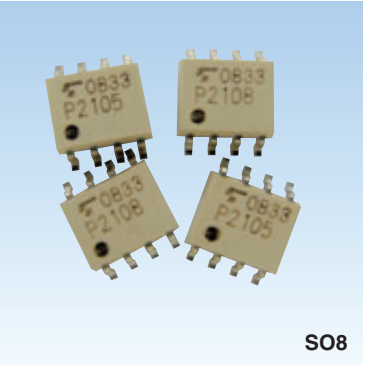
2 New Products

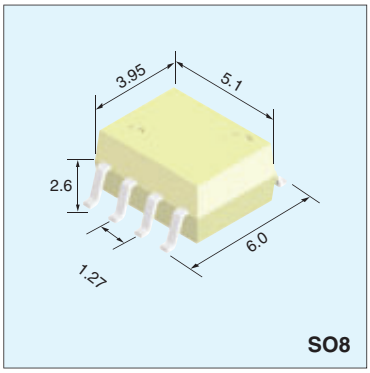
Small Surface-Mount IC-Output Photocouplers in the SO8 Package

Toshiba is expanding its portfolio of IC-output photocouplers in the small and thin SO8 package. To meet customer needs, Toshiba has released photocouplers featuring various data rates, dual-channel configurations and power device drivers.

Data rate (typ.)	Part Number	# of Circuits	Output	Supply Voltage
0.1 Mbit/s	**TLP2403**	1-ch	Darlington	Up to 18 V
1 Mbit/s	**TLP2404**	1-ch	Open-collector	4.5 V to 30 V
	TLP2409	1-ch		Up to 30 V
5 Mbit/s	**TLP2405**	1-ch	Totem-pole	4.5 V to 20 V
	TLP2408	1-ch		
	TLP2105	2-ch		
	TLP2108	2-ch		
15 Mbit/s to 20 Mbit/s	**TLP2466***	1-ch	Totem-pole	3.3 V/5 V
	TLP2160*	2-ch		
	TLP2418	1-ch	Open-collector	5 V
	TLP2118E	2-ch		
	TLP2468*	1-ch	Open-collector	3.3 V/5 V
	TLP2168*	2-ch		
	TLP2116	2-ch	Totem-pole	5 V
	TLP2166A	2-ch		3.3 V
50 Mbit/s	**TLP2467***	1-ch	Totem-pole	3.3 V/5 V
	TLP2167*	2-ch		
Driver Propagation Delay: 0.7 μs (max)	**TLP2451**	1-ch	±0.6-A peak current	10 V to 30 V
Driver Propagation Delay: 0.5 μs (max)	**TLP2451A***	1-ch	±0.6-A peak current	10 V to 30 V

*Under development. Specifications subject to change without notice.
For the latest information, please contact your nearest Toshiba sales representative.





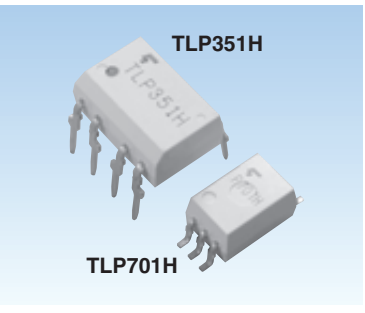
IGBT/MOSFET Gate-Drive IC-Output Photocouplers with an Extended Operating Temperature Range

Printed circuit boards are becoming smaller and denser as a result of product miniaturization. This is driving the need for electronic components with an extended operating temperature range.
To meet this need, Toshiba has been expanding its portfolio of IC-output photocouplers that are guaranteed up to 125°C instead of the conventional 100°C limit.

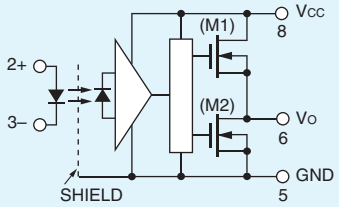
- Wide packaging options: SO6, SO8, SDIP6, DIP8
- Key specifications are guaranteed over −40°C to 125°C (−40°C to 110°C for the TLP151)
- Low current consumption: I_{CC} = 2 mA (max)

Peak Output Current	Part Number	Package	Supply Voltage (V_{CC})	Supply Current (I_{CC})	Input Threshold Current	Propagation Delay (max)	UVLO
±0.6 A	**TLP351H***	DIP8	10 V to 30 V	2 mA (max)	5 mA (max)	700 ns	–
	TLP701H*	SDIP6					–
	TLP2451	SO8					–
	TLP2451A*	SO8				500 ns	–
	TLP151*	SO6				700 ns	–
	TLP151A*	SO6				500 ns	–
±2.0 A	**TLP700H***	SDIP6	15 V to 30 V				Yes
±2.5 A	**TLP350H***	DIP8					Yes

*Under development. Specifications subject to change without notice.
For the latest information, please contact your nearest Toshiba sales representative.



Functional Schematic (TLP2451)



1: N.C. 5: GND
2: Anode 6: Vo (Output)
3: Cathode 7: N.C.
4: N.C. 8: Vcc

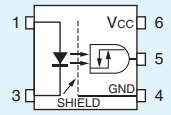
2 New Products

General-Purpose 5-Mbit/s IC-Output Photocouplers

IC-output photocouplers with a date rate of 5 Mbits/s are beneficial for applications where the user needs a data rate that is not achievable with transistor-output photocouplers. In conjunction with various packaging options, the fast IC-output photocouplers simplify system design and provide extra performance for future upgrades.

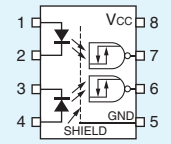
- Packaging options: MFSOP6, SDIP6, SO8
- Available in positive and negative polarity versions.
- Key specifications guaranteed over −40°C to 100°C
- Low input current: 1.6 mA max (3 mA for the TLP715 and TLP718)
- Totem-pole output: Eliminates the need for an external load resistor.
- Wide supply voltage range: 4.5 V to 20 V
- Available in dual-channel versions (TLP2105/TLP2108)
- EN60747-5-2-certified

Pin Configuration



TLP105

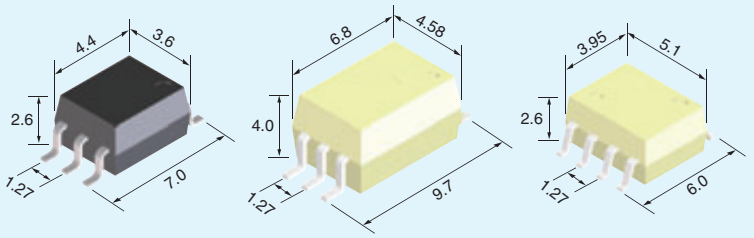
1: Anode
3: Cathode
4: GND
5: Vo (Output)
6: Vcc



TLP2105

1: Anode 1
2: Cathode 1
3: Cathode 2
4: Anode 2
5: GND
6: Output 2
7: Output 1
8: Vcc

Package	Part Number	# of Channels	Logic Polarity
MFSOP6	**TLP105**	1-ch	Positive
	TLP108	1-ch	Negative
SDIP6	**TLP715**	1-ch	Positive
	TLP718	1-ch	Negative
SO8	**TLP2405**	1-ch	Positive
	TLP2408	1-ch	Negative
	TLP2105	2-ch	Positive
	TLP2108	2-ch	Negative

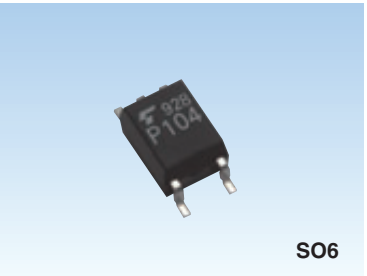


MFSOP6 SDIP6 SO8

IC-Output Photocouplers for IPM Drive Applications

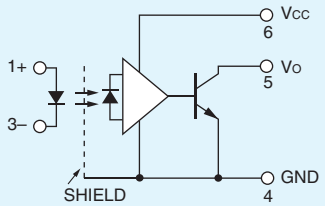
Toshiba offers IC-output photocouplers ideal for IPM drive applications. Compared to the conventional TLP114A (IGM), these IC-output photocouplers provide shorter propagation delay times, a wider operating temperature range and digital output. Thus, they help to simplify system design and improve system performance. The TLP104 and TLP2404 in a small surface-mount package are now available in mass-production quantities, while those in the SDIP6 and DIP8 packages will shortly be available.

- Wide packaging options: SO6, SO8, SDIP6, DIP8
- Key specifications are guaranteed over −40°C to 125°C.
- Low current consumption: 5 mA (max)
- Wide supply voltage range: 4.5 to 30 V
- Propagation delay times: tpHL = 400 ns (max), tpLH = 550 ns (max)
- Propagation delay skew: |tpHL − tpLH| = 400 ns (max)



SO6

Functional Schematic (TLP104)



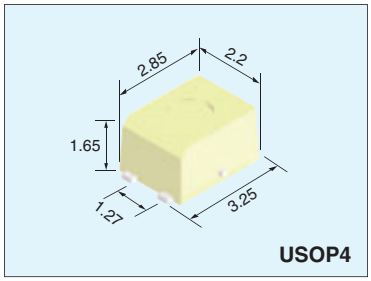
1: Anode
3: Cathode
4: GND
5: Vo (Output)
6: Vcc

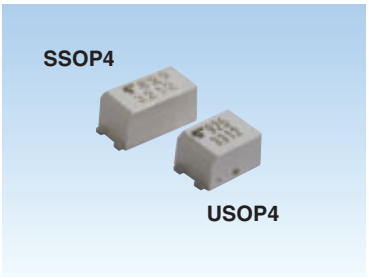
Part Number	Package	Feature
TLP104	SO6	Small surface-mount package with a 2.3-mm PCB mounted height (max)
TLP2404	SO8	Standard 8-pin small surface-mount package
TLP714*	SDIP6	Small surface-mount SDIP6 package
TLP754*	DIP8	Standard DIP8 package

*Under development. Specifications subject to change without notice.
For the latest information, please contact your nearest Toshiba sales representative.

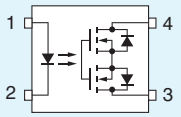
Photorelays in the Ultra-Small USOP4 Package: TLP33xx Series

There is a strong market need for smaller photorelays. To meet this need, Toshiba has developed photorelays in the ultra-small USOP4 package, which are suitable for high-density board assembly. These photorelays help to reduce system size and cost. They are ideal for use in small measuring instruments such as semiconductor testers that require numerous relays. The TLP3312 and TLP3375 provide well-balanced off-state voltage and on-state current, making them suitable not only for tester applications but also for various applications requiring high-density board assembly such as battery-controlled devices.





Pin Configuration



1. Anode
2. Cathode
3. Drain
4. Drain

Part Number	Off-State Voltage (max)	On-State Current (max)	On-State Resistance (max)	Total Capacitance (typ.)	LED Trigger Current (max)
TLP3312	60 V	0.4 A	1.5 Ω	20 pF	3 mA
TLP3375	50 V	0.3 A	1.5 Ω	12 pF	3 mA

High-ION Photorelays: TLP354x Series (Under Development)

Toshiba is now developing the TLP354x Series in the DIP6 package targeting applications that deal with relatively large current. Housed in the DIP6 package, the TLP354x photorelays allow B and C connections, enabling the switching of 8-A, 7-A, 6-A and 4-A dc current respectively. They are suitable for various applications such as factory equipment, power supplies and security systems.

Scheduled for mass production in April

Characteristic	Symbol	Unit	Available	Under Development			
			TLP3542	TLP3543	TLP3544	TLP3545	TLP3546
Package	–	–	DIP6				
Peak Off-State Voltage (min)	V_{OFF}	V	40	20	40	60	100
On-State Current (max)	I_{ON}	A	2.5	4	3.5	3	2
On-State Resistance (max)	R_{ON}	mΩ	100	50	60	70	200
Isolation Voltage (min)	B_{VS}	Vrms	2500	2500	2500	2500	2500

*Under development. Specifications subject to change without notice.
For the latest information, please contact your nearest Toshiba sales representative.

2 New Products

General-Purpose Photorelays Certified for Reinforced Insulation: TLP220 Series and TLP221A (Under Development)

Toshiba is now developing the TLP220 Series and the TLP221 targeting factory equipment applications, and wattmeter and smart meter applications for the monitoring of electrical energy consumption. These photorelays meet the requirements for high isolation voltage between input and output, as well as for international safety standards certification. Housed in the DIP4 package, the new photorelays save board space and provide an isolation voltage of 5 kV. The TLP220 Series is available in versions with 60-V, 200-V, 350-V, 400-V and 600-V peak off-state voltages. The TLP221A provides a 60-V peak off-state voltage and a 1.5-A on-state current.

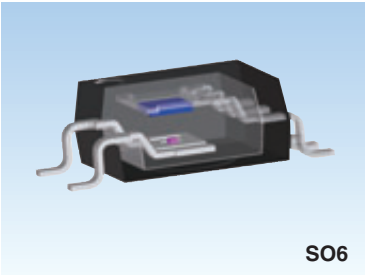
Scheduled for mass production in June to August

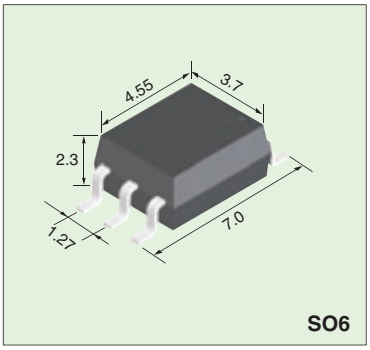
Characteristic	Symbol	Unit	Existing Photorelay Examples		Under Development					
			TLP222A	TLP222G	TLP220A	TLP220D	TLP220G	TLP220GA	TLP220J	TLP221A
Package	–	–	DIP4							
Peak Off-State Voltage (min)	V_{OFF}	V	60	350	60	200	350	400	600	60
On-State Current (max)	I_{ON}	A	0.5	0.12	0.5	0.25	0.1	0.12	0.09	1.5
On-State Resistance (max)	R_{ON}	Ω	2	50	2	8	50	35	60	0.2
Isolation Voltage (min)	B_{VS}	Vrms	5000	5000	5000	5000	5000	5000	5000	5000

*Under development. Specifications subject to change without notice.
For the latest information, please contact your nearest Toshiba sales representative.

IC-Output Photocouplers in the SO6 Package Certified for Reinforced Insulation

Despite the same footprint size as the MFSOP6 package, the new SO6 package provides reinforced insulation, offering clearance and creepage distances of ≥ 5 mm; an internal isolation thickness of ≥ 0.4 mm; and an isolation voltage of 3750 Vrms.
Additionally, the SO6 features the maximum PCB mounted height of 2.3 mm, approximately 20% lower than the MFSOP6. This makes the photocouplers in SO6 ideal for low-profile applications.


SO6



SO6

- Clearance/creepage: ≥ 5 mm
- Thin package: ≤ 2.3 mm
- Internal Faraday shield: ≥ 0.4 mm
- Thin package: ≤ 2.3 mm

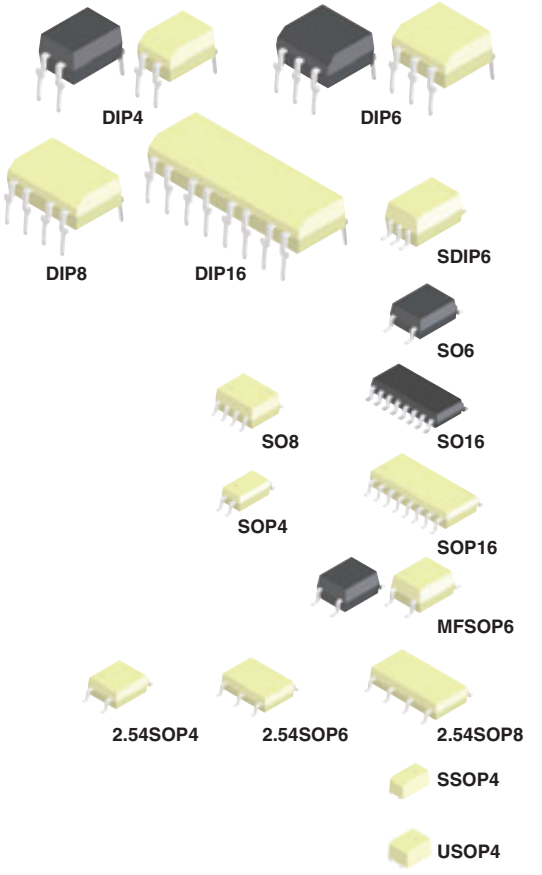
Part Number	Data rate (typ.)	Output	Supply voltage	Input Threshold Current (max)
TLP104	1 Mbit/s	Open-collector, optimized for IPM drive	4.5 V to 30 V	5 mA
TLP109	1 Mbit/s	Open-collector	4.5 V to 30 V	–
TLP116A	20 Mbit/s	Totem-pole inverting logic	5 V	5 mA
TLP2366*			3.3 V/5 V	5 mA
TLP118	20 Mbit/s	Open-collector inverting logic	5 V	5 mA
TLP2368*			3.3 V/5 V	5 mA
TLP2367*	50 Mbit/s	Totem-pole inverting logic	3.3 V/5 V	5 mA

*Under development. Specifications subject to change without notice.
For the latest information, please contact your nearest Toshiba sales representative.

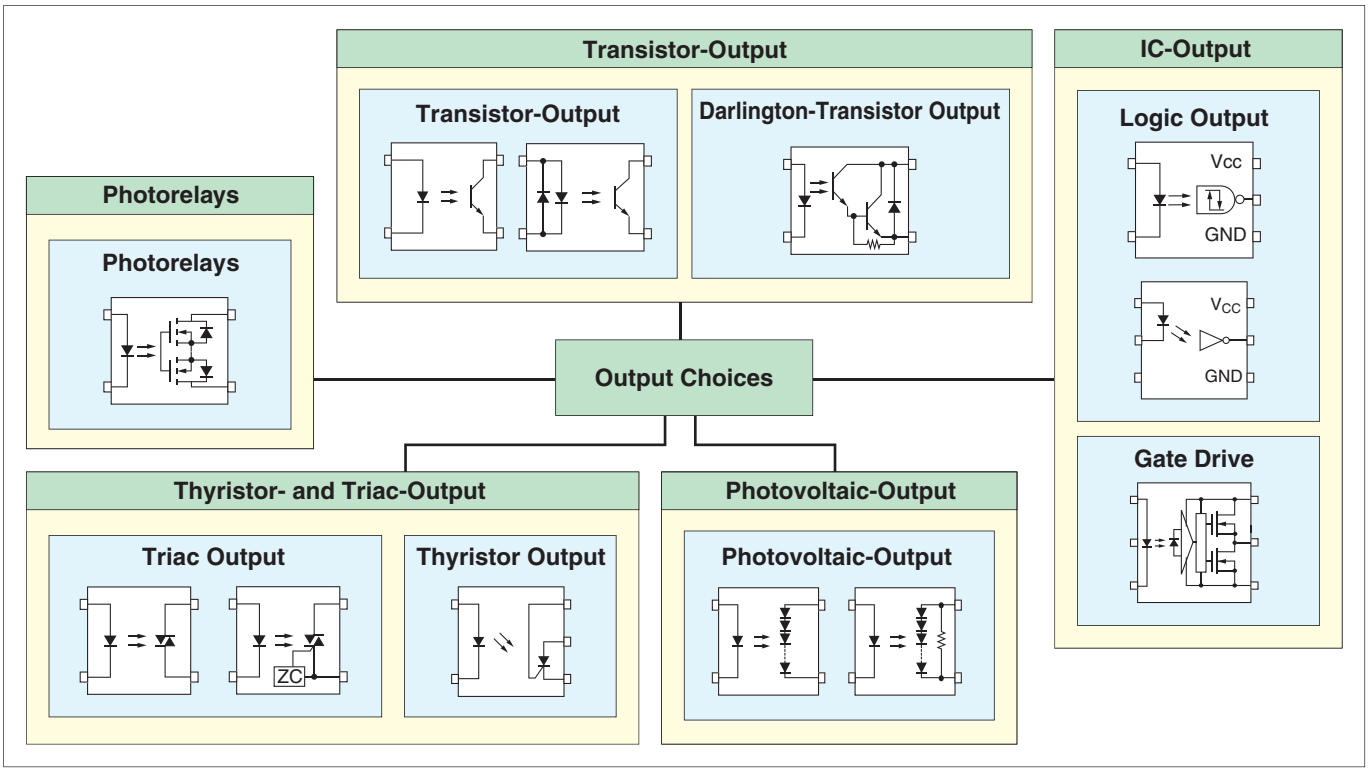
3 Photocoupler Product Tree

Photocoupler Product Tree

Package

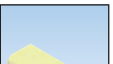


DIP4, DIP6, DIP8, DIP16	● General-purpose packages ● Lead-forming options for surface mounting
SDIP6	● ≥ 7-mm clearance/creepage; ≥ 0.4-mm isolation thickness ● 6-pin SMD package (1.27-mm lead pitch)
SO6	● ≥ 5-mm clearance/creepage; ≥ 0.4-mm isolation thickness ● 5-pin SMD package (1.27-mm lead pitch); low-profile
SO8, SO16	● 8-pin SMD package (1.27-mm lead pitch) ● 16-pin SMD package (1.27-mm lead pitch)
SOP4, SOP16	● 4-pin SMD package (1.27-mm lead pitch) ● 16-pin SMD package (1.27-mm lead pitch)
MFSOP6	● SMD package (1.27-mm lead pitch)
2.54SOP4, 2.54SOP6, 2.54SOP8	● SMD package (2.54-mm lead pitch)
SSOP4	● Ultra-small; SMD package (1.27-mm lead pitch)
USOP4	● Ultra-small; SMD package (1.27-mm lead pitch)



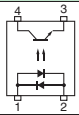
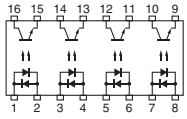
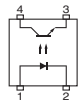
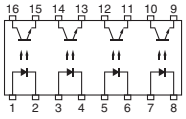
4 Selection Guide

1 Transistor-Output and Darlington-Transistor-Output Photocouplers

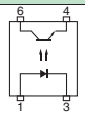
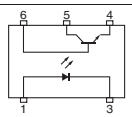
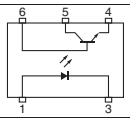
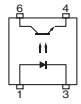
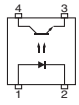
Features	Package									
		SOP4	SOP16	SO6	SO16	MFSOP6	DIP6	DIP4	DIP8	DIP16
	Channel / Isolation Voltage	Single	Quad	Single	Quad	Single	Single	Single	Dual	Quad
General-purpose	2500 Vrms	TLP281	TLP281-4		TLP291-4*		TLP531 TLP532		TLP504A	
	3750 Vrms	TLP285	TLP285-4	TLP185*		TLP131 TLP181				
	4000 Vrms						TLP731 TLP732 TLP733 TLP734			
	5000 Vrms						TLP631 TLP632	TLP781 TLP785		
Low I_F	3750 Vrms					TLP124 TLP137				
	5000 Vrms						TLP331 TLP332	TLP624	TLP624-2	TLP624-4
High V_{CEO}	5000 Vrms							TLP628	TLP628-2	TLP628-4
High I_F	5000 Vrms							TLP629	TLP629-2	TLP629-4
AC input	2500 Vrms	TLP280	TLP280-4		TLP290-4*					
	3750 Vrms	TLP284	TLP284-4	TLP184*		TLP130 TLP180				
	5000 Vrms						TLP630	TLP620	TLP620-2	TLP620-4
Low I_F	3750 Vrms					TLP126				
	5000 Vrms							TLP626	TLP626-2	TLP626-4
High I_F	5000 Vrms						TLP330	TLP320	TLP320-2	TLP320-4
Darlington	2500 Vrms						TLP570 TLP571 TLP572	TLP523	TLP523-2	TLP523-4
High V_{CEO}	2500 Vrms					TLP127				
	5000 Vrms						TLP371 TLP372 TLP373	TLP627	TLP627-2	TLP627-4

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.

New Products with Reinforced Insulation in a Small, Surface-Mount SOP Package (≥ 5-mm Clearance/Creepage and ≥ 0.4-mm Internal Isolation Thickness)

Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP284(4)		**SOP4** Lead pitch = 1.27 mm AC Input SEMKO-approved TST part recm'ed	–	50	600	±5 mA, 5 V	80 V	3750 Vrms	○ / ○	△	○(1)	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
TLP284-4		**SOP16** 4-channel version of the TLP284 Lead pitch = 1.27 mm AC Input SEMKO-approved	–	50	600	±5 mA, 5 V	80 V	3750 Vrms	○ / ○	△	○(1)		△
			GB	100	600								
TLP285(4)		**SOP4** Lead pitch = 1.27 mm SEMKO-approved TST part recm'ed	–	50	600	5 mA, 5 V	80 V	3750 Vrms	○ / ○	○(1)	○(1)	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
			YH	75	150								
			GRL	100	200								
			GRH	150	300								
			BLL	200	400								
TLP285-4		**SOP16** 4-channel version of the TLP285 Lead pitch = 1.27 mm SEMKO-approved	–	50	600	5 mA, 5 V	80 V	3750 Vrms	○ / ○	△	○(1)		△
			GB	100	600								

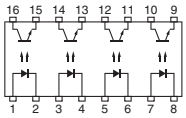
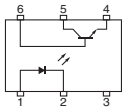
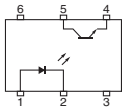
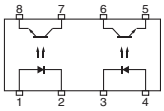
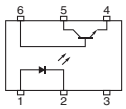
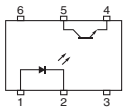
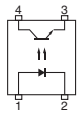
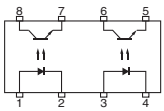
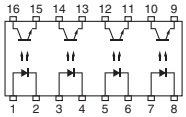
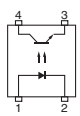
General-Purpose, Transistor-Output Photocouplers

Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP124		Mini-flat **MFSOP6** Low input drive current	–	100	1200	1 mA, 0.5 V	80 V	3750 Vrms	○ / ○				
			BV	200	1200								
TLP131		Mini-flat **MFSOP6** Internal base connection	–	50	600	5 mA, 5 V	80 V	3750 Vrms	○ / ○				
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
TLP137		Mini-flat **MFSOP6** Low input drive current Internal base connection	–	100	1200	1 mA, 0.5 V	80 V	3750 Vrms	○ / ○				
			BV	200	1200								
TLP181(4)		Mini-flat **MFSOP6** SEMKO-approved TST part recm'ed	–	50	600	5 mA, 5 V	80 V	3750 Vrms	○ / ○	△	○(1)	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
			YH	75	150								
			GRL	100	200								
			GRH	150	300								
			BLL	200	400								
TLP281(4)		**SOP4** Lead pitch = 1.27 mm SEMKO-approved TST part recm'ed	–	50	600	5 mA, 5 V	80 V	2500 Vrms	○ / ○	○(1)	○(1)	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
			YH	75	150								
			GRL	100	200								
			GRH	150	300								
			BLL	200	400								

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
Note 3: Some CTR ranks may be limited in production quantities. For details, please contact your nearest Toshiba sales representative.
Note 4: Product manufactured by Toshiba Semiconductor (Thailand) Co.,Ltd. [TST] is recommended. See page 38 for detail. Japan product is non-promotional item.

4 Selection Guide

General-Purpose, Transistor-Output Photocouplers (Continued)

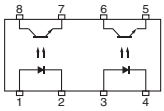
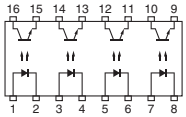
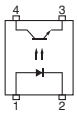
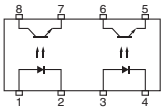
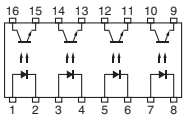
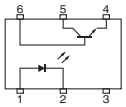
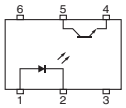
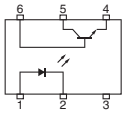
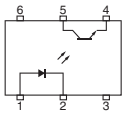
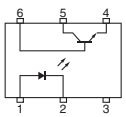
Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP281-4		**SOP16** 4-channel version of the TLP281 Lead pitch = 1.27 mm SEMKO-approved	–	50	600	5 mA, 5 V	80 V	2500 Vrms	○ / ○	△	○ (1)	◎	◎
			GB	100	600								
TLP331		**DIP6** Low input drive current Internal base connection	–	100	1200	1 mA, 0.5 V	55 V	5000 Vrms	○ / ○				
			BV	200	1200								
TLP332		**DIP6** Low input drive current	–	100	1200	1 mA, 0.5 V	55 V	5000 Vrms	○ / ○				
			BV	200	1200								
TLP504A		**DIP8**	–	50	600	5 mA, 5 V	55 V	2500 Vrms	○ / –				
			GB	100	600								
TLP531		**DIP6** Internal base connection	–	50	600	5 mA, 5 V	55 V	2500 Vrms	○ / ○				
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
TLP532		**DIP6** High EMI immunity	–	50	600	5 mA, 5 V	55 V	2500 Vrms	○ / ○				
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
TLP624		**DIP4** Low input drive current	–	100	1200	1 mA, 5 V	55 V	5000 Vrms	○ / –	△	△	◎	◎
			BV	200	1200								
TLP624-2		**DIP8** Dual-channel version of the TLP624	–	100	1200	1 mA, 5 V	55 V	5000 Vrms	○ / –	△	△	◎	◎
			BV	200	1200								
TLP624-4		**DIP16** 4-channel version of the TLP624	–	100	1200	1 mA, 5 V	55 V	5000 Vrms	○ / –	△	△	◎	◎
			BV	200	1200								
TLP628		**DIP4** High V_{CEO}	–	50	600	5 mA, 5 V	350 V	5000 Vrms	○ / –	△	△	△	△
			GB	100	600								

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

Note 3: Some CTR ranks may be limited in production quantities. For details, please contact your nearest Toshiba sales representative.

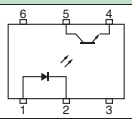
General-Purpose, Transistor-Output Photocouplers (Continued)

Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP628-2		**DIP8** Dual-channel version of the TLP628	–	50	600	5 mA, 5 V	350 V	5000 Vrms	○ / –	△	△	△	△
			GB	100	600								
TLP628-4		**DIP16** 4-channel version of the TLP628	–	50	600	5 mA, 5 V	350 V	5000 Vrms	○ / –	△	△	△	△
			GB	100	600								
TLP629		**DIP4** High input current I_F = 150 mA	–	20	80	100 mA, 1 V	55 V	5000 Vrms	○ / –	△	△	△	△
TLP629-2		**DIP8** Dual-channel version of the TLP629	–	20	80	100 mA, 1 V	55 V	5000 Vrms	○ / –	△	△	△	△
TLP629-4		**DIP16** 4-channel version of the TLP629	–	20	80	100 mA, 1 V	55 V	5000 Vrms	○ / –	△	△	△	△
TLP631		**DIP6** Internal base connection	–	50	600	5 mA, 5 V	55 V	5000 Vrms	○ / ○				
			GB	100	600								
			GR	100	300								
TLP632		**DIP6** High EMI immunity	–	50	600	5 mA, 5 V	55 V	5000 Vrms	○ / ○				
			GB	100	600								
			GR	100	300								
TLP731		**DIP6** SEMKO-approved Internal base connection	–	50	600	5 mA, 5 V	55 V	4000 Vrms	○ / ○	△	○	◎	◎
			GB	100	600								
			GR	100	300								
TLP732		**DIP6** SEMKO-approved	–	50	600	5 mA, 5 V	55 V	4000 Vrms	○ / ○	△	○	◎	◎
			GB	100	600								
			GR	100	300								
TLP733 **TLP733F**		**DIP6** SEMKO-approved Internal base connection	–	50	600	5 mA, 5 V	55 V	4000 Vrms	○ / –	△	○	◎	◎
			GB	100	600								
			GR	100	300								

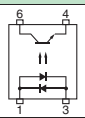
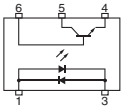
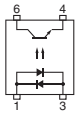
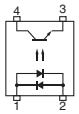
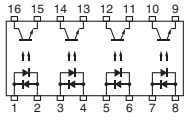
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
Note 3: Some CTR ranks may be limited in production quantities. For details, please contact your nearest Toshiba sales representative.

4 Selection Guide

General-Purpose, Transistor-Output Photocouplers (Continued)

Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP734 **TLP734F**		**DIP6** SEMKO-approved	–	50	600	5 mA, 5 V	55 V	4000 Vrms	○ / –	△	○	◎	◎
			GB	100	600								
			GR	100	300								
TLP781(6) **TLP781F**(6)		**DIP 4** High isolation voltage UL-approved (double protection)	–	50	600	5 mA, 5 V	80 V	5000 Vrms	(5) ○ / ○	△	○	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
			YH	75	150								
			GRL	100	200								
			GRH	150	300								
			BLL	200	400								
TLP785*(6) **TLP785F***(6)		**DIP 4** High isolation voltage UL-approved (double protection)	–	50	600	5 mA, 5 V	80 V	5000 Vrms	(5) ○ / ○	△	△	△	△
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
			YH	75	150								
			GRL	100	200								
			GRH	150	300								
			BLL	200	400								

AC-Input, Transistor-Output Photocouplers

Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP126		Mini-flat **MFSOP6** AC input Low input drive current	–	100	1200	±1 mA, 0.5 V	80 V	3750 Vrms	○ / ○				
TLP130		Mini-flat **MFSOP6** AC input Internal base connection	–	50	600	±5 mA, 5 V	80 V	3750 Vrms	○ / ○				
			GB	100	600								
TLP180(4)		Mini-flat **MFSOP6** AC input SEMKO-approved TST part recm'ed	–	50	600	±5 mA, 5 V	80 V	3750 Vrms	○ / ○	○(1)	○(1)	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
TLP280(4)		**SOP4** Lead pitch = 1.27 mm AC input SEMKO-approved TST part recm'ed	–	50	600	±5 mA, 5 V	80 V	2500 Vrms	○ / ○	○(1)	○(1)	◎	◎
			Y	50	150								
			GR	100	300								
			BL	200	600								
			GB	100	600								
TLP280-4		**SOP16** 4-channel version of the TLP280 Lead pitch = 1.27 mm AC input SEMKO-approved	–	50	600	±5 mA, 5 V	80 V	2500 Vrms	○ / ○	△	○(1)	◎	◎
			GB	100	600								

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
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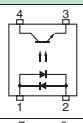
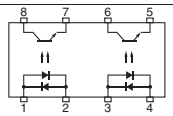
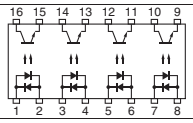
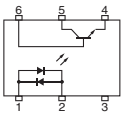
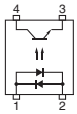
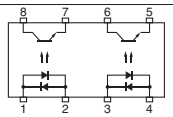
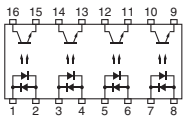
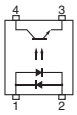
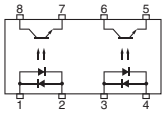
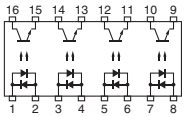
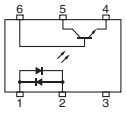
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
Note 3: Some CTR ranks may be limited in production quantities. For details, please contact your nearest Toshiba sales representative.
Note 4: Product manufactured by Toshiba Semiconductor (Thailand) Co.,Ltd. [TST] is recommended. See page 38 for detail. Japan product is non-promotional item.
Note 5: For safety standard compliance criteria including the operating temperature conditions, please contact your nearest Toshiba representative.
Note 6: About the package dimensions and lead form options, see each datasheet.

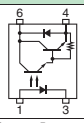
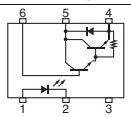
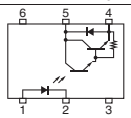
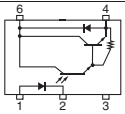
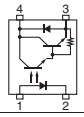
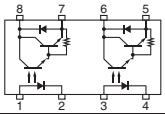
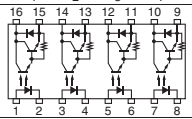
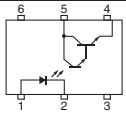
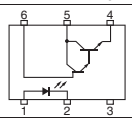
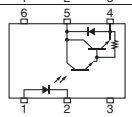
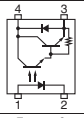
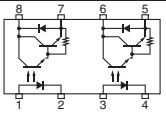
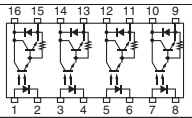
AC-Input, Transistor-Output Photocouplers (Continued)

Part Number	Pin Configuration	Features	CTR (%)(3)				V_{CEO}	BVs	Safety Standards(2)				
			Rank	Min	Max	@I_F, V_{CE}			UL/cUL	TÜV	VDE	BSI	IEC
TLP320		**DIP4** High input current AC input I_F = 150 mA	–	20	80	±100 mA, 1 V	55 V	5000 Vrms	○ / ○			◎	◎
TLP320-2		**DIP8** Dual-channel version of the TLP320	–	20	80	±100 mA, 1 V	55 V	5000 Vrms	○ / ○			◎	◎
TLP320-4		**DIP16** 4-channel version of the TLP320	–	20	80	±100 mA, 1 V	55 V	5000 Vrms	○ / ○			◎	◎
TLP330		**DIP6** High input current AC input I_F = 150 mA Internal base connection	–	20	80	±100 mA, 1 V	55 V	5000 Vrms	○ / ○				
TLP620(4) **TLP620F**(4)		**DIP4** AC input SEMKO-approved TST part recm'ed	– Y GR BL GB	50 50 100 200 100	600 150 300 600 600	±5 mA, 5 V	55 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP620-2(4) **TLP620F-2**(4)		**DIP8** Dual-channel version of the TLP620 SEMKO-approved TST part recm'ed	– GB	50 100	600 600	±5 mA, 5 V	55 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP620-4		**DIP16** 4-channel version of the TLP620	– GB	50 100	600 600	±5 mA, 5 V	55 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP626		**DIP4** Low input drive current AC input	– BV	100 200	1200	±1 mA, 0.5 V	55 V	5000 Vrms	○ / –	△	△	◎	◎
TLP626-2		**DIP8** Dual-channel version of the TLP626	– BV	100 200	1200	±1 mA, 0.5 V	55 V	5000 Vrms	○ / –	△	△	◎	◎
TLP626-4		**DIP16** 4-channel version of the TLP626	– BV	100 200	1200	±1 mA, 0.5 V	55 V	5000 Vrms	○ / –	△	△	◎	◎
TLP630		**DIP6** AC input High isolation voltage Internal base connection	– GB	50 100	600	±5 mA, 5 V	55 V	5000 Vrms	○ / ○				

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
Note 3: Some CTR ranks may be limited in production quantities. For details, please contact your nearest Toshiba sales representative.
Note 4: Product manufactured by Toshiba Semiconductor (Thailand) Co.,Ltd. [TST] is recommended. See page 38 for detail. Japan product is non-promotional item.

4 Selection Guide

Darlington-Transistor-Output Photocouplers

Part Number	Pin Configuration	Features	CTR (%)(3)		$V_{CE\ (sat)}$		V_{CEO}	BVs	Safety Standards(2)				
			Min	@I_F, V_{CE}	Max	@I_C, I_F			UL/cUL	TÜV	VDE	BSI	IEC
TLP127		Mini-flat **MFSOP6** High V_{CEO}	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	2500 Vrms	○ / ○	△	○(1)	◎	◎
TLP371		**DIP6** High V_{CEO} SEMKO-approved Internal base connection	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	5000 Vrms	○ / ○			△	△
TLP372		**DIP6** High V_{CEO} SEMKO-approved	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	5000 Vrms	○ / ○			△	△
TLP373		**DIP6** High V_{CEO} Long emitter-collector distance SEMKO-approved	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	5000 Vrms	○ / ○			△	△
TLP523		**DIP4**	500	1 mA, 1 V	1 V	50 mA, 10 mA	55 V	2500 Vrms	○ / ○				
TLP523-2		**DIP8** Dual-channel version of the TLP523	500	1 mA, 1 V	1 V	50 mA, 10 mA	55 V	2500 Vrms	○ / ○				
TLP523-4		**DIP16** 4-channel version of the TLP523	500	1 mA, 1 V	1 V	50 mA, 10 mA	55 V	2500 Vrms	○ / ○				
TLP570		**DIP6** High EMI immunity	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	35 V	2500 Vrms	○ / ○				
TLP571		**DIP6** Internal base connection	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	35 V	2500 Vrms	○ / –				
TLP572		**DIP6** Built-in R_{BE}	1000	1 mA, 1.2 V	1.2 V	100 mA, 10 mA	55V	2500 Vrms	○ / –				
TLP627(4)		**DIP4** High V_{CEO} SEMKO-approved TST part recm'ed	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP627-2(4)		**DIP8** Dual-channel version of the TLP627 SEMKO-approved TST part recm'ed	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP627-4		**DIP16** 4-channel version of the TLP627	1000	1 mA, 1 V	1.2 V	100 mA, 10 mA	300 V	5000 Vrms	○ / ○	△	○	◎	◎

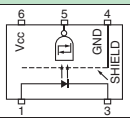
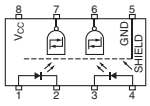
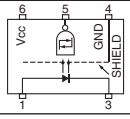
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
Note 3: Some CTR ranks may be limited in production quantities. For details, please contact your nearest Toshiba sales representative.
Note 4: Product manufactured by Toshiba Semiconductor (Thailand) Co.,Ltd. [TST] is recommended. See page 38 for detail. Japan product is non-promotional item.

2 Photocouplers for Logic Signal Transmission

Features \ Package			MFSOP6	SO6	SO8		SDIP6	DIP6	DIP8		JEDEC
Data Rate (Typ.)	Output				1ch	2ch			1ch	2ch	
0.3 Mbit/s	Open-collector (Darlington)				TLP2403				TLP553		6N138 6N139
1 Mbit/s	Open-collector		(TLP112)*2 (TLP112A)*2 (TLP114A)*2	TLP109	TLP2409		TLP719	TLP512	TLP550 TLP551 TLP559 TLP651 TLP750 TLP751 TLP759	TLP2530 TLP2531	6N135 6N136
		IPM drive	(TLP114A(IGM))*3	TLP109(IGM) TLP104	TLP2409(IGM) TLP2404		TLP714*1		TLP559(IGM) TLP759(IGM) TLP754*1		
5 Mbit/s	Totem-pole		TLP105 TLP108		TLP2405 TLP2408	TLP2105 TLP2108	TLP715 TLP718				
		Dual polarity input	TLP2095 TLP2098								
	3-state								TLP555 TLP558 TLP2200		
10 Mbit/s	Open-collector		(TLP113)*4 (TLP115)*4 (TLP115A)*4					TLP513	TLP552 TLP554 TLP2601	TLP2630 TLP2631	6N137
15 to 20 Mbit/s	Totem-pole	5 V	(TLP116)*5	TLP116A		TLP2116	TLP716				
		3.3 V	TLP2066			TLP2166A					
		3.3 V/5 V		TLP2366*1	TLP2466*1	TLP2160*1	TLP2766*1				
	Open-collector	5 V		TLP118	TLP2418	TLP2118	TLP708				
		3.3 V/5 V		TLP2368*1	TLP2468*1	TLP2168*1	TLP2768*1				
50 Mbit/s	Totem-pole	5 V	TLP117								
		3.3 V/5 V		TLP2367*1	TLP2467*1	TLP2167*1	TLP2767*1				

*1: Under development as of January 2011. For the latest information, please contact your nearest Toshiba sales representative.
*2: TLP109 recommended
*3: TLP109(IGM) recommended
*4: TLP118 recommended
*5: TLP116A recommended

Photocouplers for Logic Signal Transmission at 40 to 50 Mbit/s (Typ.)

Part Number	Pin Configuration	Features	Data Rate (NRZ) (Typ.)	Output Form	IFHL (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP117		Mini-flat **MFSOP6** Propagation delay time: 30 ns (max) VCC = 5 V	50 Mbit/s	Totem pole output (Inverter logic)	5 mA	3750 Vrms	○ / ○	○(1)	○(1)		
TLP2167*		**SO8** VCC = 3.3 or 5 V Topr (max) 125˚C	40 Mbit/s	Totem pole output (Inverter logic)	5 mA	2500 Vrms	△ / △		△(1)		
TLP2367*		**SO6** (reinforced insulation) VCC = 3.3 or 5 V Topr (max) 125˚C	40 Mbit/s	Totem pole output (Inverter logic)	5 mA	3750 Vrms	△ / △		△(2)		

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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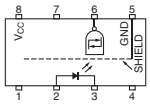
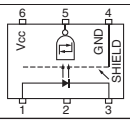
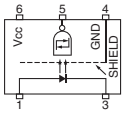
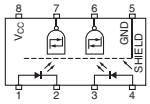
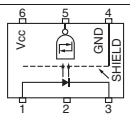
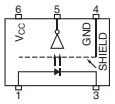
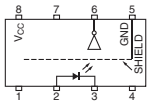
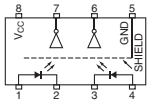
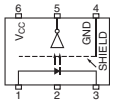
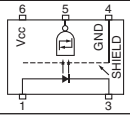
4 Selection Guide

Photocouplers for Logic Signal Transmission at 40 to 50 Mbit/s (Typ.) (Continued)

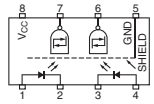
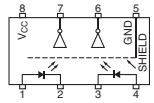
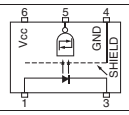
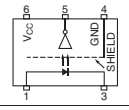
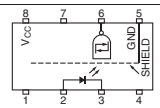
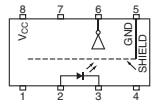
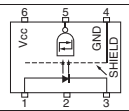
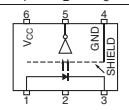
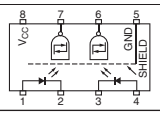
Part Number	Pin Configuration	Features	Data Rate (NRZ) (Typ.)	Output Form	I_{FHL} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP2467*		**SO8** V_{CC} = 3.3 or 5 V T_{opr} (max) 125˚C	40 Mbit/s	Totem pole output (Inverter logic)	5 mA	3750 Vrms	△ / △		△(1)		
TLP2767*		**SDIP6** (reinforced insulation) V_{CC} = 3.3 or 5 V T_{opr} (max) 125˚C	40 Mbit/s	Totem pole output (Inverter logic)	5 mA	5000 Vrms	△ / △		△		

Photocouplers for Logic Signal Transmission at 15 to 20 Mbit/s (Typ.)

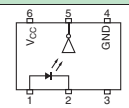
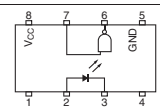
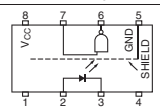
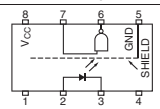
Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form	I_{FHL} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP116A		**SO6** (reinforced insulation) High speed: 20 Mbit/s V_{CC} = 5 V	60 ns	Totem pole output (Inverter logic)	5 mA	3750 Vrms	○ / ○	○(1)	○(1)		
TLP2116		**SO8** High speed: 15 Mbit/s V_{CC} = 5 V Dual-channel version	75 ns	Totem pole output (Inverter logic)	5 mA	2500 Vrms	○ / ○	○(1)	○(1)		
TLP716 **TLP716F**		**SDIP6** High speed: 15 Mbit/s V_{CC} = 5 V High isolation voltage	75 ns	Totem pole output (Inverter logic)	6.5 mA	5000 Vrms	○ / ○	○	○		
TLP118		**SO6** (reinforced insulation) High speed: 20 Mbit/s V_{CC} = 5 V T_{opr} = 125°C (max)	60 ns	Open-collector (Inverter logic)	5 mA	3750 Vrms	○ / ○		○(1)		
TLP2418*		**SO8** High speed: 15 Mbit/s V_{CC} = 5 V	75 ns	Open-collector (Inverter logic)	5 mA	3750 Vrms	○ / ○		○(1)		
TLP2118E*		**SO8** High speed: 15 Mbit/s V_{CC} = 5 V	75 ns	Open-collector (Inverter logic)	5 mA	2500 Vrms	○ / ○		○(1)		
TLP708*		**SDIP6** High speed: 15 Mbit/s V_{CC} = 5 V High isolation voltage	75 ns	Open-collector (Inverter logic)	5 mA	5000 Vrms	○ / ○		○		
TLP2066		Mini-flat **MFSOP6** High speed: 20 Mbit/s V_{CC} = 3.3 V	60 ns	Totem pole output (Inverter logic)	5 mA	3750 Vrms	○ / ○	○(1)	○(1)		

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

Photocouplers for Logic Signal Transmission at 15 to 20 Mbit/s (Typ.) (Continued)

Part Number	Pin Configuration	Features	Data Rate (NRZ) (Typ.)	Output Form	I_{FHL} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP2160*		**SO8** V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max) Dual-channel version	20 Mbit/s	Totem pole output (Inverter logic)	3.5 mA	2500 Vrms	△ / △		△(1)		
TLP2168*		**SO8** V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max) Dual-channel version	20 Mbit/s	Open-collector (Inverter logic)	5 mA	3750 Vrms	○ / ○		○(1)		
TLP2366*		**SO6** (reinforced insulation) V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max)	20 Mbit/s	Totem pole output (Inverter logic)	3.5 mA	3750 Vrms	△ / △		△(1)		
TLP2368*		**SO6** (reinforced insulation) V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max)	20 Mbit/s	Open-collector (Inverter logic)	5 mA	3750 Vrms	△ / △		△(1)		
TLP2466*		**SO8** V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max)	20 Mbit/s	Totem pole output (Inverter logic)	3.5 mA	3750 Vrms	△ / △		△(1)		
TLP2468		**SO8** V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max)	20 Mbit/s	Open-collector (Inverter logic)	5 mA	3750 Vrms	○ / ○		○(1)		
TLP2766*		**SDIP6** V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max)	20 Mbit/s	Totem pole output (Inverter logic)	3.5 mA	5000 Vrms	△ / △		△		
TLP2768*		**SDIP6** V_{CC} = 3.3 or 5 V T_{opr} = 125˚C (max)	20 Mbit/s	Open-collector (Inverter logic)	5 mA	5000 Vrms	△ / △		△		
TLP2166A		**SO8** Propagation delay time: 75 ns V_{CC} = 3.3 V Dual-channel version	15 Mbit/s	Totem pole output (Inverter logic)	3 mA	2500 Vrms	○ / ○		○(1)		

Photocouplers for Logic Signal Transmission at 10 Mbit/s (Typ.)

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form	I_{FHL}, I_{FLH} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP513		**DIP6** 6-pin package version of the TLP552 V_{CC} = 5 V	120 ns (T_{opr} = 25˚C)	Open-collector	5 mA	2500 Vrms	○ / –				
TLP552		**DIP8** Logic output V_{CC} = 5 V	120 ns (T_{opr} = 25˚C)	Open-collector	5 mA	2500 Vrms	○ / –				
TLP554		**DIP8** High CMR version of the TLP552 V_{CC} = 5 V	120 ns (T_{opr} = 25˚C)	Open-collector	5 mA	2500 Vrms	○ / ○				
TLP2601		**DIP8** High CMR V_{CC} = 5 V	75 ns (T_{opr} = 25˚C)	Open-collector	5 mA	2500 Vrms	○ / ○				

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Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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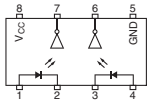
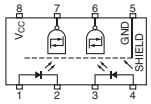
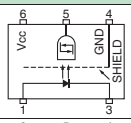
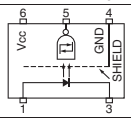
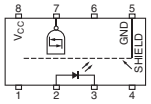
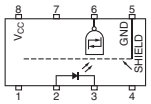
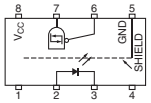
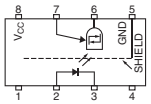
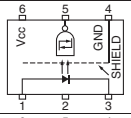
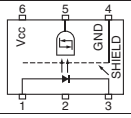
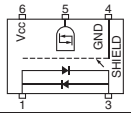
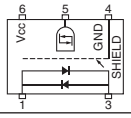
Photocouplers for Logic Signal Transmission at 10 Mbit/s (Typ.) (Continued)

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form	I_{FHL}, I_{FLH} (Max)	BVs	Safety Standards[2]				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP2630		**DIP8** Dual-channel version of the 6N137 and the TLP552 V_{CC} = 5 V	75 ns (Topr = 25°C)	Open-collector	5 mA	2500 Vrms	○ / ○				
TLP2631		**DIP8** High CMR Dual-channel version of the TLP554 V_{CC} = 5 V	75 ns (Topr = 25°C)	Open-collector	5 mA	2500 Vrms	○ / ○				

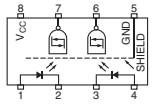
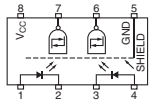
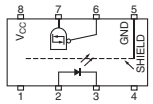
Photocouplers for Logic Signal Transmission at 5 Mbit/s (Typ.)

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form	I_{FHL}, I_{FLH} (Max)	BVs	Safety Standards[2]				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP105		Mini-flat **MFSOP6** V_{CC} = 4.5 to 20 V Low input operation IPM drive	250 ns	Totem pole output (Buffer logic)	1.6 mA	3750 Vrms	○ / ○	○ [1]	○ [1]		
TLP108		Mini-flat **MFSOP6** V_{CC} = 4.5 to 20 V Low input operation IPM drive	250 ns	Totem pole output (Inverter logic)	1.6 mA	3750 Vrms	○ / ○	○ [1]	○ [1]		
TLP2405		**SO8** V_{CC} = 4.5 to 20 V Low input operation IPM drive	250 ns	Totem pole output (Buffer logic)	1.6 mA	3750 Vrms	○ / ○		○ [1]		
TLP2408		**SO8** V_{CC} = 4.5 to 20 V Low input operation IPM drive	250 ns	Totem pole output (Inverter logic)	1.6 mA	3750 Vrms	○ / ○		○ [1]		
TLP555		**DIP8** Low input current V_{CC} = 4.5 to 20 V	400 ns (Topr = 25°C)	3-state (Buffer logic)	1.6 mA	2500 Vrms	○ / ○				
TLP558		**DIP8** Inverting logic version of the TLP555 V_{CC} = 4.5 to 20 V	400 ns (Topr = 25°C)	3-state (Inverter logic)	1.6 mA	2500 Vrms	○ / ○				
TLP715 **TLP715F**		**SDIP6** IPM drive High CMR V_{CC} = 4.5 to 20 V	250 ns	Totem pole output (Buffer logic)	3 mA	5000 Vrms	○ / ○	○	○		
TLP718 **TLP718F**		**SDIP6** IPM drive High CMR V_{CC} = 4.5 to 20 V	250 ns	Totem pole output (Inverter logic)	3 mA	5000 Vrms	○ / ○	○	○		
TLP2095		Mini-flat **MFSOP6** Dual polarity input version of the TLP105 V_{CC} = 3 to 20 V	250 ns	Totem pole output (Buffer logic)	3 mA	3750 Vrms	○ / ○		○ [1]		
TLP2098		Mini-flat **MFSOP6** Dual polarity input version of the TLP108 V_{CC} = 3 to 20 V	250 ns	Totem pole output (Inverter logic)	3 mA	3750 Vrms	○ / ○		○ [1]		

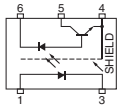
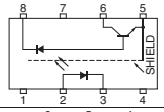
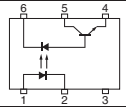
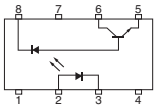
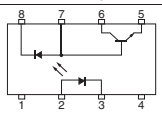
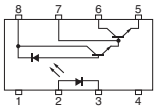
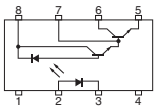
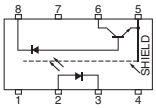
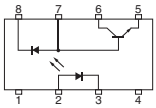
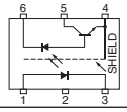
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

Photocouplers for Logic Signal Transmission at 5 Mbit/s (Typ.) (Continued)

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form	I_{FHL}, I_{FLH} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP2105		**SO8** Dual-channel version for the TLP105 V_{CC} = 4.5 to 20 V	250 ns	Totem pole output (Buffer logic)	1.6 mA	3750 Vrms	○ / ○	○ (1)	○ (1)		
TLP2108		**SO8** Dual-channel version for the TLP108 V_{CC} = 4.5 to 20 V	250 ns	Totem pole output (Inverter logic)	1.6 mA	3750 Vrms	○ / ○	○ (1)	○ (1)		
TLP2200		**DIP8** Low input current V_{CC} = 4.5 to 20 V	400 ns	3-state (Buffer logic)	1.6 mA	2500 Vrms	○ / ○				

Photocouplers for Logic Signal Transmission at 1 Mbit/s (Typ.)

Part Number	Pin Configuration	Features	Data Rate (NRZ) (Typ.)	CTR		BVs	Safety Standards(2)				
					@I_F		UL/cUL	TÜV	VDE	BSI	IEC
TLP109		**SO6** (reinforced insulation)	1 Mbit/s	20% (min)	16 mA	3750 Vrms	○ / ○		○ (1)		
TLP2409		**SO8** Topr = 125˚C(max) SO8 version of the TLP109	1 Mbit/s	20% (min)	16 mA	3750 Vrms	○ / ○		○ (1)		
TLP512		**DIP6** 6-pin package version of the TLP550	1 Mbit/s	20% (min)	16 mA	2500 Vrms	○ / –				
TLP550		**DIP8** High CMR	1 Mbit/s	10% (min) (19% min for rank 0)	16 mA	2500 Vrms	○ / ○				
TLP551		**DIP8** Internal base connection	1 Mbit/s	10% (min) (19% min for rank 0)	16 mA	2500 Vrms	○ / ○				
TLP2403		**SO8** Low input current SO8 version of the TLP553	300 kbit/s	400% (min)	0.5 mA	3750 Vrms	○ / ○		○ (1)		
TLP553		**DIP8** Low input drive current	300 kbit/s	400% (min)	0.5 mA	2500 Vrms	○ / –				
TLP559		**DIP8** High CMR version of the TLP550	1 Mbit/s	20% (min)	16 mA	2500 Vrms	○ / ○				
TLP651		**DIP8** Internal base connection	1 Mbit/s	10% (min) (19% min for rank 0)	16 mA	5000 Vrms	○ / ○				
TLP719 **TLP719F**		**SDIP6** High CMR	1 Mbit/s	20% (min)	16 mA	5000 Vrms	○ / ○	○	○		

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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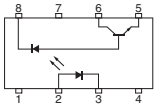
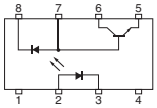
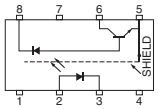
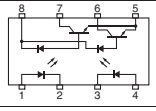
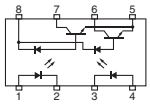
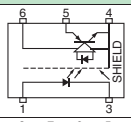
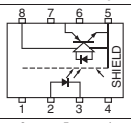
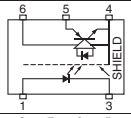
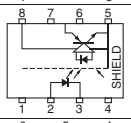
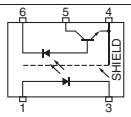
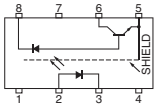
Photocouplers for Logic Signal Transmission at 1 Mbit/s (Typ.) (Continued)

Part Number	Pin Configuration	Features	Data Rate (NRZ) (Typ.)	CTR	@IF	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP750 **TLP750F**		**DIP8** High CMR SEMKO-approved	1 Mbit/s	10% (min) (19% min for rank 0)	16 mA	5000 Vrms	○ / ○	△	○	◎	◎
TLP751 **TLP751F**		**DIP8** Internal base connection SEMKO-approved	1 Mbit/s	10% (min)	16 mA	5000 Vrms	○ / ○	△	○	◎	◎
TLP759 **TLP759F**		**DIP8** IEC60950-compliant version of the TLP559 SEMKO-approved	1 Mbit/s	20% (min)	16 mA	5000 Vrms	○ / ○	△	○	◎	◎
TLP2530		**DIP8** Dual-channel version of the 6N135 and the TLP550	1 Mbit/s	7% (min)	16 mA	2500 Vrms	○ / ○				
TLP2531		**DIP8** Dual-channel version of the 6N136 and the TLP550	1 Mbit/s	19% (min)	16 mA	2500 Vrms	○ / ○				

IPM-Drive Photocouplers

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form/CTR	IFHL, IFLH (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP104		**SO6** (reinforced insulation) IPM drive T_{opr} = 125°C (max)	550 ns	Open-collector	5 mA	3750 Vrms	○ / ○		○(1)		
TLP2404		**SO8** IPM drive T_{opr} = 125°C (max) SO8 version of the TLP104	550 ns	Open-collector (Inverter logic)	5 mA	3750 Vrms	○ / ○		○(1)		
TLP714 **TLP714F**		**SDIP6** (reinforced insulation) IPM drive T_{opr} = 125°C (max) High isolation voltage	550 ns	Open-collector (Inverter logic)	5 mA	5000 Vrms	○ / ○		○		
TLP754* **TLP754F***		**DIP8** IPM drive	550 ns	Open-collector	5 mA	5000 Vrms	△ / △		△		
TLP109(IGM)		**SO6** (reinforced insulation) IPM drive High CMR	800 ns	25% (min)	10 mA	3750 Vrms	○ / ○		○(1)		
TLP2409(IGM)		**SO8** IPM drive High CMR	800 ns	20% (min)	10 mA	3750 Vrms	△ / △		△(1)		

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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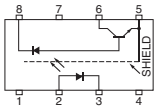
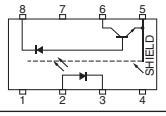
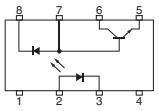
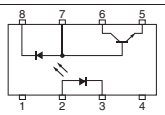
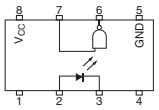
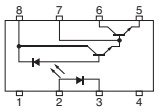
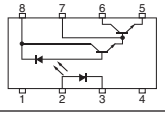
IPM-Drive Photocouplers (Continued)

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output Form/CTR	I_{FHL}, I_{FLH} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP559(IGM)		**DIP8** IPM drive High CMR	800 ns	25% (min)	10 mA	2500 Vrms	○ / ○				
TLP759(IGM) **TLP759F(IGM)**		**DIP8** IPM drive High CMR SEMKO-approved	800 ns	25% (min)	10 mA	5000 Vrms	○ / ○	△	○	◎	◎

JEDEC-Compliant Photocouplers

Part Number	Pin Configuration	Features	Data Rate (NRZ) (Typ.)	CTR	I_{FHL}, I_{FLH} (Max)	BVs	Safety Standards(2)				
							UL/cUL	TÜV	VDE	BSI	IEC
6N135		JEDEC-compliant	1 Mbit/s	7% (min)	16 mA	2500 Vrms	○ / –				
6N136		JEDEC-compliant	1 Mbit/s	19% (min)	16 mA	2500 Vrms	○ / –				
6N137		JEDEC-compliant	10 Mbit/s	700% (Typ.)	5 mA	2500 Vrms	○ / –				
6N138		JEDEC-compliant High CTR	300 kbit/s	300% (min)	1.6 mA	2500 Vrms	○ / –				
6N139		JEDEC-compliant High CTR	300 kbit/s	400% (min)	0.5 mA	2500 Vrms	○ / –				

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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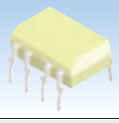
3 Photocouplers for IGBT/MOSFET Gate Drive

Output Peak Current \ Package				
	SDIP6	**DIP8**	**SO6**	**SO8**
± 0.25 A		**TLP557**		
± 0.45 A (max)	**TLP705** (High speed)			
± 0.6 A (max)	**TLP701** **TLP701A*** **TLP701H*** **TLP705A***	**TLP351** **TLP351A*** **TLP351E** **TLP351H***	**TLP151*** **TLP151A*** **TLP155E**	**TLP2451** **TLP2451A***
± 2.0 A (max)	**TLP700** **TLP700H***			
± 2.5 A (max)		**TLP350** **TLP350H*** **TLP352***		

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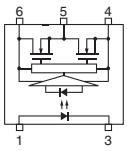
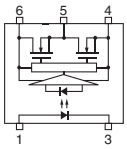
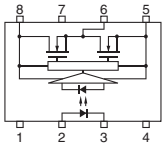
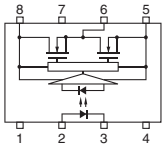
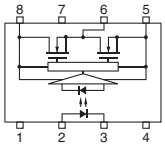
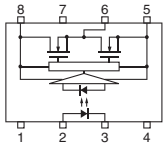
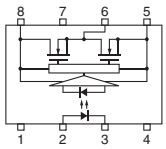
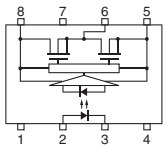
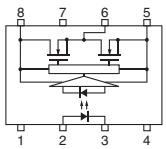
4 Selection Guide

Photocouplers for IGBT/MOSFET Gate Drive

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output	I_{FHL} (Max)	BVs	Safety Standards (2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP151*		**SO6** (reinforced Insulation) T_{opr} = 110°C (max) Direct drive of a small-power IGBT/MOSFET	0.7 μs	Peak output current (max): ±0.6 A	5 mA	3750 Vrms	○ / ○		○ (1)		
TLP151A*			0.5 μs				○ / ○		△ (1)		
TLP155E		**SO6** (reinforced Insulation) T_{opr} = 100°C (max) Direct drive of a small-power IGBT/MOSFET	0.2 μs	Peak output current (max): ±0.6 A	7.5 mA	3750 Vrms	○ / ○		○		
TLP2451		**SO8** T_{opr} = 125°C (max) Direct drive of a small-power IGBT/MOSFET High CMR	0.7 μs	Peak output current (max): ±0.6 A	5 mA	3750 Vrms	○ / ○		○		
TLP2451A*			0.5 μs				○ / ○		△		
TLP350 **TLP350F**		**DIP8** Direct drive of a medium-power IGBT/MOSFET High CMR Low power dissipation	0.5 μs	Peak output current (max): ±2.5 A	5 mA	3750 Vrms	○ / ○	○	○		
TLP350H* **TLP350HF***		**DIP8** T_{opr} = 125°C (max) Direct drive of a medium-power IGBT/MOSFET High CMR	0.5 μs	Peak output current (max): ±2.5 A	5 mA	3750 Vrms	○ / ○		○		
TLP351 **TLP351F**		**DIP8** Direct drive of a medium-power IGBT/MOSFET Low power dissipation	0.7 μs	Peak output current (max): ±0.6 A	5 mA	3750 Vrms	○ / ○	○	○		
TLP351A* **TLP351AF***		**DIP8** Direct drive of a small-power IGBT/MOSFET Low power dissipation	0.7 μs	Peak output current (max): ±0.6 A	5 mA	3750 Vrms	△ / △				
TLP351H* **TLP351HF***		**DIP8** T_{opr} = 125°C (max) Direct drive of a small-power IGBT/MOSFET High CMR	0.7 μs	Peak output current (max): ±6.0 A	5 mA	3750 Vrms	○ / ○		○		
TLP352* **TLP352F***		**DIP8** Direct drive of a medium-power IGBT/MOSFET Low power dissipation T_{opr} = 125°C (max)	0.2 μs	Peak output current (max): ±2.5 A	5 mA	3750 Vrms	△ / △				

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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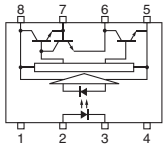
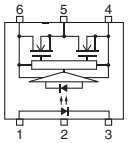
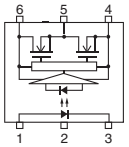
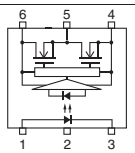
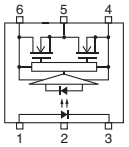
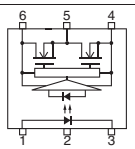
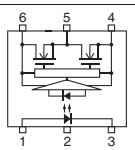
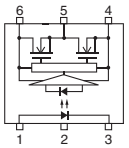
Photocouplers for IGBT/MOSFET Gate Drive (Continued)

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output	I_{FHL} (Max)	BVs	Safety Standards (2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP557		**DIP8** Direct drive of a power transistor	5 μs	Constant current output : 0.25 A	5 mA	2500 Vrms	○ / ○				
TLP700 **TLP700F**		**SDIP6** Direct drive of a medium-power IGBT/MOSFET Low power dissipation	0.5 μs	Peak output current (max): ±2.0 A	5 mA	5000 Vrms	○ / ○	○	△		
TLP700H* **TLP700HF***		**SDIP6** T_{opr} = 125°C (max) Direct drive of a medium-power IGBT/MOSFET High CMR	0.5 μs	Peak output current (max): ±2.0 A	5 mA	5000 Vrms	○ / ○		○		
TLP701 **TLP701F**		**SDIP6** Direct drive of a medium-power IGBT/MOSFET Low power dissipation	0.7 μs	Peak output current (max): ±0.6 A	5 mA	5000 Vrms	○ / ○	○	○		
TLP701A* **TLP701AF***		**SDIP6** Direct drive of a small-power IGBT/MOSFET Low power dissipation	0.7 μs	Peak output current (max): ±0.6 A	5 mA	5000 Vrms	○ / ○		○		
TLP701H* **TLP701HF***		**SDIP6** T_{opr} = 125°C (max) Direct drive of a small-power IGBT/MOSFET High CMR	0.7 μs	Peak output current (max): ±0.6 A	5 mA	5000 Vrms	○ / ○		○		
TLP705 **TLP705F**		**SDIP6** Direct drive of a small-power IGBT/MOSFET High speed (250 kHz) Low power dissipation	0.2 μs	Peak output current (max): ±0.45 A	8 mA	5000 Vrms	○ / ○	○	○		
TLP705A* **TLP705AF***		**SDIP6** Direct drive of a small-power IGBT/MOSFET High speed Low power dissipation	0.2 μs	Peak output current (max): ±0.6 A	7.5 mA	5000 Vrms	○ / ○		○		

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Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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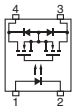
4 Photorelays (1-Form-A and 2-Form-A)

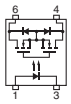
Features			Package								
Off-State Voltage (max) (V)	On-State Resistance (max) (Ω)	On-State Current (max) (A)	USOP4	SSOP4	SO6	2.54SOP4	2.54SOP6	2.54SOP8	DIP4	DIP6	DIP8
20	8	0.16		TLP3230		TLP3130					
	5	0.2		TLP3250							
	1.2	0.3				TLP3131					
	1.2	0.45		TLP3231							
	0.22	0.9		TLP3203							
	0.05	2.5					TLP3100				
	0.05	4								TLP3543*	
40	35	0.08		TLP3213		TLP3113					
	15	0.12		TLP3216		TLP3116					
	14	0.12		TLP3240							
	10	0.14		TLP3241							
	3	0.25		TLP3214		TLP3114					
	1.5	0.3		TLP3215		TLP3115					
	0.13	1				TLP3123					
	0.06	2.5					TLP3102				
	0.06	3.5								TLP3544*	
50	1.5	0.3	TLP3375	TLP3275							
60	50	0.07				TLP173A†					
	50	0.1			TLP175A*						
	2	0.4				TLP170A TLP172A TLP176A	TLP192A TLP197A	TLP202A◆ TLP206A◆			
	2	0.5							TLP220A* TLP222A TLP227A	TLP598AA TLP592A TLP597A	TLP222A-2◆ TLP227A-2◆
	1.5	0.4		TLP3212							
	1.2	0.35				TLP3110					
	1.1	0.5							TLP225A		
	1	0.4	TLP3312								
	0.7	1				TLP3122					
	0.2	1.5							TLP221A*		
	0.1	2.5								TLP3542	
	0.07	2.3					TLP3103				
	0.07	3								TLP3545*	
80	25	0.04		TLP3218		TLP3118					
	20	0.1				TLP3111					
	12	0.12		TLP3217							
	8	0.2		TLP3219		TLP3119					
	1.2	0.35				TLP3121					
	0.15	1.25					TLP3120				
100	14	0.08		TLP3220							
	0.2	1.4					TLP3105				
	0.2	2								TLP3546*	
200	50	0.05				TLP179D	TLP199D	TLP209D◆			
	8	0.2				TLP170D TLP176D	TLP197D	TLP200D◆			
	8	0.25							TLP220D*		
350	50	0.1				TLP170G			TLP220G*		
	35	0.11				TLP172G	TLP192G	TLP202G◆			
	35	0.12				TLP174G TLP176G	TLP197G	TLP206G◆	TLP222G TLP224G TLP227G	TLP592G TLP597G	TLP222G-2◆ TLP224G-2◆ TLP227G-2◆
400	35	0.12				TLP176GA	TLP197GA	TLP206GA◆	TLP227GA TLP220GA*	TLP597GA TLP797GA	TLP227GA-2◆
	12	0.15								TLP598GA TLP798GA	
	35	0.12				TLP174GA			TLP224GA		TLP224GA-2◆
	4	0.2						TLP3125			
600	35	0.1								TLP797J	
	60	0.09				TLP170J			TLP220J*		

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative. ◆ Dual-channel †: MFSOP6

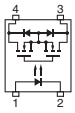
MOSFET-Output Photorelays, 1-Form-A in a USOP4 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP3312*		**USOP4** C_{OFF}: 20 pF (typ.)	3 mA	1 Ω	5 mA	0.4 A	60 V	500 Vrms					
TLP3375*		**USOP4** C_{OFF}: 12 pF (typ.)	3 mA	1.5 Ω	5 mA	0.3 A	50 V	500 Vrms					

MOSFET-Output Photorelays, 1-Form-A in a SO6 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP175A*		**SO6** General-purpose Low trigger current	1 mA	50 Ω	2 mA	0.1 A	60 V	3750 Vrms	△ / △				

MOSFET-Output Photorelays, 1-Form-A in a SSOP4 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP3203		**SSOP4** C_{OFF}: 40 pF (typ.)	3 mA	0.22 Ω	5 mA	0.9 A	20 V	1500 Vrms	○ / –				
TLP3212		**SSOP4** C_{OFF}: 20 pF (typ.)	5 mA	1.5 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / –				
TLP3213		**SSOP4** C_{OFF}: 0.6 pF (typ.)	4 mA	35 Ω	5 mA	0.08 A	40 V	1500 Vrms	○ / –				
TLP3214		**SSOP4** C_{OFF}: 5 pF (typ.)	4 mA	3 Ω	5 mA	0.25 A	40 V	1500 Vrms	○ / –				
TLP3215		**SSOP4** C_{OFF}: 10 pF (typ.)	4 mA	1.5 Ω	5 mA	0.3 A	40 V	1500 Vrms	○ / –				
TLP3216		**SSOP4** C_{OFF}: 1 pF (typ.)	4 mA	15 Ω	5 mA	0.12 A	40 V	1500 Vrms	○ / –				
TLP3217		**SSOP4** C_{OFF}: 5 pF (typ.)	5 mA	12 Ω	10 mA	0.12 A	80 V	1500 Vrms	○ / –				
TLP3218		**SSOP4** C_{OFF}: 2.5 pF (typ.)	5 mA	25 Ω	5 mA	0.04 A	80 V	1500 Vrms	△ / –				
TLP3219		**SSOP4** C_{OFF}: 6.5 pF (typ.)	3 mA	8 Ω	5 mA	0.2 A	80 V	1500 Vrms	△ / –				
TLP3220		**SSOP4** C_{OFF}: 6 pF (typ.)	5 mA	14 Ω	10 mA	0.08 A	100 V	1500 Vrms	○ / –				
TLP3230		**SSOP4** C_{OFF}: 1 pF (typ.)	4 mA	8 Ω	5 mA	0.16 A	20 V	1500 Vrms	○ / –				
TLP3231		**SSOP4** C_{OFF}: 5 pF (typ.)	4 mA	1.2 Ω	5 mA	0.45 A	20 V	1500 Vrms	○ / –				
TLP3240		**SSOP4** C_{OFF}: 0.45 pF (typ.)	3 mA	14 Ω	5 mA	0.12 A	40 V	1500 Vrms	○ / –				
TLP3241		**SSOP4** C_{OFF}: 0.7 pF (typ.)	3 mA	10 Ω	5 mA	0.14 A	40 V	1500 Vrms	○ / –				
TLP3250		**SSOP4** C_{OFF}: 0.8 pF (typ.)	3 mA	5 Ω	5 mA	0.2 A	20 V	1500 Vrms	○ / –				
TLP3275		**SSOP4** C_{OFF}: 12 pF (typ.)	3 mA	1.5 Ω	5 mA	0.3 A	50 V	1500 Vrms	○ / –				

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Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
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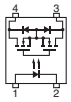
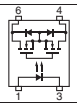
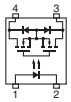
4 Selection Guide

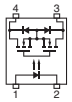
MOSFET-Output Photorelays, 1-Form-A in a 2.54SOP4 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP170A		**2.54SOP4** Lead pitch: 2.54 mm Low trigger LED current	1 mA	2 Ω	2 mA	0.4 A	60 V	1500 Vrms	○ / ○				
TLP170D		**2.54SOP4** Lead pitch: 2.54 mm Low trigger LED current	1 mA	8 Ω	2 mA	0.2 A	200 V	1500 Vrms	○ / ○				
TLP170G		**2.54SOP4** Lead pitch: 2.54 mm Low trigger LED current	1 mA	50 Ω	2 mA	0.1 A	350 V	1500 Vrms	○ / ○				
TLP170J		**2.54SOP4** Lead pitch: 2.54 mm Low trigger LED current	1 mA	60 Ω	2 mA	0.09 A	600 V	1500 Vrms	○ / ○				
TLP172A		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / ○				
TLP172G		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 30 pF (typ.)	3 mA	35 Ω	5 mA	0.11 A	350 V	1500 Vrms	○ / ○				
TLP173A		Mini-flat **MFSOP6** Low trigger LED current	2 mA	50 Ω	3 mA	0.07 A	60 V	3750 Vrms	○ / ○	△	△		
TLP174G		**2.54SOP4** Lead pitch: 2.54 mm SEMKO-approved Current-limiting function Limit current: 150 to 300 mA	3 mA	35 Ω	5 mA	0.12 A	350 V	1500 Vrms	○ / ○				△
TLP174GA		**2.54SOP4** Lead pitch: 2.54 mm Current-limiting function Limit current: 150 to 300 mA	3 mA	35 Ω	5 mA	0.12 A	400 V	1500 Vrms	○ / ○				
TLP176A		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / ○	△	○ (1)		
TLP176D		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 100 pF (typ.)	3 mA	8 Ω	5 mA	0.2 A	200 V	1500 Vrms	○ / ○	△	○ (1)		
TLP176G		**2.54SOP4** Lead pitch: 2.54 mm SEMKO-approved C_{OFF}: 40 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	350 V	1500 Vrms	○ / ○	△	○ (1)	○	○
TLP176GA		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 70 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	400 V	1500 Vrms	○ / ○			○	○
TLP179D		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 15 pF (typ.)	3 mA	50 Ω	5 mA	0.05 A	200 V	1500 Vrms	○ / ○				
TLP3110		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 100 pF (typ.)	4 mA	1.2 Ω	5 mA	0.35 A	60 V	1500 Vrms	○ / –				
TLP3111		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 11 pF (typ.)	4 mA	20 Ω	5 mA	0.1 A	80 V	1500 Vrms	○ / –				
TLP3113		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 0.6 pF (typ.)	4 mA	35 Ω	5 mA	0.08 A	40 V	1500 Vrms	○ / –				
TLP3114		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 5 pF (typ.)	4 mA	3 Ω	5 mA	0.25 A	40 V	1500 Vrms	○ / –				
TLP3115		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 10 pF (typ.)	4 mA	1.5 Ω	5 mA	0.3 A	40 V	1500 Vrms	○ / –				
TLP3116		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 1 pF (typ.)	4 mA	15 Ω	5 mA	0.12 A	40 V	1500 Vrms	○ / –				
TLP3118		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 2.5 pF (typ.)	3 mA	25 Ω	5 mA	0.04 A	80 V	1500 Vrms	○ / –				

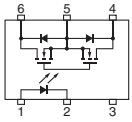
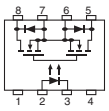
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

MOSFET-Output Photorelays, 1-Form-A in a 2.54SOP4 Package (Continued)

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP3119		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 6.5 pF (typ.)	3 mA	8 Ω	5 mA	0.2 A	80 V	1500 Vrms	○ / –				
TLP3121		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 30 pF (typ.)	4 mA	1.2 Ω	5 mA	0.35 A	80 V	1500 Vrms	○ / ○				
TLP3122		**2.54SOP4** Lead pitch: 2.54 mm I_{ON}: 1 A (max)@Ta: up to 50˚C C_{OFF}: 90 pF (typ.)	3 mA	0.7 Ω	5 mA	1.0 A	60 V	1500 Vrms	○ / ○				
TLP3123		**2.54SOP4** Lead pitch: 2.54 mm I_{ON}: 1 A (max)@Ta: up to 50˚C C_{OFF}: 300 pF (typ.)	3 mA	0.13 Ω	5 mA	1.0 A	40 V	1500 Vrms	○ / ○				
TLP3130		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 1 pF (typ.)	4 mA	8 Ω	5 mA	0.16 A	20 V	1500 Vrms	○ / –				
TLP3131		**2.54SOP4** Lead pitch: 2.54 mm C_{OFF}: 5 pF (typ.)	4 mA	1.2 Ω	5 mA	0.3 A	20 V	1500 Vrms	○ / –				

MOSFET-Output Photorelays, 1-Form-A in a 2.54SOP6 or 2.54SOP8 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP192A		**2.54SOP6** Lead pitch: 2.54 mm C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / ○				
TLP192G		**2.54SOP6** Lead pitch: 2.54 mm C_{OFF}: 30 pF (typ.)	3 mA	35 Ω	5 mA	0.11 A	350 V	1500 Vrms	○ / ○				
TLP197A		**2.54SOP6** Lead pitch: 2.54 mm C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / ○				
TLP197D		**2.54SOP6** Lead pitch: 2.54 mm C_{OFF}: 100 pF (typ.)	3 mA	8 Ω	5 mA	0.2 A	200 V	1500 Vrms	○ / ○				
TLP197G		**2.54SOP6** Lead pitch: 2.54 mm SEMKO-approved	3 mA	35 Ω	5 mA	0.12 A	350 V	1500 Vrms	○ / ○	△	○ (1)	○	○
TLP197GA		**2.54SOP6** Lead pitch: 2.54 mm C_{OFF}: 70 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	400 V	1500 Vrms	○ / –			○	○
TLP199D		**2.54SOP6** Lead pitch: 2.54 mm C_{OFF}: 15 pF (typ.)	3 mA	50 Ω	5 mA	0.05 A	200 V	1500 Vrms	○ / ○				
TLP3100		**2.54SOP6** Lead pitch : 2.54 mm I_{ON}: 2.5 A (max) @Ta: up to 50˚C	3 mA	0.05 Ω	5 mA	2.5 A	20 V	1500 Vrms	○ / ○				
TLP3102		**2.54SOP6** I_{ON} (DC) = 5 A (max); C-connection	3 mA	0.06 Ω	5 mA	2.5 A	40 V	1500 Vrms	△ /△				
TLP3103		**2.54SOP6** I_{ON} (DC) = 4.6 A (max); C-connection	3 mA	0.07 Ω	5 mA	2.3 A	60 V	1500 Vrms	△ /△				
TLP3105		**2.54SOP6** I_{ON} (DC) = 2.8 A (max); C-connection	3 mA	0.2 Ω	5 mA	1.4 A	100 V	1500 Vrms	△ /△				
TLP3120		**2.54SOP6** Lead pitch : 2.54 mm I_{ON}: 1.25 A (max)	5 mA	0.15 Ω	5 mA	1.25 A	80 V	1500 Vrms	○ / ○				
TLP3125		**2.54SOP8** Lead pitch: 2.54 mm C_{OFF}: 410 pF (typ.)	3 mA	4 Ω	5 mA	0.2 A	400 V	1500 Vrms	○ / ○				

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
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TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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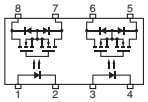
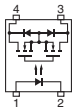
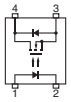
4 Selection Guide

MOSFET-Output Photorelays, 2-Form-A in a 2.54SOP8 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP200D		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP176D	3 mA	8 Ω	5 mA	0.2 A	200 V	1500 Vrms	○ / –				
TLP202A		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP172A	3 mA	2 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / –				
TLP202G		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP172G	3 mA	50 Ω	5 mA	0.11 A	350 V	1500 Vrms	○ / –				
TLP206A		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP176A	3 mA	2 Ω	5 mA	0.4 A	60 V	1500 Vrms	○ / –				
TLP206G		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP176G	3 mA	35 Ω	5 mA	0.12 A	350 V	1500 Vrms	○ / –	△	○ (1)	○	○
TLP206GA		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP176GA	3 mA	35 Ω	5 mA	0.12 A	400 V	1500 Vrms	○ / –			○	○
TLP209D		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP179D	3 mA	50 Ω	5 mA	0.05 A	200 V	1500 Vrms	○ / –				

MOSFET-Output Photorelays, 1-Form-A in a DIP4 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP220A*		**DIP4** General-purpose Reinforced insulation	2 mA	2 Ω	5 mA	±0.5 A	60 V	5000 Vrms	△ /△		△	△	
TLP220D*		**DIP4** General-purpose Reinforced insulation	2 mA	8 Ω	5 mA	±0.25 A	200 V	5000 Vrms	△ /△		△	△	
TLP220G*		**DIP4** General-purpose Reinforced insulation	2 mA	50 Ω	5 mA	±0.1 A	350 V	5000 Vrms	△ /△		△	△	
TLP220GA*		**DIP4** General-purpose Reinforced insulation	2 mA	35 Ω	5 mA	±0.12 A	400 V	5000 Vrms	△ /△		△	△	
TLP220J*		**DIP4** General-purpose Reinforced insulation	2 mA	60 Ω	5 mA	±0.09 A	600 V	5000 Vrms	△ /△		△	△	
TLP221A*		**DIP4** General-purpose Reinforced insulation	2 mA	0.2 Ω	5 mA	±1.5 A	60 V	5000 Vrms	△ /△		△	△	
TLP222A		**DIP4** C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / ○				
TLP222G		**DIP4** C_{OFF}: 30 pF (typ.)	3 mA	50 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / ○			○	○
TLP224G		**DIP4** SEMKO-approved Current-limiting function Limit current: 150 to 300 mA	3 mA	35 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / ○			◎	◎
TLP224GA		**DIP4** For modems Current-limiting function Limit current: 150 to 300 mA	3 mA	35 Ω	5 mA	0.12 A	400 V	2500 Vrms	○ / –				△
TLP227A		**DIP4** SEMKO-approved C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / ○				△
TLP227G		**DIP4** SEMKO-approved C_{OFF}: 40 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / ○	△	○	○	○
TLP227GA		**DIP4** SEMKO-approved	3 mA	35 Ω	5 mA	0.12 A	400 V	2500 Vrms	○ / –				△
TLP225A		**DIP4** Designed for DC output modules	5 mA	1.1 Ω	10 mA	0.5 A	60 V	2500 Vrms	○ / ○				

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
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Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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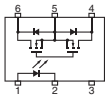
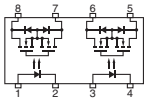
MOSFET-Output Photorelays, 1-Form-A in a DIP6 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP592A		**DIP6** C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / –				
TLP592G		**DIP6** C_{OFF}: 30 pF (typ.)	3 mA	50 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / –				
TLP597A		**DIP6** SEMKO-approved C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / –				△
TLP597G		**DIP6** SEMKO-approved C_{OFF}: 40 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / –	△	○	○	○
TLP597GA		**DIP6** SEMKO-approved C_{OFF}: 70 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	400 V	2500 Vrms	○ / –				△
TLP598AA		**DIP6** C_{OFF}: 130 pF (typ.)	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / –				
TLP598GA		**DIP6**	3 mA	12 Ω	5 mA	0.15 A	400 V	2500 Vrms	○ / –				
TLP797GA **TLP797GAF**		**DIP6** C_{OFF}: 40 pF (typ.)	3 mA	35 Ω	5 mA	0.12 A	400 V	5000 Vrms	○ / –	△	△	△	△
TLP797J **TLP797JF**		**DIP6** C_{OFF}: 120 pF (typ.)	5 mA	35 Ω	10 mA	0.1 A	600 V	5000 Vrms	○ / ○	△	△	△	△
TLP798GA		**DIP6**	5 mA	12 Ω	5 mA	0.15 A	400 V	5000 Vrms	○ / –	△	△	△	△
TLP3542		**DIP6** High output current: 2.5 A (max) C_{OFF}: 400 pF (typ.)	3 mA	0.1 Ω	10 mA	2.5 A	60 V	2500 Vrms	○ / ○				
TLP3543*		**DIP6** High output current: 4 A (max)	3 mA	0.05 Ω	5 mA	4 A	20 V	2500 Vrms	△ /△				
TLP3544*		**DIP6** High output current: 3.5 A (max)	3 mA	0.06 Ω	5 mA	3.5 A	40 V	2500 Vrms	△ /△				
TLP3545*		**DIP6** High output current: 3 A (max)	3 mA	0.07 Ω	5 mA	3 A	60 V	2500 Vrms	△ /△				
TLP3546*		**DIP6** High output current: 2 A (max)	3 mA	0.2 Ω	5 mA	2 A	100 V	2500 Vrms	△ /△				

MOSFET-Output Photorelays, 2-Form-A in a DIP8 Package

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP222A-2		**DIP8** Dual-channel version of the TLP222A	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / ○				
TLP222G-2		**DIP8** Dual-channel version of the TLP222G SEMKO-approved	3 mA	50 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / ○			○	○
TLP224G-2		**DIP8** Dual-channel version of the TLP224G SEMKO-approved	3 mA	35 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / ○			○	○
TLP224GA-2		**DIP8** Current-limiting function Limit current: 150 to 300 mA	3 mA	35 Ω	5 mA	0.12 A	400 V	2500 Vrms	○ / –				
TLP227A-2		**DIP8** Dual-channel version of the TLP227A SEMKO-approved	3 mA	2 Ω	5 mA	0.5 A	60 V	2500 Vrms	○ / ○				△

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Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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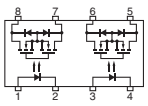
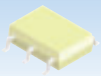
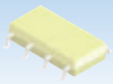
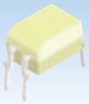
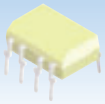
4 Selection Guide

MOSFET-Output Photorelays, 2-Form-A in a DIP8 Package (Continued)

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)	@I_F	I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
									UL/cUL	TÜV	VDE	BSI	IEC
TLP227G-2		**DIP8** Dual-channel version of the TLP227G SEMKO-approved	3 mA	35 Ω	5 mA	0.12 A	350 V	2500 Vrms	○ / ○	△	○	○	○
TLP227GA-2		**DIP8** Dual-channel version of the TLP227GA SEMKO-approved	3 mA	35 Ω	5 mA	0.12 A	400 V	2500 Vrms	○ / –				△

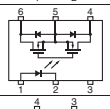
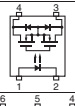
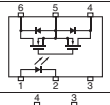
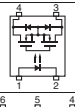
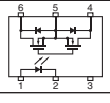
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

5 Photorelays (1-Form-B, 2-Form-B and 1-Form-A/1-Form-B)

Features \ Package	Off-State Voltage (max) (V)	On-State Resistance (max) (Ω)	On-State Current (max) (A)	2.54SOP4	 2.54SOP6	 2.54SOP8	 DIP4	DIP6	 DIP8
1-Form-B, 2-Form-B	350	50	0.09	**TLP4172G**	**TLP4192G**	**TLP4202G***			
		50	0.10				**TLP4222G**	**TLP4592G**	**TLP4222G-2***
		25	0.12	**TLP4176G**	**TLP4197G**	**TLP4206G***			
		25	0.15				**TLP4227G**	**TLP4597G**	**TLP4227G-2***
1-Form-A/ 1-Form-B	350	50	0.09			**TLP4027G***			
		50	0.10						**TLP4007G***
		25	0.12			**TLP4026G***			**TLP4006G***

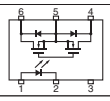
* Dual-channel

MOSFET-Output Photorelays, 1-Form-B

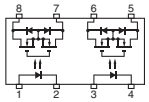
Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)	@I_F	I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
									UL/cUL	TÜV	VDE	BSI	IEC
TLP4172G		**2.54SOP4** Lead pitch: 2.54 mm 1-Form-B	3 mA	50 Ω	0 mA	0.09 A	350 V	1500 Vrms	○ / –				
TLP4192G		**2.54SOP6** Lead pitch: 2.54 mm 1-Form-B	3 mA	50 Ω	0 mA	0.09 A	350 V	1500 Vrms	○ / –				
TLP4222G		**DIP4** 1-Form-B	3 mA	50 Ω	0 mA	0.1 A	350 V	2500 Vrms	○ / –				
TLP4592G		**DIP6** 1-Form-B	3 mA	50 Ω	0 mA	0.1 A	350 V	2500 Vrms	○ / –				
TLP4176G		**2.54SOP4** Lead pitch: 2.54 mm 1-Form-B	3 mA	25 Ω	0 mA	0.12 A	350 V	1500 Vrms	○ / –				
TLP4197G		**2.54SOP6** Lead pitch: 2.54 mm 1-Form-B	3 mA	25 Ω	0 mA	0.12 A	350 V	1500 Vrms	○ / –				

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

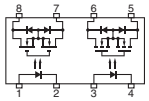
MOSFET-Output Photorelays, 1-Form-B (Continued)

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP4227G		**DIP4** 1-Form-B SEMKO-approved	3 mA	25 Ω	0 mA	0.15 A	350 V	2500 Vrms	○ / –				△
TLP4597G		**DIP6** 1-Form-B SEMKO-approved	3 mA	25 Ω	0 mA	0.15 A	350 V	2500 Vrms	○ / –				△

MOSFET-Output Photorelays, 2-Form-B

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP4202G		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP4172G 2-Form-B	3 mA	50 Ω	0 mA	0.09 A	350 V	1500 Vrms	○ / –				
TLP4222G-2		**DIP8** Dual-channel version of the TLP4222G 2-Form-B	3 mA	50 Ω	0 mA	0.1 A	350 V	2500 Vrms	○ / –				
TLP4206G		**2.54SOP8** Lead pitch: 2.54 mm Dual-channel version of the TLP4176G 2-Form-B	3 mA	25 Ω	0 mA	0.12 A	350 V	1500 Vrms	○ / –				
TLP4227G-2		**DIP8** Dual-channel version of the TLP4227G 2-Form-B SEMKO-approved	3 mA	25 Ω	0 mA	0.15 A	350 V	2500 Vrms	○ / –				△

MOSFET-Output Photorelays, 1-Form-A/1-Form-B

Part Number	Pin Configuration	Features	I_{FT} (Max)	R_{ON} (Max)		I_{ON} (Max)	V_{OFF}	BVs	Safety Standards (2)				
					@I_F				UL/cUL	TÜV	VDE	BSI	IEC
TLP4027G		**2.54SOP8** Lead pitch: 2.54 1a1b (N.C. + N.O.)	3 mA	50 Ω	(Form-A) 5 mA (Form-B) 0 mA	0.09 A	350 V	1500 Vrms	○ / –				
TLP4007G		**DIP8** 1a1b (N.C. + N.O.)	3 mA	50 Ω	(Form-A) 5 mA (Form-B) 0 mA	0.1 A	350 V	2500 Vrms	△ / –				
TLP4026G		**2.54SOP8** Lead pitch: 2.54 1a1b (N.C. + N.O.)	3 mA	25 Ω	(Form-A) 5 mA (Form-B) 0 mA	0.12 A	350 V	1500 Vrms	○ / –				
TLP4006G		**DIP8** 1a1b (N.C. + N.O.)	3 mA	25 Ω	(Form-A) 5 mA (Form-B) 0 mA	0.12 A	350 V	2500 Vrms	△ / –				

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

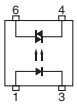
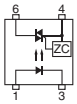
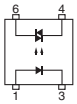
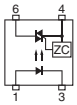
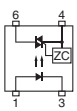
4 Selection Guide

6 Triac-Output Photocouplers

Features \ Package	MFSOP6		DIP6		DIP4/8/16		SO6	
V_{DRM}	Isolation voltage	NZC	ZC	NZC	ZC	NZC	ZC	NZC	ZC
400 V	2500 Vrms	**TLP160G**	**TLP161G**	**TLP560G**	**TLP561G**	**TLP525G/-2/-4**			
	5000 Vrms			**TLP3022(S)** **TLP3023(S)**	**TLP3042(S)** **TLP3043(S)**				
600 V	2500 Vrms	**TLP160J** **TLP165J**	**TLP161J** **TLP163J** **TLP166J**	**TLP560J**	**TLP561J**				
	3000 Vrms	**TLP260J**	**TLP261J**						
	3750 Vrms		**TLP168J**						
	4000 Vrms			**TLP762J**	**TLP763J**				
	5000 Vrms			**TLP3052(S)**	**TLP3762(S)** **TLP3062(S)** **TLP3063(S)** **TLP3064(S)**	**TLP360J**	**TLP361J** **TLP363J**		
800 V	5000 Vrms				**TLP3082(S)** **TLP3782(S)** **TLP3783(S)**				

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
NZC: Non-zero cross
ZC: Zero cross

Triac-Output Photocouplers for Solid State Relays (SSRs)

Part Number	Pin Configuration	Features	I_{FT} (Max)		V_{TM} (Max)		V_{DRM}	BVs	Safety Standards (2)				
			Rank			@I_{TM}			UL/c-UL	TÜV	VDE	BSI	IEC
TLP160G		Mini-flat **MFSOP6** Non-zero cross	–	10 mA	2.8 V	70 mA	400 V	2500 Vrms	○ / ○	△	○ (1)		
			IFT7	7 mA									
			IFT5	5 mA									
TLP161G		Mini-flat **MFSOP6** Zero cross	–	10 mA	2.8 V	70 mA	400 V	2500 Vrms	○ / ○	△	○ (1)		
			IFT7	7 mA									
			IFT5	5 mA									
TLP160J **TLP165J**		Mini-flat **MFSOP6** Non-zero cross	–	10 mA	2.8 V	70 mA	600 V	2500 Vrms	○ / ○	△	○ (1)		
			IFT7	7 mA									
TLP161J **TLP166J**		Mini-flat **MFSOP6** Zero cross	–	10 mA	2.8 V	70 mA	600 V	2500 Vrms	○ / ○	△	○ (1)		
			IFT7	7 mA									
TLP168J		Mini-flat **MFSOP6** Zero cross Low trigger current	–	3 mA	2.8 V	70 mA	600 V	2500 Vrms	○ / ○				
TLP163J		Mini-flat **MFSOP6** Zero cross High impulse noise immunity V_N=2000 V (typ.)	–	10 mA	2.8 V	100 mA	600 V	2500 Vrms	○ / ○	△	△		

Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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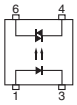
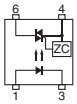
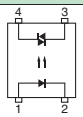
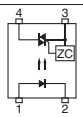
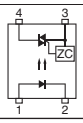
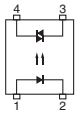
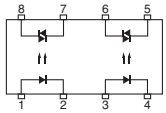
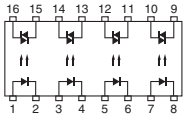
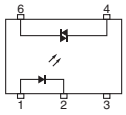
Triac-Output Photocouplers for Solid State Relays (SSRs) (Continued)

Part Number	Pin Configuration	Features	I_{FT} (Max)		V_{TM} (Max)		V_{DRM}	BVs	Safety Standards (2)				
			Rank			@I_{TM}			UL/c-UL	TÜV	VDE	BSI	IEC
TLP260J		Mini-flat **MFSOP6** Non-zero cross	–	10 mA	2.8 V	70 mA	600 V	3000 Vrms	○ / –	△	○ (1)		
TLP261J		Mini-flat **MFSOP6** Zero cross	–	10 mA	2.8 V	70 mA	600 V	3000 Vrms	○ / –	△	○ (1)		

Triac-Output Photocouplers for Office Equipment

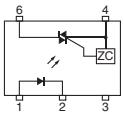
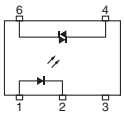
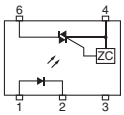
Part Number	Pin Configuration	Features	I_{FT} (Max)		V_{TM} (Max)		V_{DRM}	BVs	Safety Standards (2)				
			Rank			@I_{TM}			UL/c-UL	TÜV	VDE	BSI	IEC
TLP360J **TLP360JF**		**DIP4** Non-zero cross	– IFT7	10 mA 7 mA	2.8 V	70 mA	600 V	5000 Vrms	○ / ○	○	○		
TLP361J **TLP361JF**		**DIP4** Zero cross	– IFT7	10 mA 7 mA	2.8 V	70 mA	600 V	5000 Vrms	○ / ○	○	○		
TLP363J **TLP363JF**		**DIP4** Zero cross High impulse noise immunity V_N = 2000 V (typ.)	–	10 mA	2.8 V	70 mA	600 V	5000 Vrms	○ / ○	○	○		

Triac-Output Photocouplers for AC 100 to 120 V Lines

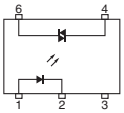
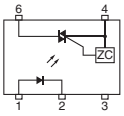
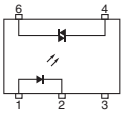
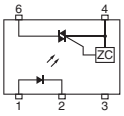
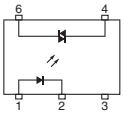
Part Number	Pin Configuration	Features	I_{FT} (Max)		V_{TM} (Max)		V_{DRM}	BVs	Safety Standards (2)				
			Rank			@I_{TM}			UL/c-UL	TÜV	VDE	BSI	IEC
TLP525G		**DIP4**	–	10 mA	3 V	100 mA	400 V	2500 Vrms	○ / ○				
TLP525G-2		**DIP8** Dual-channel version of the TLP525G	–	10 mA	3 V	100 mA	400 V	2500 Vrms	○ / ○				
TLP525G-4		**DIP16** 4-channel version of the TLP525G	–	10 mA	3 V	100 mA	400 V	2500 Vrms	○ / ○				
TLP560G		**DIP6** General-purpose Non-zero cross	– IFT7 IFT5	10 mA 7 mA 5 mA	3 V	100 mA	400 V	2500 Vrms	○ / –	△	○		

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

Triac-Output Photocouplers for AC 100 to 120 V Lines (Continued)

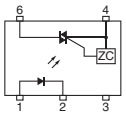
Part Number	Pin Configuration	Features	I_{FT} (Max) Rank	I_{FT} (Max)	V_{TM} (Max)	@I_{TM}	V_{DRM}	BVs	Safety Standards (2) UL/c-UL	TÜV	VDE	BSI	IEC
TLP561G		**DIP6** General-purpose Zero cross	– IFT7 IFT5	10 mA 7 mA 5 mA	3 V	100 mA	400 V	2500 Vrms	○ / –	△	○		
TLP3022(S) **TLP3022F(S)**		**DIP6** Direct replacement for XXX3020/3021/3022 SEMKO-approved Non-zero cross	–	10 mA	3 V	100 mA	400 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP3023(S) **TLP3023F(S)**		**DIP6** Direct replacement for XXX3023 SEMKO-approved Non-zero cross	–	5 mA	3 V	100 mA	400 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP3042(S) **TLP3042F(S)**		**DIP6** Direct replacement for XXX3040/3041/3042 SEMKO-approved Zero cross	–	10 mA	3 V	100 mA	400 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP3043(S) **TLP3043F(S)**		**DIP6** Direct replacement for XXX3043 SEMKO-approved Zero cross	–	5 mA	3 V	100 mA	400 V	5000 Vrms	○ / ○	△	○	◎	◎

Triac-Output Photocouplers for AC 200 to 240 V Line

Part Number	Pin Configuration	Features	I_{FT} (Max) Rank	I_{FT} (Max)	V_{TM} (Max)	@I_{TM}	V_{DRM}	BVs	Safety Standards (2) UL/c-UL	TÜV	VDE	BSI	IEC
TLP560J		**DIP6** General-purpose Non-zero cross	– IFT7	10 mA 7 mA	3 V	100 mA	600 V	2500 Vrms	○ / –	△	○		
TLP561J		**DIP6** General-purpose Zero cross	– IFT7	10 mA 7 mA	3 V	100 mA	600 V	2500 Vrms	○ / –	△	○		
TLP762J **TLP762JF**		**DIP6** Internal creepage: 4 mm (min) SEMKO-approved Non-zero cross-on	–	10 mA	3 V	100 mA	600 V	4000 Vrms	○ / –	△	○	◎	◎
TLP763J **TLP763JF**		**DIP6** Internal creepage: 4 mm (min) SEMKO-approved Zero cross	–	10 mA	3 V	100 mA	600 V	4000 Vrms	○ / –	△	○	◎	◎
TLP3052(S) **TLP3052F(S)**		**DIP6** High V_{DRM} SEMKO-approved Non-zero cross-on	–	10 mA	3 V	100 mA	600 V	5000 Vrms	○ / ○	△	○	◎	◎

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.

Triac-Output Photocouplers for AC 200 to 240 V Line (Continued)

Part Number	Pin Configuration	Features	I_{FT} (Max)		V_{TM} (Max)		V_{DRM}	BVs	Safety Standards (2)				
			Rank			@I_{TM}			UL/c-UL	TÜV	VDE	BSI	IEC
TLP3062(S) **TLP3062F(S)**		**DIP6** SEMKO-approved High V_{DRM} Zero cross	–	10 mA	3 V	100 mA	600 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP3063(S) **TLP3063F(S)**		**DIP6** SEMKO-approved High V_{DRM} Zero cross	–	5 mA	3 V	100 mA	600 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP3064(S) **TLP3064F(S)**		**DIP6** SEMKO-approved Low trigger current Zero cross	–	3 mA	3 V	100 mA	600 V	5000 Vrms	○ / ○	△	○	◎	◎
TLP3762(S) **TLP3762F(S)**		**DIP6** Zero cross High impulse noise immunity V_N = 2000 V (typ.)	–	10 mA	3 V	100 mA	600 V	5000 Vrms	○ / ○	△	○		
TLP3082(S) **TLP3082F(S)**		**DIP6** Zero cross	–	10 mA	3 V	100 mA	800 V	5000 Vrms	○ / ○	△	○		
TLP3782(S) **TLP3782F(S)**		**DIP6** High impulse noise immunity V_N = 1500 V (typ.) Zero cross	–	10 mA	3 V	100 mA	800 V	5000 Vrms	○ / ○	△	○		
TLP3783(S) **TLP3783F(S)**			–	5 mA	3 V	100 mA	800 V	5000 Vrms	○ / ○	△	○		

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EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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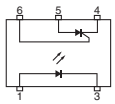
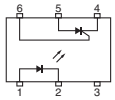
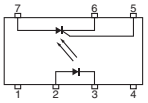
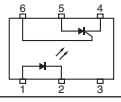
7 Thyristor-Output Photocouplers

Features \ Package				
V_{DRM}	Isolation voltage	**MFSOP6**	**DIP6**	**DIP8**
400 V	2500 Vrms	**TLP148G**		
600 V	2500 Vrms		**TLP548J**	**TLP549J**
	4000 Vrms		**TLP748J**	

Replacement Devices

New Device	Discontinued Devices
TLP148G	**TLP141G**
TLP548J	**TLP541J** **TLP545J**
TLP549J	**TLP542G** **TLP543J**
TLP748J	**TLP641G/J** **TLP741G/J** **TLP747G/J**

The new and discontinued devices are not exactly identical in terms of electrical characteristics. For device replacement, hardware evaluation must be performed in the real-world environment.

Part Number	Pin Configuration	Features	I_{FT} (Max)	V_{TM} (Max)		V_{DRM}	BVs	Safety Standards (2)				
					@I_{TM}			UL/cUL	TÜV	VDE	BSI	IEC
TLP148G		Mini-flat **MFSOP6**	10 mA	1.45 V	100 mA	400 V	2500 Vrms	○ / –				
TLP548J		**DIP6** Low trigger current	7 mA	1.45 V	100 mA	600 V	2500 Vrms	○ / –				
TLP549J		**DIP8** Long anode-cathode distance (SCR)	7 mA	1.45 V	100 mA	600 V	2500 Vrms	○ / –				
TLP748J **TLP748JF**		**DIP6** SEMKO-approved	10 mA	1.45 V	100 mA	600 V	4000 Vrms	○ / –		○	○	△

Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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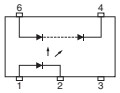
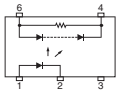
4 Selection Guide

8 Photovoltaic-Output photocouplers

Features \ Package				
Short-Circuit Current	Open Voltage	SSOP4	MFSOP6	DIP6
		1500 Vrms	2500 Vrms	
5 μA	7 V	TLP3904	TLP3902	
12 μA	7 V		TLP190B	TLP590B
20 μA	7 V	TLP3914		
24 μA	7 V		TLP191B*	TLP591B*
4 μA	30 V	TLP3924		

*Built-in shunt resistor

Part Number	Pin Configuration	Features	Short-Circuit Current (Min)			Open-Circuit Voltage (Min)		BVs	Safety Standards (2)				
			Rank		@IF		@IF		UL/cUL	TÜV	VDE	BSI	IEC
TLP190B		Mini-flat **MFSOP6**	—	12 μA	10 mA	7 V	10 mA	2500 Vrms	○ / ○				
TLP191B		Mini-flat **MFSOP6** Built-in shunt resistor	—	24 μA	20 mA	7 V	20 mA	2500 Vrms	○ / ○				
TLP590B		**DIP6**	—	12 μA	10 mA	7 V	10 mA	2500 Vrms	○ / –				
			C20	20 μA									
TLP591B		**DIP6** Built-in shunt resistor	—	24 μA	20 mA	7 V	20 mA	2500 Vrms	○ / –				
			C40	40 μA									
TLP3902		Mini-flat **MFSOP6**	—	5 μA	10 mA	7 V	10 mA	2500 Vrms	△ / –				
TLP3904		**SSOP4**	—	5 μA	10 mA	7 V	10 mA	1500 Vrms	○ / –				
TLP3914		**SSOP4**	—	20 μA	10 mA	7 V	10 mA	1500 Vrms	○ / –				
TLP3924		**SSOP4** High open-circuit voltage	—	4 μA	10 mA	30 V	10 mA	1500 Vrms	○ / –				

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EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
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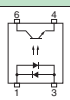
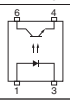
9 Products Manufactured by Toshiba Semiconductor (Thailand) Co., Ltd. (TST)

Transistor-Output and Darlington-Transistor-Output Photocouplers

Part Number	Pin Configuration	Features	V_{CEO}	BVs @1 Minute	Safety Standards (2)					
					UL	c-UL	TÜV	VDE	BSI	IEC
TLP180		Mini-flat **MFSOP6** AC input SEMKO-approved	80 V	3750 Vrms	○	○	○ (1)	○ (1)	◎	◎
TLP181		Mini-flat **MFSOP6** Transistor output General-purpose	80 V	3750 Vrms	○	○	△	○ (1)	◎	◎

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
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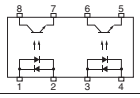
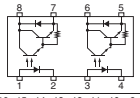
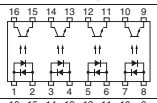
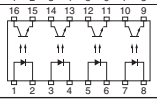
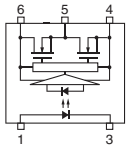
Some of the photocouplers with triac output are also manufactured by Toshiba Semiconductor Thailand Co.,Ltd. For detailed information, please contact your nearest Toshiba sales representative.

Transistor-Output and Darlington-Transistor-Output Photocouplers (Continued)

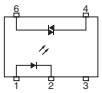
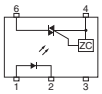
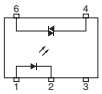
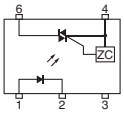
Part Number	Pin Configuration	Features	V_{CEO}	BVs @1 Minute	Safety Standards (2)					
					UL	c-UL	TÜV	VDE	BSI	IEC
TLP184*		**SO6** (reinforced insulation) AC input	80 V	3750 Vrms	△	△	△ (1)	△ (1)	△	△
TLP185*		**SO6** (reinforced insulation)	80 V	3750 Vrms	△	△	△ (1)	△ (1)	△	△
TLP280		**SOP4** Lead pitch = 1.27 mm AC input	80 V	2500 Vrms	○	○	○ (1)	○ (1)	△	△
TLP281		**SOP4** Lead pitch = 1.27 mm General-purpose SEMKO-approved	80 V	2500 Vrms	○	○	△	○ (1)	◎	◎
TLP284		**SOP4** (reinforced insulation) Lead pitch = 1.27 mm Creepage/clearance ≥ 5 mm Isolation thickness ≥ 0.4 mm AC input	80 V	3750 Vrms	○	○	○ (1)	○ (1)	◎	◎
TLP285		**SOP4** (reinforced insulation) Lead pitch = 1.27 mm Creepage/clearance ≥ 5 mm Isolation thickness ≥ 0.4 mm SEMKO-approved	80 V	3750 Vrms	○	○	○ (1)	○ (1)	◎	◎
TLP620		**DIP4** Transistor output AC input SEMKO-approved	55 V	5000 Vrms	○	—	△	○	◎	◎
TLP620-2		**DIP8** Dual-channel version of the TLP620 SEMKO-approved	55 V	5000 Vrms	○	—	△	○	◎	◎
TLP627		**DIP4** Darlington transistor output High V_{CEO} SEMKO-approved	300 V	5000 Vrms	○	—	△	○	◎	◎
TLP627-2		**DIP8** Dual-channel version of the TLP627 SEMKO-approved	300 V	5000 Vrms	○	—	△	○	◎	◎
TLP290-4*		**SO16** 4-channel version Lead pitch = 1.27 mm AC input	80 V	2500 Vrms	△	△		△ (2)	△	△
TLP291-4*		**SO16** 4-channel version Lead pitch = 1.27 mm	80 V	2500 Vrms	△	△		△ (2)	△	△

Photocouplers for IGBT/MOSFET Gate Drive

Part Number	Pin Configuration	Features	Propagation Delay Time (Max)	Output	I_{FHL} (Max)	BVs	Safety Standards (2)				
							UL/cUL	TÜV	VDE	BSI	IEC
TLP155E		**SO6** (reinforced Insulation) T_{opr} = 100°C (max) Direct drive of a small-power IGBT/MOSFET	0.2 μs	Peak output current (max): ±0.6 A	7.5 mA	3750 Vrms	○ / ○		○		

*Under development. Specifications subject to change without notice. For the latest information, please contact your nearest Toshiba sales representative.
Note 1: The EN60747-5-2 safety standard for compact packages is different from that for standard DIP packages.
Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.
Note 2: BSI and IEC: ○: Approved (supplementary or basic insulation) ◎: Approved (reinforced insulation) △: Design which meets safety standard/approval pending as of January 2011
EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
Some of the photocouplers with triac output are also manufactured by Toshiba Semiconductor Thailand Co.,Ltd. For detailed information, please contact your nearest Toshiba sales representative.

Triac-Output Photocouplers

Part Number	Pin Configuration	Features	Tingger LED Current, I_{FT}		Peak On-State Voltage, V_{TM}		Off-State Output Terminal Voltage V_{DRM}	BVs @1 Minute	Safety Standards(2)					
			Rank	Max	Max	@I_{TM}			UL	c-UL	TÜV	VDE	BSI	IEC
TLP360J **TLP360JF**		**DIP4** Non-zero cross	–	10 mA	3.0 V	100 mA	600 V	5000 Vrms	○	△	△	○		
			IFT7	7 mA										
TLP361J **TLP361JF**		**DIP4** Zero cross	–	10 mA	3.0 V	100 mA	600 V		○	△	△	○		
			IFT7	7 mA										
TLP363J **TLP363JF**		**DIP4** Zero cross High impulse noise immunity V_N = 2000 V (typ.)	–	10 mA										
TP560G		**DIP6** General-purpose Non-zero cross	–	10 mA	3.0 V	100 mA	400 V	2500 Vrms	○					
			IFT7	7 mA										
TP560J			IFT5	5 mA										
			–	10 mA			600 V							
			IFT7	7 mA										
TP561G		**DIP6** General-purpose Zero cross	–	10 mA	3.0 V	100 mA	400 V		○					
			IFT7	7 mA										
TP561J			IFT5	5 mA										
			–	10 mA			600 V							
			IFT7	7 mA										
TLP3022 (S) **TLP3022F (S)**		**DIP6** SEMKO-approved Non-zero cross	–	10 mA	3.0 V	100 mA	400 V	5000 Vrms	○	○	△	○	◎	△
TLP3023 (S) **TLP3023F (S)**			–	5 mA										
TLP3052 (S) **TLP3052F (S)**		**DIP6** High V_{DRM} SEMKO-approved Non-zero cross	–	10 mA			600 V							
TLP3042 (S)		**DIP6** SEMKO-approved Zero cross	–	10 mA	3.0 V	100 mA	400 V	5000 Vrms	○		△	○	◎	△
TLP3043 (S)			–	5 mA										
TLP3062 (S) **TLP3062F (S)**		**DIP6** SEMKO-approved High V_{DRM} Zero cross	–	10 mA			600 V							
TLP3063 (S) **TLP3063F (S)**			–	5 mA										
TLP3064 (S)		**DIP6** SEMKO-approved Zero cross	–	3 mA										
TLP3082 (S)		**DIP6** Zero cross	–	10 mA			600 V							
TLP3782 (S) **TLP3782F (S)**		**DIP6** High impulse noise immunity V_N = 1500 V (typ.)	–	10 mA			600 V		○		△	○		
TLP3783 (S) **TLP3783F (S)**			–	5 mA										

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EN 60065- and IEC 60065-approved, EN 60950- and IEC 60950-approved
TÜV and VDE: ○: Approved △: Design which meets safety standard/approval pending as of January 2011
EN 60747-5-2-approved with option V4 or D4
For the latest information, please contact your nearest Toshiba sales representative.
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5 Part Naming Conventions

1. Transistor-Output, Darlington-Transistor-Output and IC-Output Photocouplers

TLP □□□□ **F** (□□ – □□□ – □□□, □, **F**)

- Part number
- Wide-spaced leads
  Specify this option, if necessary.
- Safety standard option
  Specify either "D4" or "V4" for EN60747-5-2-approved devices.
- CTR rank
  See respective datasheets.
- Lead form option for DIP packages
  Select one of the lead form options shown on page 40.
  Carrier tape option
  Select one of the carrier tape options shown on pages 51.
- Revision code
  The revision code may be added to identify a revision of a device. For details, contact your nearest Toshiba sales representative.
- RoHS COMPATIBLE*

Example 1: **TLP781(D4-GB-TP6,F**
[D4] = EN60747-5-2 option
[GB] = CTR rank
[TP6] = LF6 lead form
Tape-and-reel packing
[,F] = RoHS COMPATIBLE*

Example 2: **TLP781F(GR,F)**
[F] = Wide-spaced leads
[GR] = CTR rank
[,F] = RoHS COMPATIBLE*

The right parenthesis is omitted due to the limit to the number of characters.

2. Triac-Output and Thyristor-Output Photocouplers

TLP □□□□ □ **F** (□□ – □□□ – □□□, □, **F**)

- Part number
- V_{DRM}
  G: 400 V
  J: 600 V
  L: 800 V
- Wide-spaced leads
- Safety standard option
- I_{FT} rank
  No character: No I_{FT} rank specified
  IFTx: For example, IFT5 denotes the 5-mA rank.
  The available I_{FT} ranks differ from product to product.
  See datasheets.
- Lead form option for DIP packages
  Carrier tape option
- Revision code
- RoHS COMPATIBLE*

Example 3: **TLP361J(D4-IFT7-TP1,S,F)**
TLP361J(D4T7TP1S,F)
(Abbreviated due to the limit to the number of characters.)
[J] = V_{DRM}: 600 V
[D4] = EN60747-5-2 option
[IFT7] = [T7] = I_{FT} = 7 mA
[TP1] = LF1 lead form
Tape-and-reel packing
[,S] = [S] = Revision code: S
[,F] = RoHS COMPATIBLE*

3. Photorelays

TLP □□□□ □ **F** (□□ – □□□, □, **F**)

- Part number
- V_{OFF}
  A: 60 V
  D: 200 V
  G: 350 V
  GA: 400 V
  J: 600 V
  Some photorelays do not have a V_{OFF} code in their names.
  See respective datasheets.
- Wide-spaced leads
- Safety standard option
- Lead form option for DIP packages
  Carrier tape option
- Revision code
- RoHS COMPATIBLE*

Example 4: **TLP227A(TP1,F)**
[A] = V_{OFF}: 60 V
[TP1] = LF1 lead form
Tape-and-reel packing
[,F] = RoHS COMPATIBLE*

Example 5: **TLP3110(TP,F)**
[TP] = Tape-and-reel packing
[,F] = RoHS COMPATIBLE*

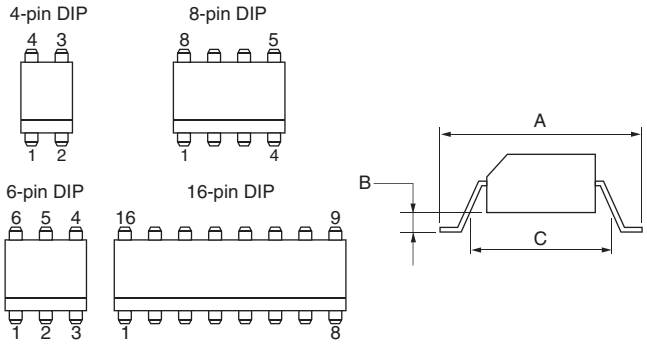
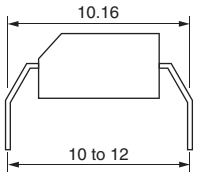
*: "F" identifies the indication of product Labels with "[[G]]/RoHS COMPATIBLE".
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Note: The length of part names is limited to 18 characters. Longer names are abbreviated by omitting the "-" character and/or using shorthand symbols. However, be sure to give full part names when you have any inquiries. For details, please contact your nearest Toshiba sales representative.

6 Package Information

1 Lead Form Options for DIP Packages

The **DIP4, DIP6, DIP8** and **DIP16** packages offer three surface-mount lead form options and a wide-spaced lead form option. The electrical characteristics are identical, regardless of these options.

Lead Form	Surface-Mount			Wide-Spaced
Appearance				
Lead Form Code	(LF1)	(LF4)	(LF5)	(LF2)
Carrier Tape Code	(TP1)	(TP4)	(TP5)	Not available*
Package Outlines				

Dimensions Unit: mm

Dimension \ Version	(LF1)		(LF4)		(LF5)	
	Min	Max	Min	Max	Min	Max
A	–	10.0	–	12.0	–	10.0
B	(0.35 typ.)		(0.25 typ.)		–	0.2
C	6.4	–	8.0	–	6.4	–

All other package dimensions are the same as for each standard package specification.

* Tape-and-reel packing is not available with (LF2).

Example 1: Standard part: TLP620(F)
Surface-mount option: TLP620(LF1,F): Packed in stick magazines (see page 49).
Surface-mount and tape-and-reel options: TLP620(TP1,F): Packed in tape-and-reel (see page 51).

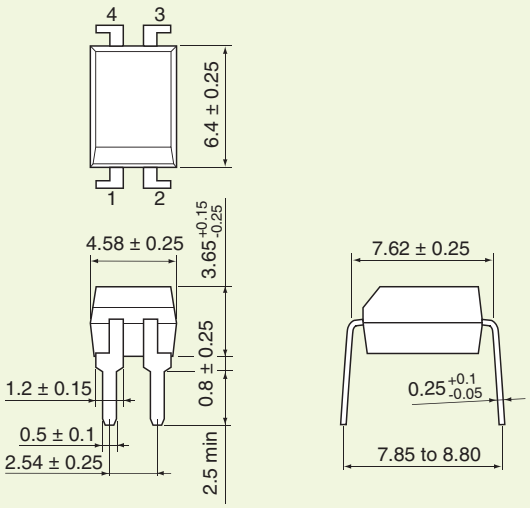
■ Standard part names should be used when applying for safety standard approval.
■ The package dimensions and lead form options of the TLP781, TLP785 differ from those shown above.
See the TLP781, TLP785 datasheet.

2 Package Dimensions (4-Pin DIP)

Standard

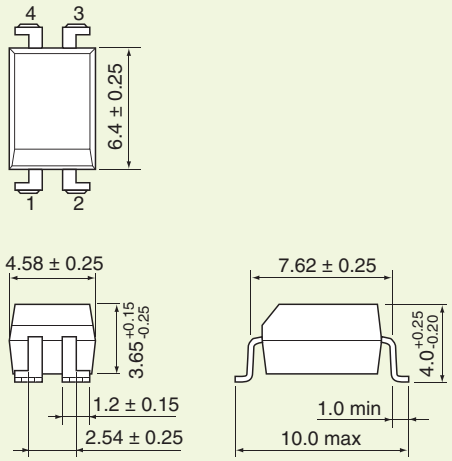
DIP4

Unit: mm



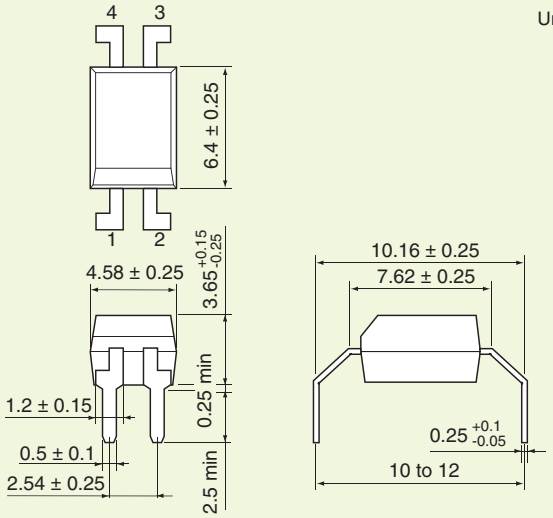
DIP4 (LF1) / (TP1)

Unit: mm



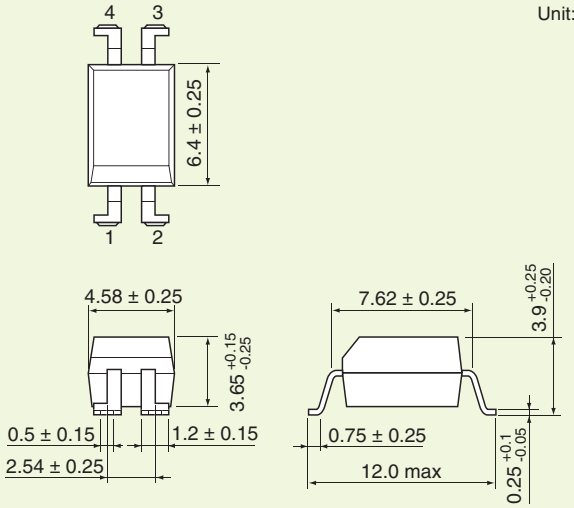
DIP4 (LF2)

Unit: mm



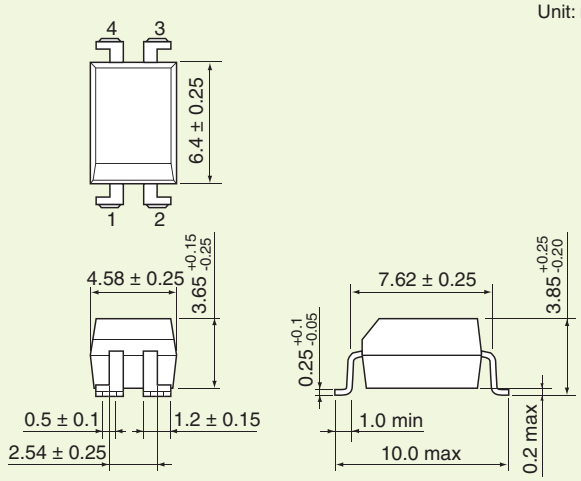
DIP4 (LF4) / (TP4)

Unit: mm



DIP4 (LF5) / (TP5)

Unit: mm

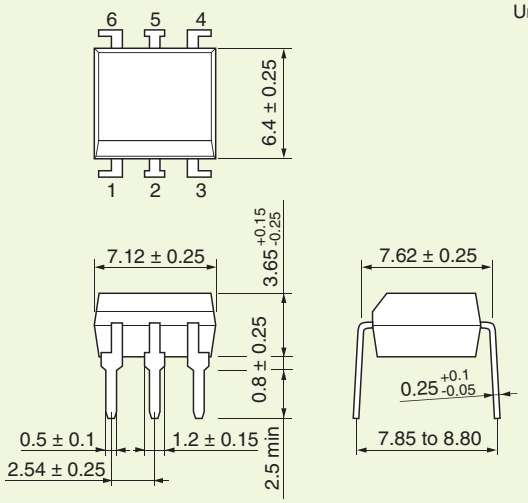


6 Package Information

2 Package Dimensions (6-Pin DIP)

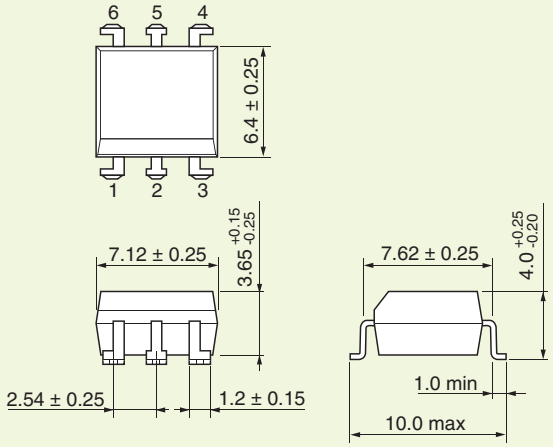
Standard DIP6

Unit: mm



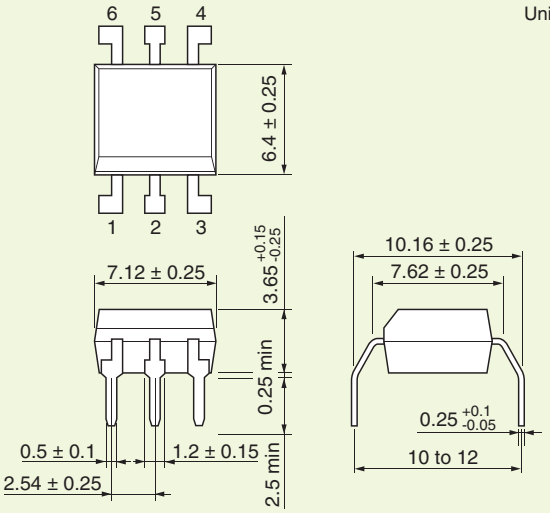
DIP6 (LF1) / (TP1)

Unit: mm



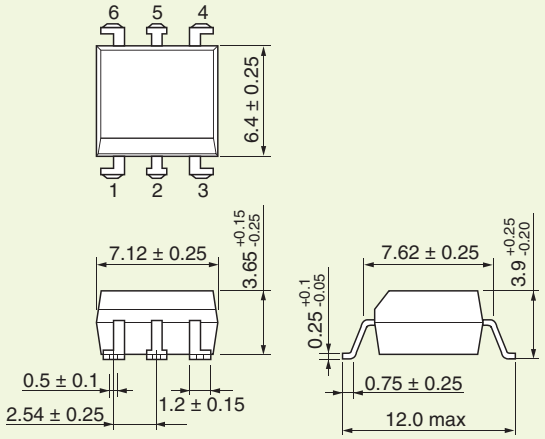
DIP6 (LF2)

Unit: mm



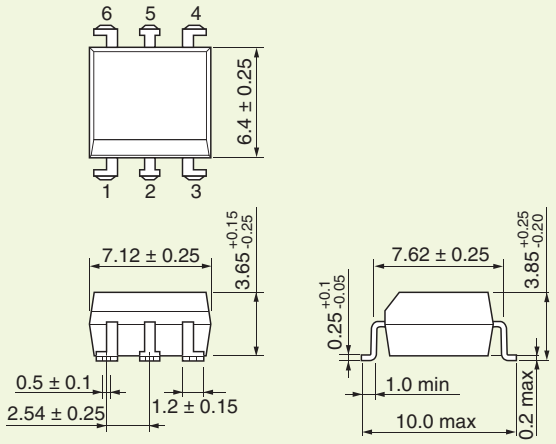
DIP6 (LF4) / (TP4)

Unit: mm



DIP6 (LF5) / (TP5)

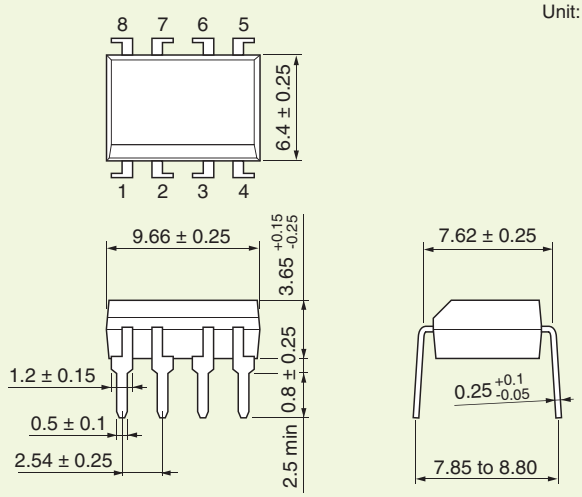
Unit: mm



2 Package Dimensions (8-Pin DIP)

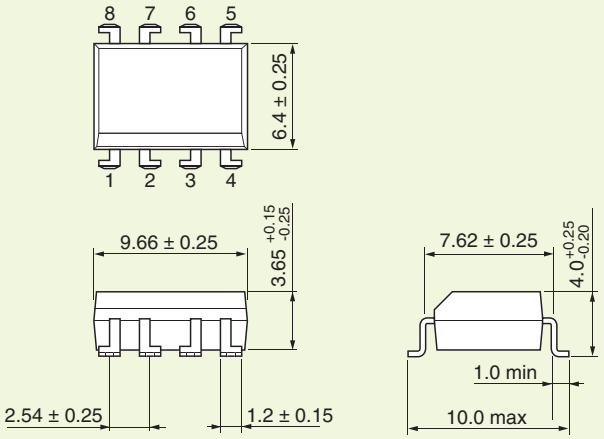
Standard DIP8

Unit: mm



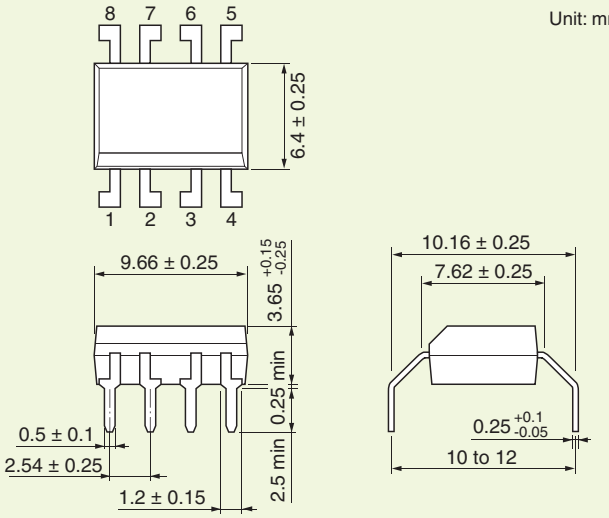
DIP8 (LF1) / (TP1)

Unit: mm



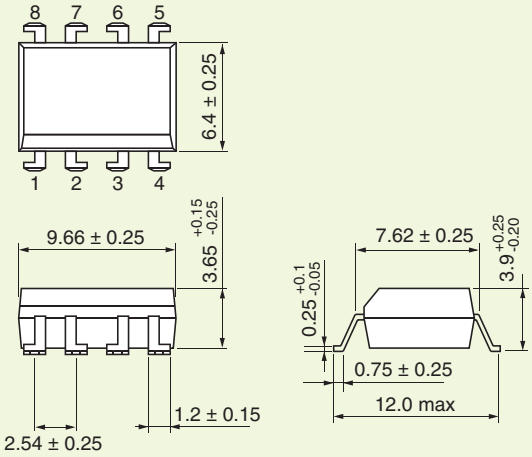
DIP8 (LF2)

Unit: mm



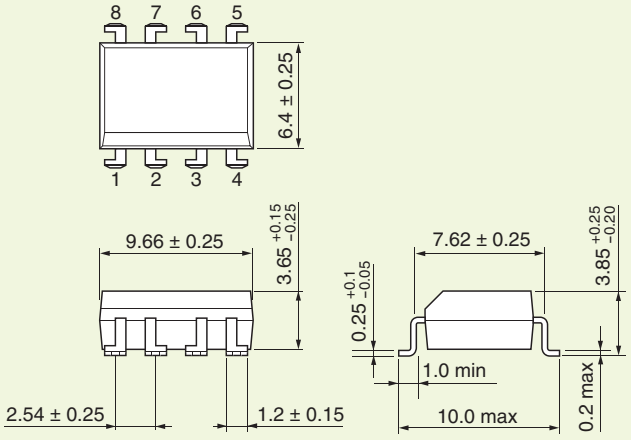
DIP8 (LF4) / (TP4)

Unit: mm



DIP8 (LF5) / (TP5)

Unit: mm

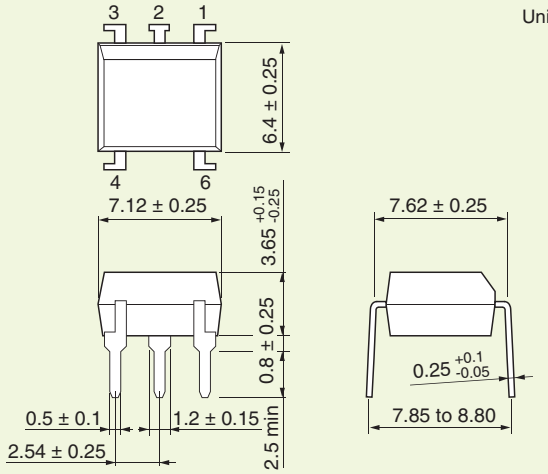


6 Package Information

2 Package Dimensions (Other DIP Packages)

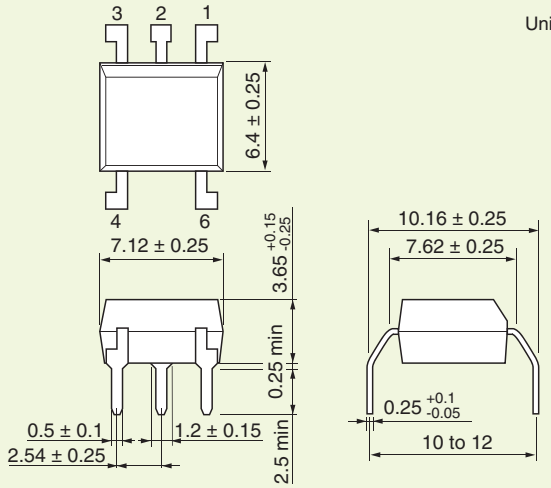
5-pin DIP6

Unit: mm



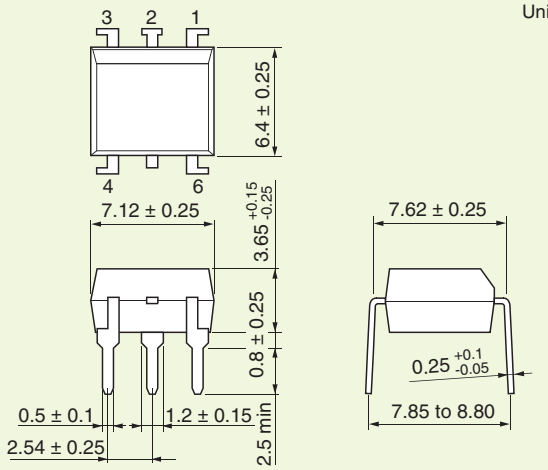
5-pin DIP6 (LF2)

Unit: mm



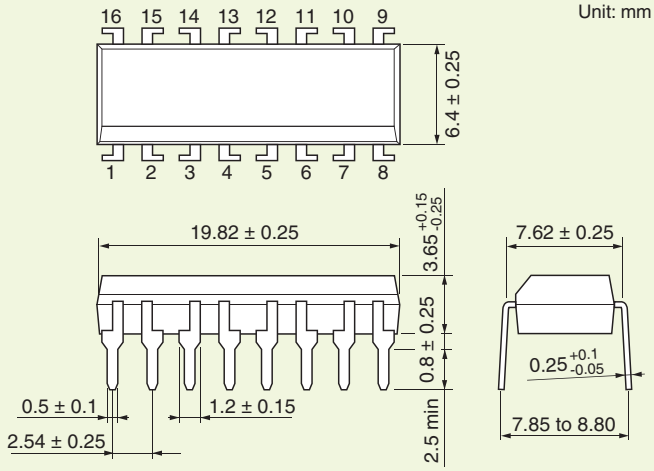
5-pin DIP (with Pin 5 Cut)

Unit: mm



DIP16

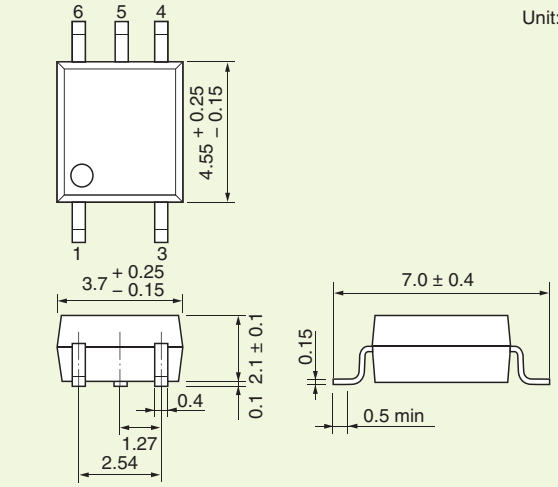
Unit: mm



2 Package Dimensions (Surface Mount)

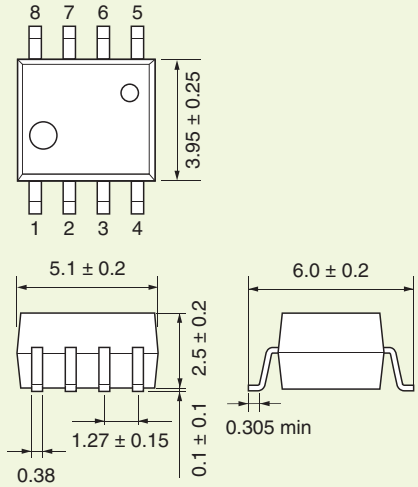
SO6

Unit: mm



SO8

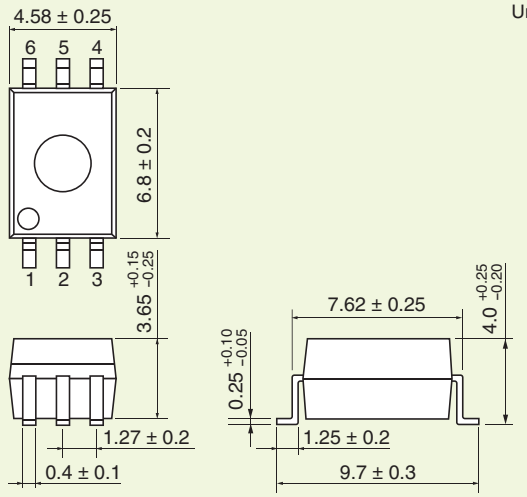
Unit: mm



2 Package Dimensions (Surface Mount) (Continued)

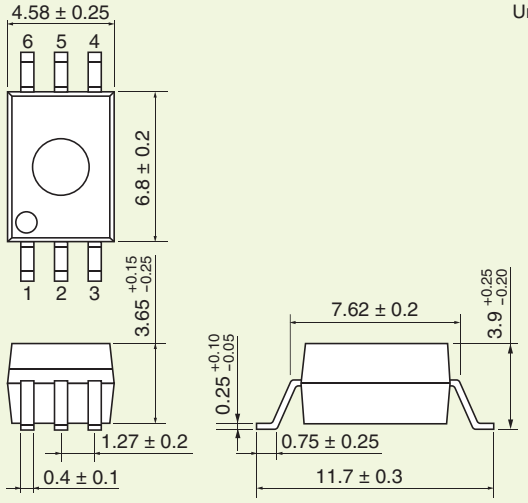
SDIP6

Unit: mm



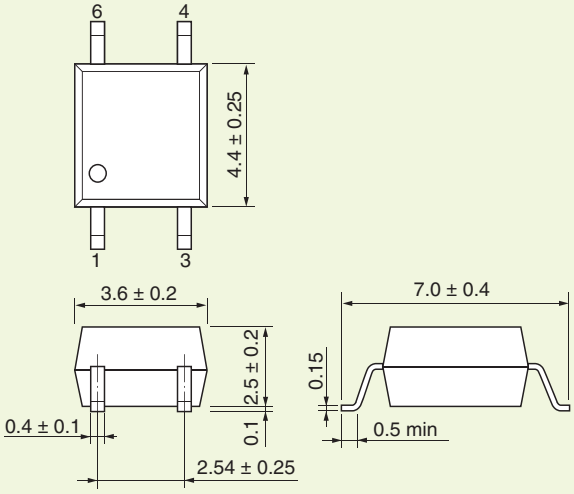
SDIP6 (F type)

Unit: mm



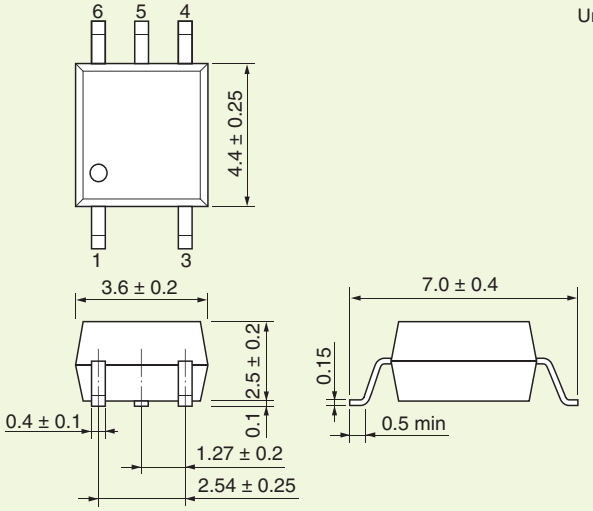
4-pin MFSOP6

Unit: mm



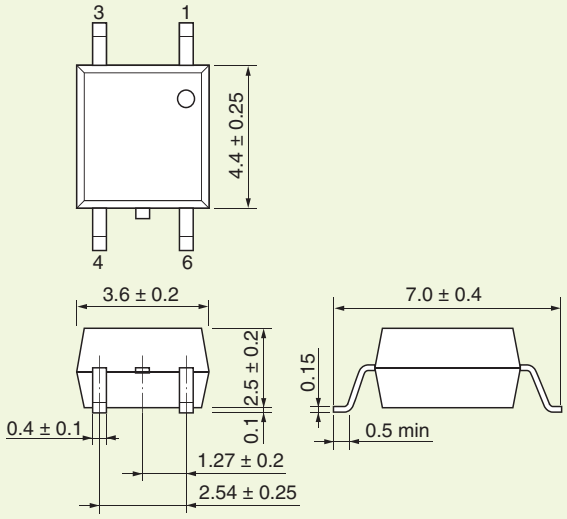
5-pin MFSOP6

Unit: mm



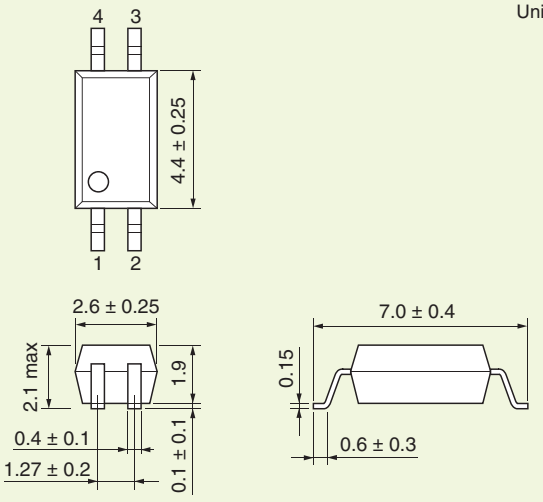
4-pin MFSOP6 (with Pin 5 Cut)

Unit: mm



SOP4

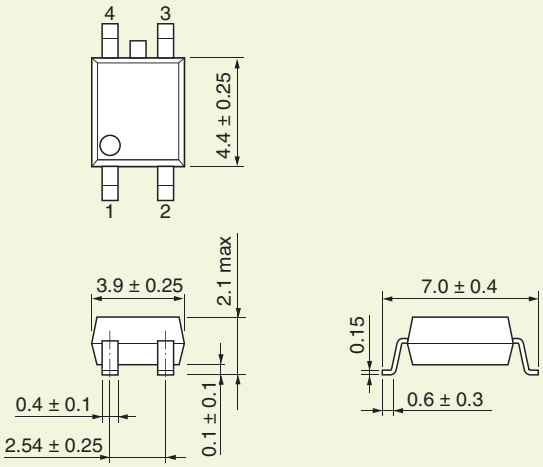
Unit: mm



2 Package Dimensions (Surface Mount) (Continued)

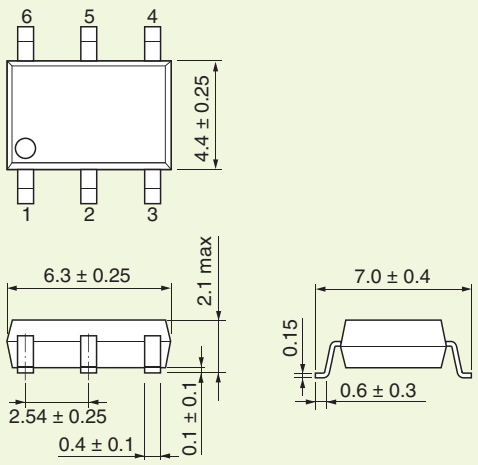
2.54SOP4

Unit: mm



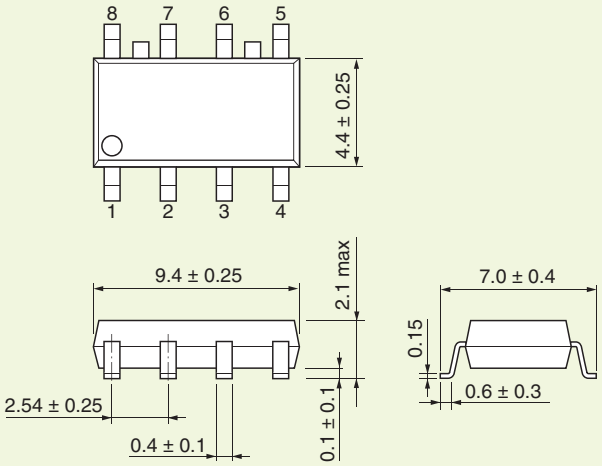
2.54SOP6

Unit: mm



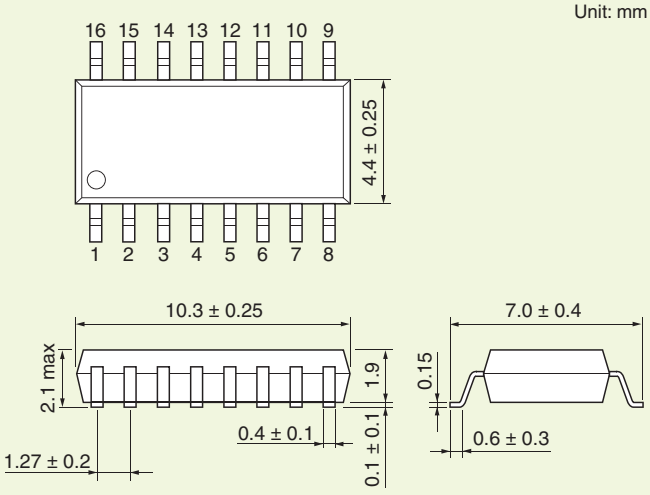
2.54SOP8

Unit: mm



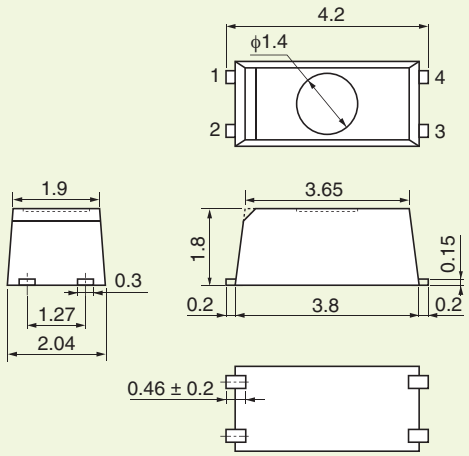
SOP16

Unit: mm



SSOP4

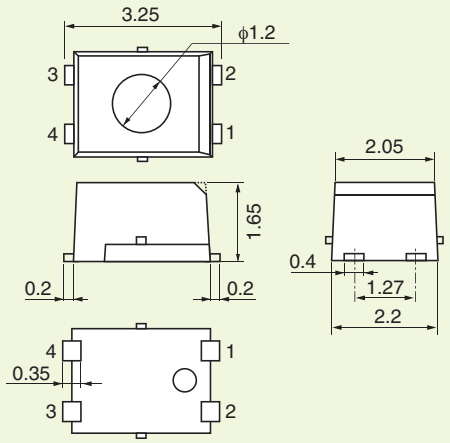
Unit: mm



Unless Otherwise Specified, Tolerance ±0.1 mm

USOP4

Unit: mm



Unless Otherwise Specified, Tolerance ±0.2 mm

3 Rank Marking

Transistor-output photocouplers are ranked according to their CTR ranges, whereas thyristor-output and triac-output photocouplers are ranked according to their maximum I_{FT} value. The following gives the rank classifications and rank marks printed on packages. Note that the rank classifications differ from product to product. For details, please refer to the relevant technical datasheets.

1. CTR Rank Name and Rank Marking

Available CTR Rank Selection (○: Available, △: Contact Toshiba)

Part Number	Rank Name									Rank Marking Group
	None	GB	Y	GR	BL	YH	GRL	GRH	BLL	
TLP180	○	○	△	○	△					❶
TLP181	○	○	○	○	○	△	△	△	△	❷
TLP280	○	○	△	○	△					❶
TLP280-4	○	○								❸
TLP281	○	○	○	○	○	△	△	△	△	❶
TLP281-4	○	○								❸
TLP531/532	○	○	△	○	△					❶
TLP620	○	○	△	○	△					❶
TLP620-2	○	○								❸
TLP620-4	○	○								❸
TLP630	○	○	△	○	△					❶
TLP631/632	○	○	△	○	△					❷
TLP731/732	○	○	△	○	△					❷
TLP733F/734F	○	○	△	○	△					❷

Rank Name	CTR	CTR Rank	
		Other than TLP421	TLP421
None	50 to 600%	✻See the right-side tables	Blank,Y,Y+,YE, G,G+,GR,B,B+, BL,GB
Y	50 to 150%	YE	YE
GR	100 to 300%	GR	GR
GB	100 to 600%	GB	GB
BL	200 to 600%	BL	BL
GRL	100 to 200%	G	G
GRH	150 to 600%	G■	G+

✻ Part Marking when No CTR Rank Is Specified

Part Number	None	Rank Marking Group
TLP180	Blank, YE, GR, BL, GB	❶
TLP280		
TLP531/532		
TLP630		
TLP181	Blank, Y, Y■, YE, G, G■, GR, B, B■, BL, GB	❷
TLP281		
TLP531		
TLP621		
TLP631		
TLP632		
TLP731		
TLP732		
TLP733F		
TLP734F		

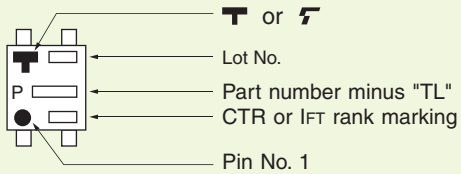
Part Number	None	Rank Marking Group
TLP280-4	Blank, GB	❸
TLP281-4		
TLP620-2		
TLP620-4		

2. LED Trigger Current (I_{FT}) Ranking and Marking

Rank Name	I_{FT}	I_{FT} Rank Marking
None	I_{FT} max	Blank, T7, T5
IFT7	7 mA max	T7, T5
IFT5	5 mA max	T5
IFT2	2 mA max	T2 (only for photorelays)

3. Marking Examples

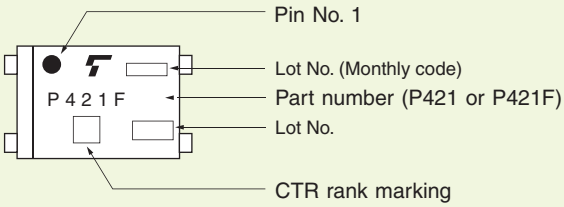
(a) 4-pin mini-flat 1-channel type



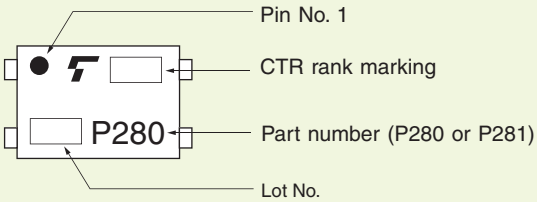
(Example: **TLP626: P626**, **TLP620: P620**, **TLP181: P181**)

TLP620

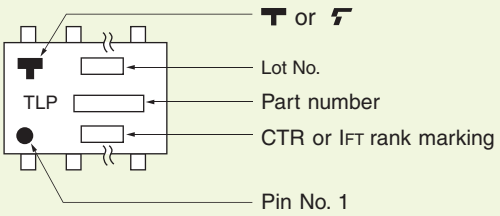
(b) TLP421, TLP421F



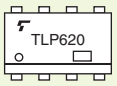
(c) TLP280, TLP281



(d) Others



(Examples: **TLP620: TLP620**, **TLP666GF: TLP666GF**)



TLP620

Note: When ordering a standard photocoupler, add a CTR or I_{FT} rank in parentheses to the standard part number.

Examples: **TLP181**(**GB**) **TLP532**(**GR**)

Use the standard part number when applying for safety standard approval.

Example $\frac{\text{Part number}}{\text{TLP181(GB)}} \rightarrow \frac{\text{Use this part number}}{\text{TLP181}}$

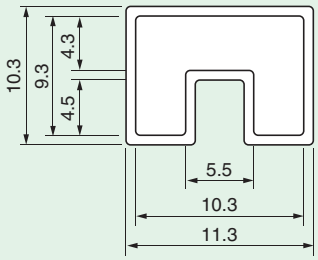
7 Packing Information

1 Photocoupler Magazine Packing Specifications

Magazine Dimensions

Standard DIP

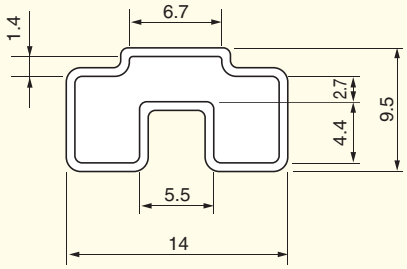
Unit: mm



Length = 525
Thickness = 0.5

DIPs with LF1, LF2, LF4 and LF5 Lead Forming

Unit: mm

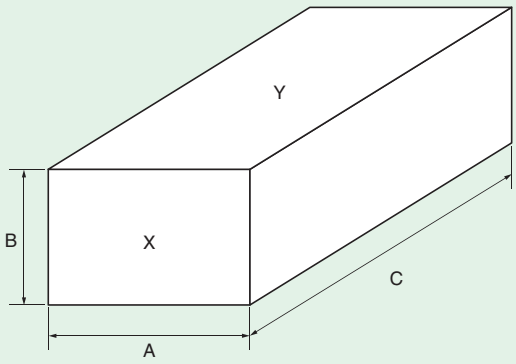


Length = 525
Thickness = 0.5

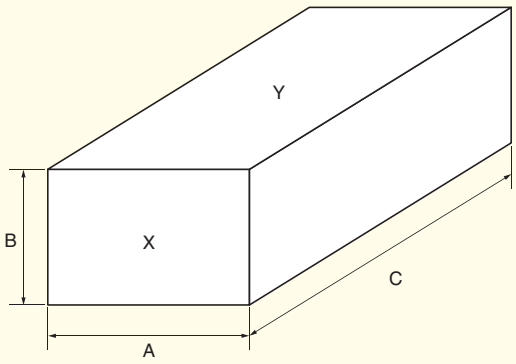
Device Quantities per Magazine

Package Pin Count	4	6	8	12	16
Quantity (pcs)	100	50	50	25	25

Packing Dimensions



Number of Magazines	Dimensions (A x B x C)	Label Position
4	50 x 12 x 531	Y
20	67 x 51 x 559	Y
60	123 x 76 x 568	X



Number of Magazines	Dimensions (A x B x C)	Label Position
4	60 x 13 x 531	Y
40	135 x 58 x 568	X

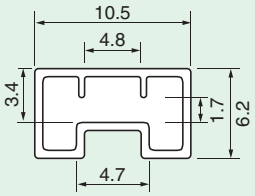
7 Packing Information

Magazine Dimensions

Mini-Flat Coupler (MFP)

Unit: mm

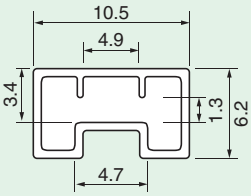
SO6



Length = 555
Thickness = 0.5

Unit: mm

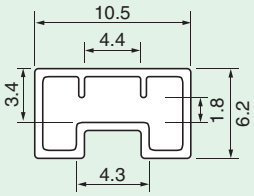
MFSOP6



Length = 555
Thickness = 0.5

Unit: mm

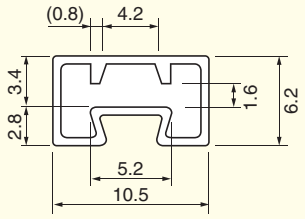
SO8



Length = 555
Thickness = 0.5

SOP Photocoupler

Unit: mm



Length = 555
Thickness = 0.5

Device Quantities per Magazine

Package Pin Count	5 (SO6)
Quantity (pcs)	125

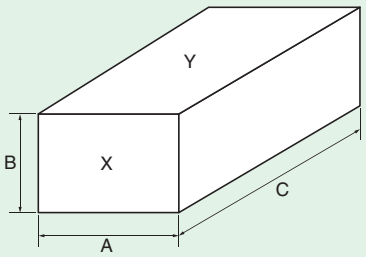
Package Pin Count	4 (MFSOP6)
Quantity (pcs)	150

Package Pin Count	8 (SO8)
Quantity (pcs)	100

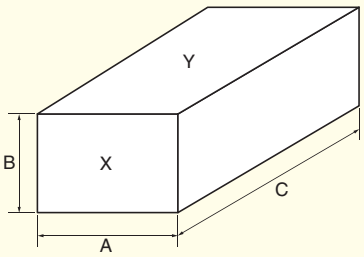
Package Pin Count	4 (SOP4)	16 (SOP16)
Quantity (pcs)	150	50

Package Pin Count	4 (2.54SOP4)	6 (2.54SOP6)	8 (2.54SOP8)
Quantity (pcs)	100	75	50

Packing Dimensions



Package	Number of Magazines	Dimensions (A x B x C)	Label Position
SO6	40	70 x 55 x 585	X
MFSOP6	4	29 x 13 x 563	Y
	24	77 x 31 x 586	Y
	40	67 x 55 x 586	X
SO8	24	75 x 29 x 579	X



Number of Magazines	Dimensions (A x B x C)	Label Position
4	29 x 13 x 563	Y
24	77 x 31 x 586	Y
40	67 x 55 x 586	X

Photocoupler Package Type	Typical Devices
MFSOP6	**TLP160J, TLP180, TLP190B**
SO6	**TLP104, TLP109, TLP116A**
SO8	**TLP2105, TLP2108, TLP2116, TLP2118E, TLP2405, TLP2408**
SOP4	**TLP280, TLP281**
SOP16	**TLP280-4, TLP281-4, TLP270D, TLP270G**
2.54SOP4	**TLP176G, TLP176A**
2.54SOP6	**TLP197G**
2.54SOP8	**TLP206G, TLP206A**

2 Tape-and-Reel Specifications

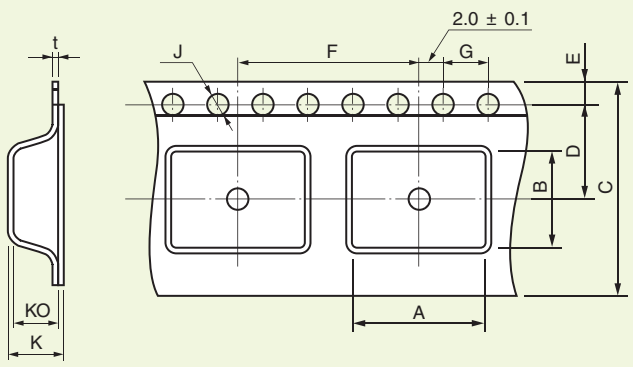
The tape specifications differ for photocouplers manufactured in Thailand.

1. Embossed Tape Specifications for Surface-Mount Lead Form Options

Photocoupler Package Types	Tape Option Symbol	Typical Devices
MFSOP6, SO6	(TPL) or (TPR)	**TLP165J, TLP181, TLP190B**
SO8	(TP)	**TLP2105, TLP2108, TLP2405, TLP2408**
SOP4	(TP)	**TLP280, TLP281**
SOP16	(TP)	**TLP280-4, TLP281-4**
2.54SOP4	(TP)	**TLP176G, TLP176A, TLP176D**
2.54SOP6	(TP)	**TLP197G**
2.54SOP8	(TP)	**TLP200D,TLP206A,TLP206G**
SSOP4	(TP15)	**TLP3212 to 3217, TLP3230 to TLP3250**
SDIP6	(TP)	**TLP701, TLP705, TLP719**
DIP(LF1, LF5)	(TP1) or (TP5)	**TLP550, TLP560G**
DIP(LF4)	(TP4)	**TLP560G**

2. Tape Dimensions

Unit: mm



Unit: mm

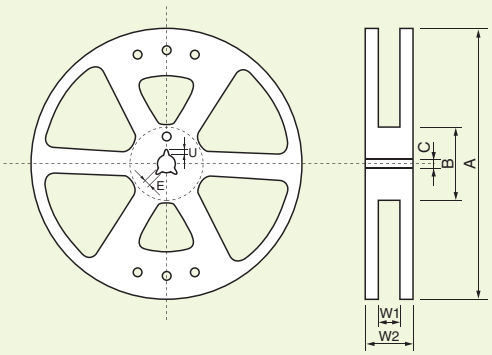
Photocoupler Package Type			MFSOP6	SO6	SO8	SOP4	SOP16	2.54SOP4	2.54SOP6	2.54SOP8	SSOP4	SDIP6	SDIP6 F type	DIP(LF1, LF5)	DIP(LF4)
Tape Option			(TPL), (TPR)	(TPL), (TPR)	(TP)	(TP)	(TP)	(TP)	(TP)	(TP)	(TP15)	(TP)	(TP)	(TP1), (TP5)	(TP4)
Symbol (See figure above)	A	Dimensions	4.2 ± 0.1	4.0 ± 0.1	6.5 ± 0.1	3.1 ± 0.1	7.5 ± 0.1	4.3 ± 0.1	7.5 ± 0.1		2.35 ± 0.2	10.4 ± 0.1	12.3 ± 0.1	10.4 ± 0.1	12.3 ± 0.1
	B		7.6 ± 0.1		5.6 ± 0.1	7.5 ± 0.1	10.5 ± 0.1	7.5 ± 0.1	6.7 ± 0.1	10.5 ± 0.1	4.5 ± 0.1	5.1 ± 0.1		✻1	✻1
	C		12.0 ± 0.3				16.0 ± 0.3	12.0 ± 0.3	16.0 ± 0.3		12.0 ± 0.3	16.0 ± 0.3			
	D		5.5 ± 0.1				7.5 ± 0.1	5.5 ± 0.1	7.5 ± 0.1		5.5 ± 0.1	7.5 ± 0.1			
	E		1.75 ± 0.1												
	F		8.0 ± 0.1				12.0 ± 0.1	8.0 ± 0.1	12.0 ± 0.1		4.0 ± 0.1	12.0 ± 0.1	16.0 ± 0.1	12.0 ± 0.1	16.0 ± 0.1
	G		4.0 ± 0.1												
	J		$1.5^{+0.1}_{-0}$												
	K		3.15 ± 0.2	2.9 ± 0.2	3.4 ± 0.2	2.5 ± 0.2	2.4 ± 0.2	2.6 ± 0.2	2.5 ± 0.2	2.4 ± 0.2	2.4 ± 0.2	4.55 ± 0.2			
	K0		2.8 ± 0.1	2.6 ± 0.1	3.1 ± 0.1	2.3 ± 0.1	2.2 ± 0.1	2.4 ± 0.1	2.3 ± 0.1	2.2 ± 0.1	2.1 ± 0.1	4.1 ± 0.1			
	t		0.3 ± 0.05									0.4 ± 0.05			

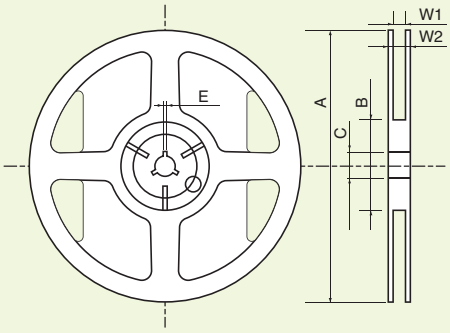
✻1: Typical devices

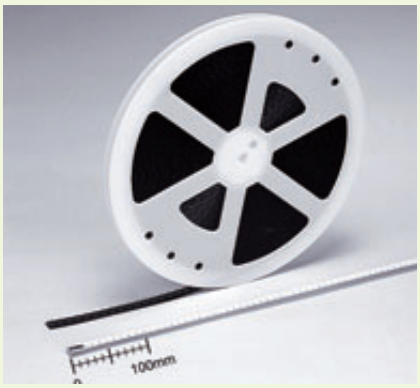
DIP4	**TLP620**	5.1 ± 0.1
DIP6 (short package)	**TLP631, TLP734, TLP747G**	7.6 ± 0.1
DIP8	**TLP555, TLP2601**	10.1 ± 0.1 (TP4) is not available

7 Packing Information

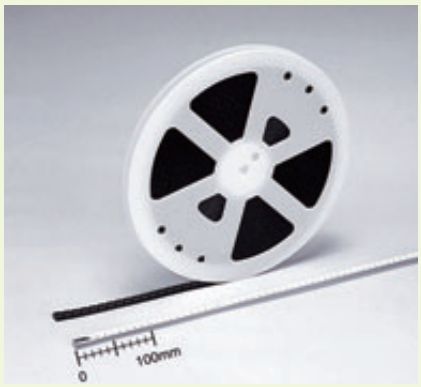
3. Reel Dimensions







ø380 mm



ø330 mm

ø180 mm

Unit: mm

Photocoupler Package Type			MFSOP, SO6	SO8	SOP4	SOP16	2.54SOP4	2.54SOP6	2.54SOP8	SSOP4	SDIP6	SDIP6 F type	DIP(LF1, LF5)	DIP(LF4)
Tape Option			(TPL), (TPR)	(TP)	(TP)	(TP)	(TP)			(TP15)	(TP)	(TP)	(TP1), (TP5)	(TP4)
Symbol (See figure above)	A	Dimensions	ø380 ± 2	ø330 ± 2						180^{+0}_{-4}	ø380 ± 2			
	B		ø80 ± 1							ø60	ø80 ± 1			
	C		ø13 ± 0.5							ø13	ø13 ± 0.5			
	E		2.0 ± 0.5							2 ± 0.5	2.0 ± 0.5			
	U		4.0 ± 0.5							4.0 ± 0.5	4.0 ± 0.5			
	W1		13.5 ± 0.5			17.5 ± 0.5	13.5 ± 0.5	17.5 ± 0.5		13 ± 0.3	17.5 ± 0.5			
	W2		17.5 ± 1.0			21.5 ± 1.0	17.5 ± 1.0	21.5 ± 1.0		15.4 ± 1.0	21.5 ± 1.0			

Photocouplers Manufactured in Thailand

Photocoupler Package Type			MFSOP	DIP6(LF1,LF5,LF4)	DIP4(LF1,LF5,LF4)	DIP8(LF1,LF5)
Tape Option			(TPL), (TPR)	(TP1), (TP5), (TP4)	(TP1), (TP5), (TP4)	(TP1), (TP5)
Symbol (See figure above)	A	Dimensions	ø380 ± 2		ø330 ± 2	
	B		ø80 ± 1			
	C		ø13 ± 0.5			
	E		2.0 ± 0.5			
	U		4.0 ± 0.5			
	W1		13.5 ± 0.5	17.5 ± 0.5		
	W2		17.5 ± 1.0	21.5 ± 1.0		

4. Other Packing Information

a) Device orientation on tape

Photocouplers are oriented in cavity, as shown below.

A)

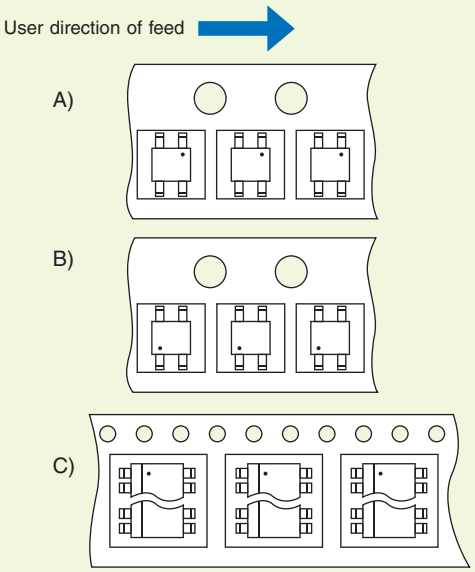
Photocoupler Package Type	Tape Option
MFSOP6, SO6	TPR

B)

Photocoupler Package Type	Tape Option
MFSOP6, SO6	TPL
SOP4, 2.54SOP4	TP
SSOP4	TP15

C)

Photocoupler Package Type	Tape Option
SOP16, SO8	TP
2.54SOP6/8	TP
SDIP6	TP
DIP(LF1, LF5)	TP1, TP5
DIP(LF4)	TP4



b) Tape Specifications

■ Quantities Per Reel

Photocoupler Package Type	MFSOP6, SO6	SOP4, SO8	SOP16	2.54SOP4/6/8	SSOP4	SDIP6	SDIP6 F type	DIP(LF1, LF5)	DIP(LF4)
Quantity (pcs)	3000	2500	2500	2500	1500	1500	1000	1500	1000

Photocouplers Manufactured in Thailand

Photocoupler Package Type	MFSOP	DIP4/6(LF1,LF5)	DIP4/6(LF4)	DIP8(LF1,LF5)
Quantity (pcs)	3000	1500	1000	1000

■ Empty Cavities

Item	Specification	Note
Consecutive empty cavities	Zero	Any 40-mm portion of tape except leader and trailer.
Non-consecutive empty cavities	0.2% max/reel ✻2	Except leader and trailer.

✻2: 6 pcs max/reel for DIP and SDIP packages

c) Packing boxes

One or five reels per box
Two or five reels per box for photocouplers manufactured in Thailand

d) Label

The reel label includes the following information:
1. Part number 2. Tape type 3. Quantity 4. Lot number

e) Purchase order

Specify the part number, tape and quantity as follows.

Example TLP181(GB-TPR, F) 3000 units

- Quantity*1
- RoHS COMPATIBLF*2
- Tape option
- CTR rank
- Photocoupler part number

*1: Must be a multiple of the quantity per-reel.
*2: "F" identifies the indication of product Labels with "[[G]]/RoHS COMPATIBLE".
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

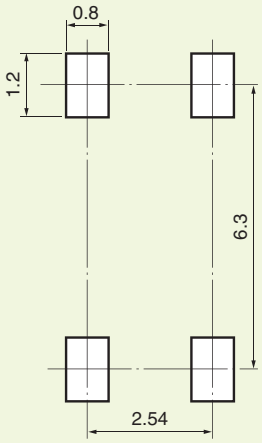
8 Board Assembly

1 Example Land Patterns

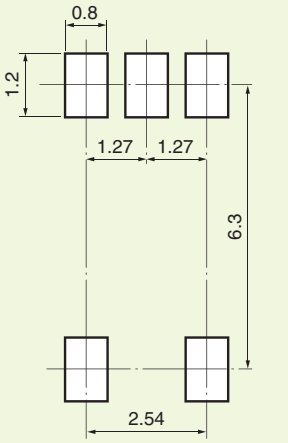
Below are the example land patterns for surface-mount packages.

Mini-flat and SOP couplers

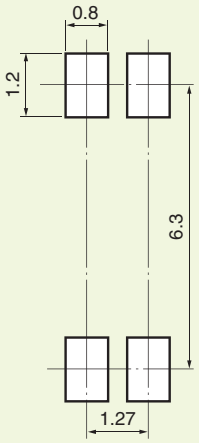
Unit: mm



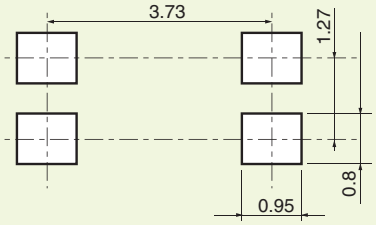
MFSOP6 (4-Pin) [e.g., TLP181]
2.54SOP4 [e.g., TLP197G]
SO6 (4-Pin) [e.g., TLP265J]



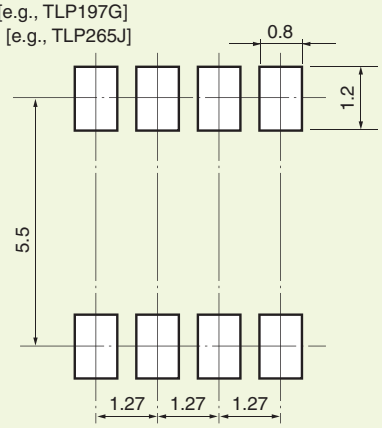
MFSOP6 (5-Pin) [e.g., TLP114A]



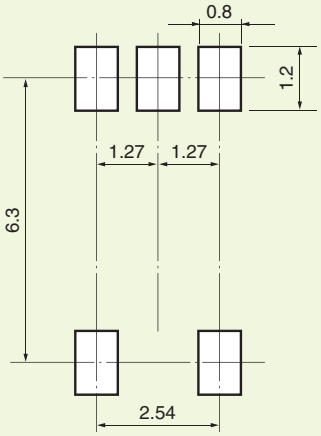
SOP4 [e.g., TLP280]



SSOP4 [e.g., TLP3213]



SO8 [e.g., TLP2105]

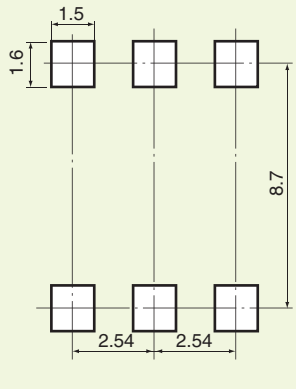


SO6 (5-Pin) [e.g., TLP109]

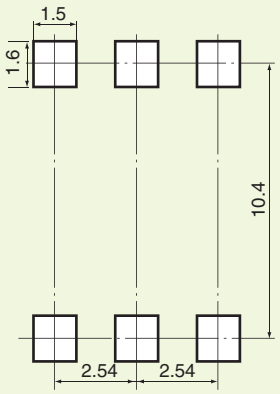
Surface-Mount Lead-Formed Photocouplers

Example: **6-pin DIP package**

Unit: mm



(LF1)&(LF5) [e.g., TLP734(LF1)]

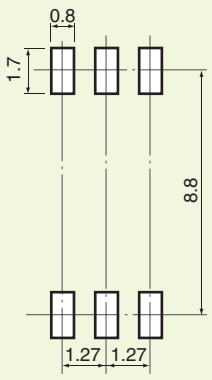


(LF4) [e.g., TLP734(LF4)]

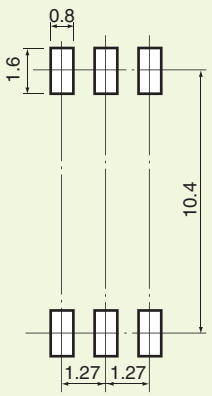
For the example land patterns for the TLP781, see its datasheet.

Example: **6-pin SDIP package**

Unit: mm



SDIP6 [e.g., TLP719]



SDIP6 (F type) [e.g., TLP719F]

2 Board Assembly Considerations

1. Soldering

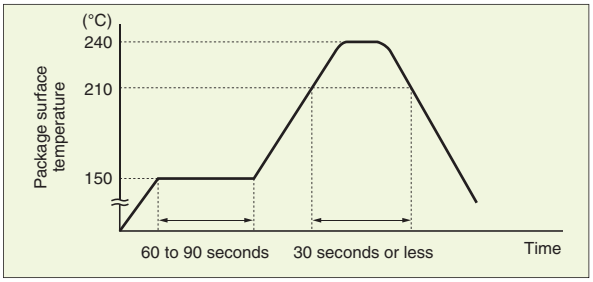
When using a soldering iron or medium infrared ray/hot air reflow, avoid a rise in device temperature as much as possible by observing the following conditions.

1.1) Using a soldering iron

a. Solder once within 10 seconds for a lead temperature of up to 260°C.
b. Solder once within 3 seconds for a lead temperature of up to 350°C.

1.2) Using medium infrared ray/hot air reflow

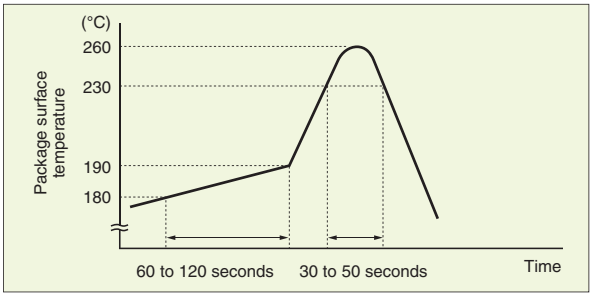
a. Complete the infrared ray/hot air reflow process at once within 30 seconds at a package surface temperature between 210°C and 240°C.
b. Example of temperature profile of lead (Pb) solder



Example of temperature profile of lead (Pb) solder

c. Example of temperature profile of lead (Pb)-free solder

The profile below shows only the typical temperature profile and conditions, which might not apply to all Toshiba photocouplers. Temperature profiles and conditions may differ from product to product. Refer to the relevant technical datasheets and databooks when mounting a device.



Example of temperature profile of lead (Pb)-free solder

d. Precautions for heating

Keeping packages at high temperature for a long period of time can degrade the quality and reliability of devices. Soldering time has to be kept as short as possible to avoid a rise in package temperature.
When using a halogen lamp or infrared heater, avoid direct irradiation of packages, since this may cause a rise in package temperature.

1.3) Dip soldering (flow soldering)

The thermal shock of dip soldering increases thermal stress on devices. To avoid stress, the use of a soldering iron or medium infrared ray/hot air reflow is recommended. If you want to use dip soldering, contact your nearest Toshiba sales representative.

2. Flux Cleaning

- When cleaning circuit boards to remove flux, make sure that no residual reactive ions such as sodium(Na^+) or chloride(Cl^-) ions remain. Note that organic solvents react with water to generate hydrogen chloride and other corrosive gases, which can degrade device performance.
- Washing devices with water will not cause any problems. However, make sure that no reactive ions such as sodium(Na^+) or chloride(Cl^-) ions are left as residue. Also, be sure to dry devices sufficiently after washing.
- Do not rub device markings with a brush or with your hand during cleaning or while the devices are still wet from the cleaning agent. Doing so can rub off the markings.
- Dip cleaning, shower cleaning and steam cleaning processes all involve the chemical action of a solvent. Use only recommended solvents for these cleaning methods. When immersing devices in a solvent or steam bath, make sure that the temperature of the liquid is 50°C or below and that the circuit board is removed from the bath within one minute.
- If a device package allows ultrasonic cleaning, keep the duration of ultrasonic cleaning as short as possible, since long hours of ultrasonic cleaning degrade the adhesion between the mold resin and the frame material.

■ The following ultrasonic cleaning conditions are recommended.

Frequency: 27 kHz to 29 kHz
Ultrasonic output power: 300 W or less (0.25 W/cm^2 or less)
Cleaning time: 30 seconds or less

Suspend the circuit board in the solvent bath during ultrasonic cleaning in such a way that the ultrasonic vibrator does not come into direct contact with the circuit board or the device.
Conventional cleaning solvents that contain freon are not recommended due to its adverse effection the earth's ozone layer. Alternative freon-free products are available on the market. Some of these alternative cleaning agents are listed in the table below. Contact Toshiba or a Toshiba distributor regarding cleaning conditions and other relevant information for each product type.

Examples of Alternative Cleaning Agents

Technocare	FRW-1, FRW-17, FRV-100	GE Toshiba Silicon
Asahi Clean	AK-225AES	Asahi Glass Co., Ltd
Clean Through	750H	Kao Co., Ltd.
Pine Alpha	ST-100S, ST-100SX	Arakawa Chemical Co., Ltd.

9 Device Degradation

1 Projected Operating Life Based on LED Light Output Degradation

Toshiba photocouplers use one of four types of LEDs and a projection of the operating life has been made for each LED. The table on page 57 shows the types of LED used in photocouplers and the figures on pages 58 to 60 show projections of long-term light output performance and operating life. Note that these operating life data are estimates extrapolated from long-term light output degradation over a single wafer lot and are shown as reference only.

	Projected Operating Life (Ta = 40°C, I_F = 20 mA, failure criteria: degradation rate ΔP_O < –50%)		Photocouplers
	F50% operating life	F0.1% operating life	
① GaAs LED	1,300,000 h	260,000 h	Mainly for phototransistor output devices and phototriac output devices
② GaAℓAs(SH) LED	540,000 h	100,000 h	Mainly for photo-IC couplers
③ GaAℓAs(DH) LED	1,000,000 h	200,000 h	Mainly for photorelays (MOSFET output), photovoltaic couplers and photo-IC couplers
④ GaAℓAs(MQW) LED	Ask your local Toshiba sales representative.		Mainly for photo-IC couplers

F50% (cumulative failure rate 50%) operating life: Time period until the projected long-term light output degradation curve of the average light output change ($\overline{X}$) shown on pages 58 to 60 reaches the failure criteria.

F0.1% (cumulative failure rate 0.1%) operating life: Time period until the projected long-term light output degradation curve of $\overline{X} - 3\sigma$ shown on pages 58 to 60 reaches the failure criteria.

The relationship between LED light output degradation and optical coupling characteristics is shown below.

(1) The relationship between LED light output degradation and current transfer ratio (CTR)/short circuit current (I_{SC}) is 1:1.

$$\frac{CTR(t)}{CTR(o)} = \frac{Po(t)}{Po(o)}$$

(2) The relationship between a reciprocal value of LED light output degradation and I_{FT}/I_{FLH}/I_{FHL}/I_{FH} change is 1:1.

$$\frac{I_{FT}(t)}{I_{FT}(o)} = \left(\frac{Po(t)}{Po(o)}\right)^{-1}$$

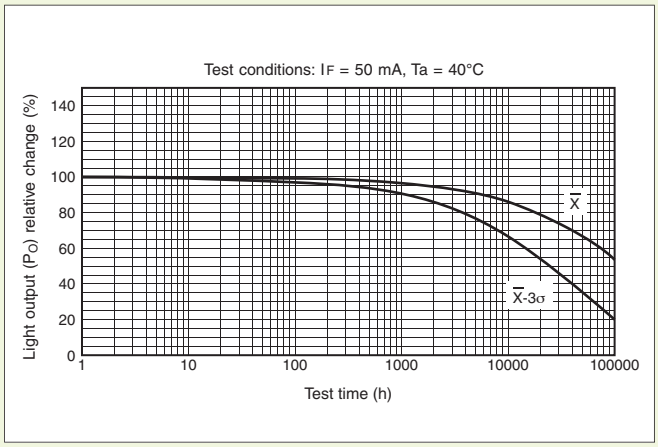
LEDs Used in Photocouplers

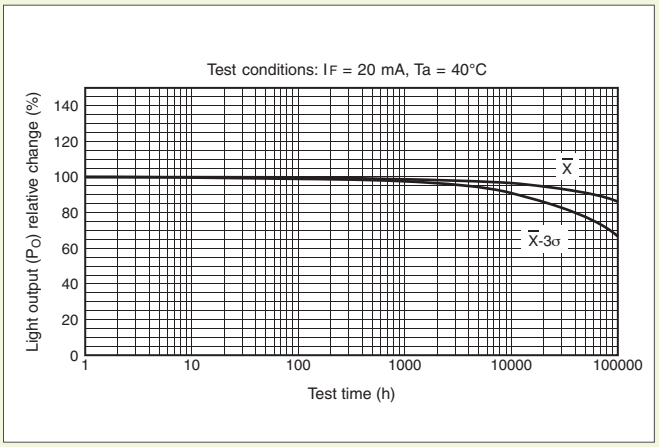
LED: ① GaAs LED ② GaAℓAs (SH) LED ③ GaAℓAs (DH) LED ④ GaAℓAs (MQW) LED

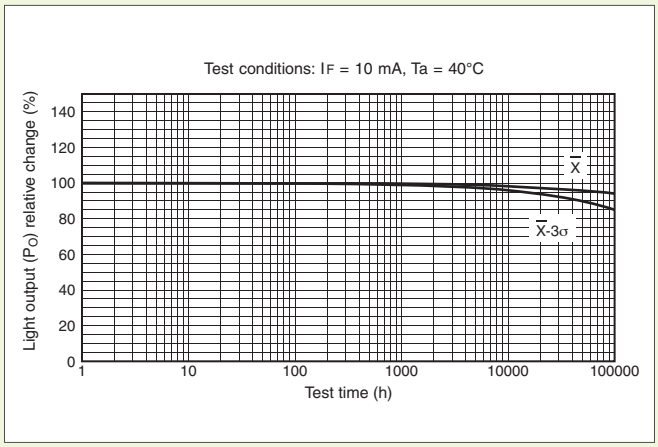
Photocouplers	LED	Photocouplers	LED	Photocouplers	LED	Photocouplers	LED	Photocouplers	LED
4N25 (SHORT)	①	TLP160 Series	①	TLP363 Series	①	TLP599 Series	①	TLP2630	②
4N25A (SHORT)	①	TLP161 Series	①	TLP371	①	TLP620 Series	①	TLP2631	②
4N26 (SHORT)	①	TLP163	①	TLP372	①	TLP621 Series	①	TLP3022(S) Series	①
4N27 (SHORT)	①	TLP165J	①	TLP373	①	TLP624 Series	①	TLP3042(S) Series	①
4N28 (SHORT)	①	TLP166J	①	TLP421 Series	①	TLP626 Series	①	TLP3063(S) Series	③
4N29 (SHORT)	①	TLP168J	③	TLP504A	①	TLP627 Series	①	TLP31xx Series	①
4N29A (SHORT)	①	TLP172 Series	①	TLP512	②	TLP628 Series	①	TLP32xx Series	①
4N30 (SHORT)	①	TLP174G	①	TLP513	②	TLP629 Series	①	TLP3230	①
4N31 (SHORT)	①	TLP176 Series	①	TLP521-1	①	TLP630	①	TLP3231	①
4N32 (SHORT)	①	TLP180	①	TLP521-2	①	TLP631	①	TLP3240	③
4N32A (SHORT)	①	TLP181	①	TLP521-4	①	TLP632	①	TLP3241	③
4N33 (SHORT)	①	TLP190B	③	TLP523 Series	①	TLP641 Series	①	TLP3250	③
4N35 (SHORT)	①	TLP191B	③	TLP525G Series	①	TLP651	②	TLP3762(S) Series	①
4N36 (SHORT)	①	TLP192 Series	①	TLP531	①	TLP700	③	TLP3904	①
4N37 (SHORT)	①	TLP197 Series	①	TLP532	①	TLP701	②	TLP3914	③
4N38 (SHORT)	①	TLP200D	①	TLP541G	①	TLP702	②	TLP3924	③
4N38A (SHORT)	①	TLP202 Series	①	TLP542G	①	TLP705	②	TLP4xxx Series	①
6N135	②	TLP206 Series	①	TLP543J	①	TLP706	②	TLP104	④
6N136	②	TLP222 Series	①	TLP545J	①	TLP716	②	TLP118	④
6N137	②	TLP224G Series	①	TLP550	②	TLP719	②	TLP151	④
6N138	②	TLP225A	①	TLP551	②	TLP731	①	TLP350H	④
6N139	②	TLP227 Series	①	TLP552	②	TLP732	①	TLP351H	④
TLP102	②	TLP250 Series	②	TLP553	②	TLP733 Series	①	TLP700H	④
TLP106	②	TLP251 Series	②	TLP554	②	TLP734 Series	①	TLP701H	④
TLP112	②	TLP260J	①	TLP555	②	TLP741 Series	①	TLP708	④
TLP112A	③	TLP270 Series	①	TLP557	②	TLP747 Series	①	TLP714	④
TLP113	②	TLP280 Series	①	TLP558	②	TLP750 Series	②	TLP754	④
TLP114A	③	TLP281 Series	①	TLP559	②	TLP751 Series	②	TLP2168	④
TLP115	②	TLP283 Series	①	TLP560 Series	①	TLP759 Series	②	TLP2368	④
TLP115A	③	TLP296G	①	TLP561 Series	①	TLP762J Series	①	TLP2404	④
TLP116	③	TLP320 Series	①	TLP570	①	TLP763J Series	①	TLP2409	④
TLP117	③	TLP330	①	TLP571	①	TLP797 Series	①	TLP2418	④
TLP124	①	TLP331	①	TLP572	①	TLP798GA	③	TLP2451	④
TLP126	①	TLP332	①	TLP590B	③	TLP2066	③	TLP2468	④
TLP127	①	TLP350	②	TLP591B	③	TLP2200	②	TLP2768	④
TLP130	①	TLP351	②	TLP592 Series	①	TLP2530	②		
TLP131	①	TLP351A	②	TLP594 Series	①	TLP2531	②		
TLP137	①	TLP360 Series	①	TLP597 Series	①	TLP2601	②		
TLP141G	①	TLP361 Series	①	TLP598 Series	③	TLP260J	①		

9 Device Degradation

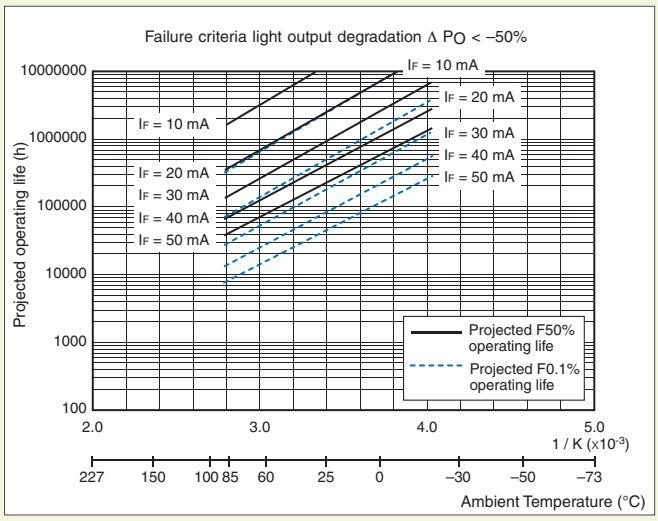
① GaAs LED Projected Light Output Degradation Data

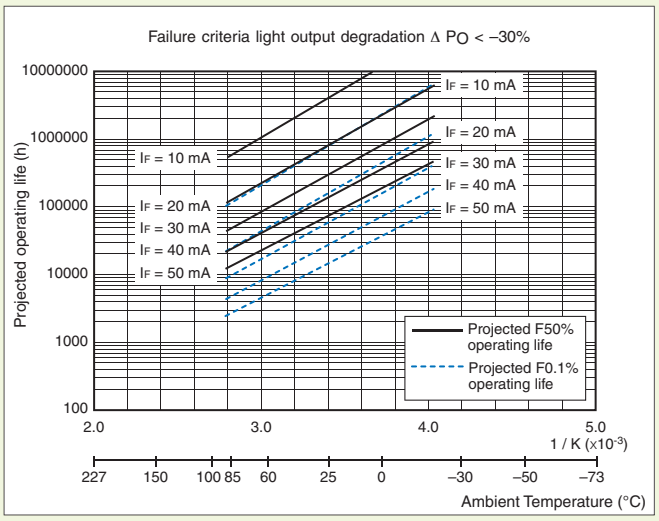






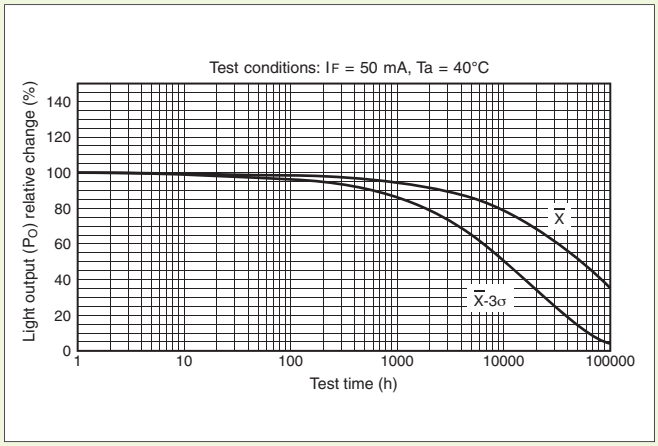
① GaAs LED Projected Operating Life Data

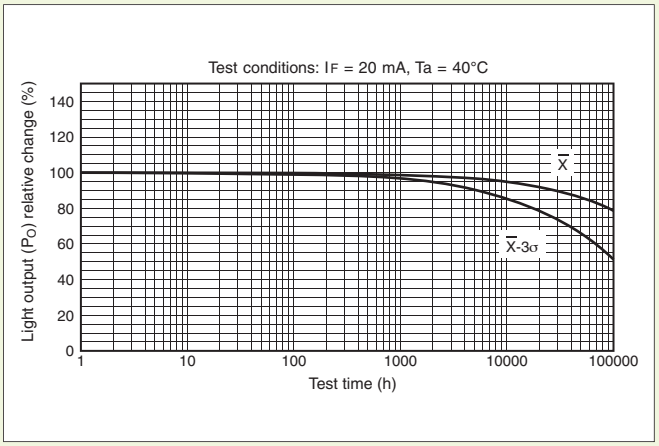


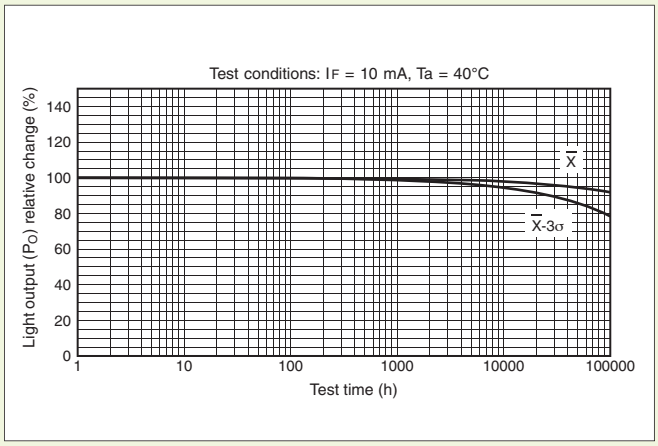


The above operating life data are estimates extrapolated from long-term light output degradation over a single wafer lot and are shown as reference only. Operating conditions exceeding the maximum ratings are not guaranteed.

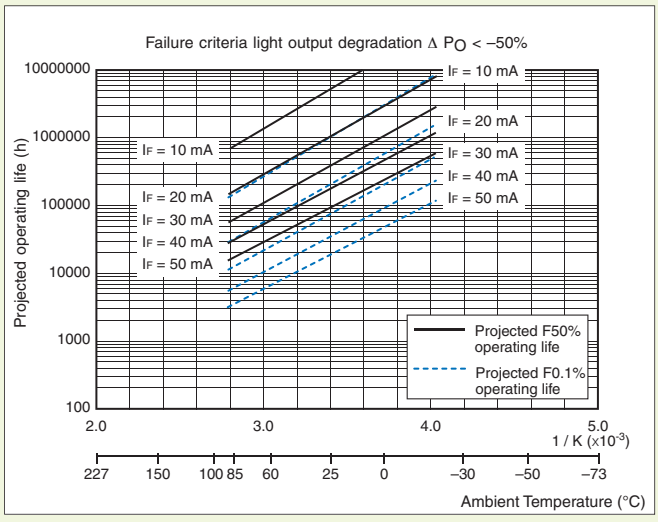
② GaAℓAs (SH) LED Projected Light Output Degradation Data

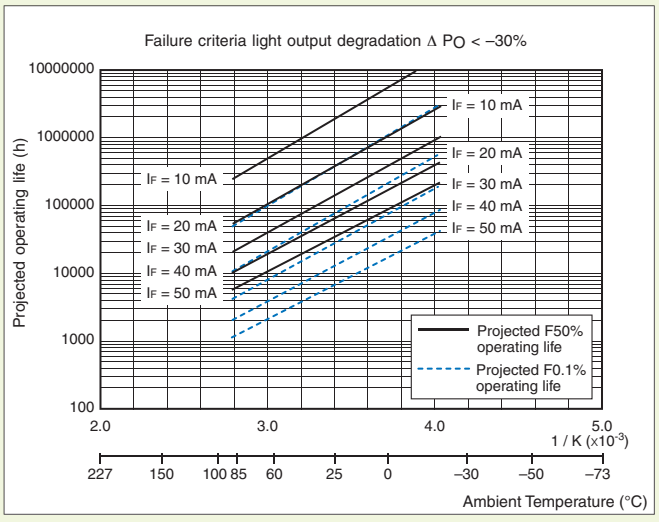






② GaAℓAs (SH) LED Projected Operating Life Data

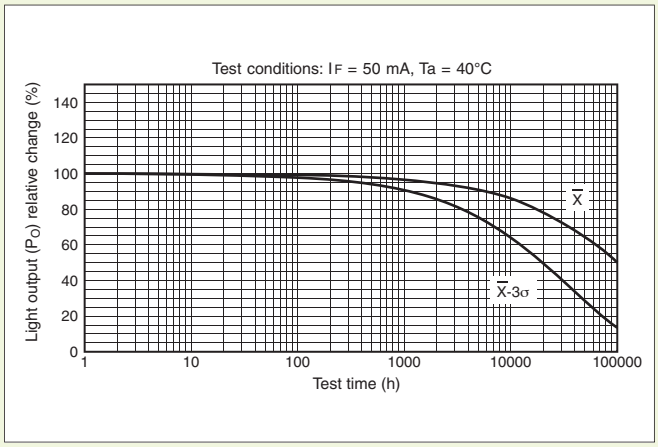


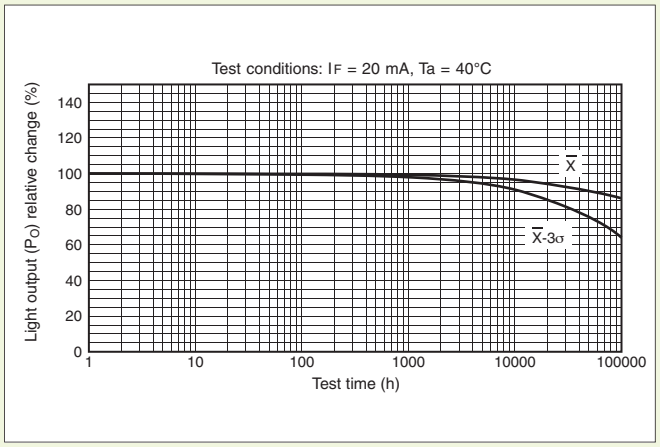


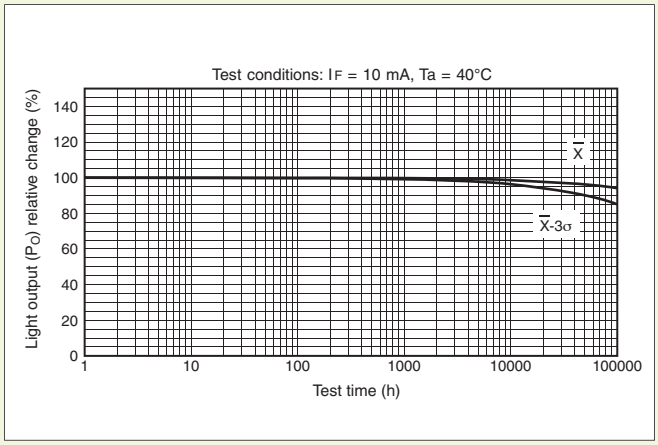
The above operating life data are estimates extrapolated from long-term light output degradation over a single wafer lot and are shown as reference only. Operating conditions exceeding the maximum ratings are not guaranteed.

9 Device Degradation

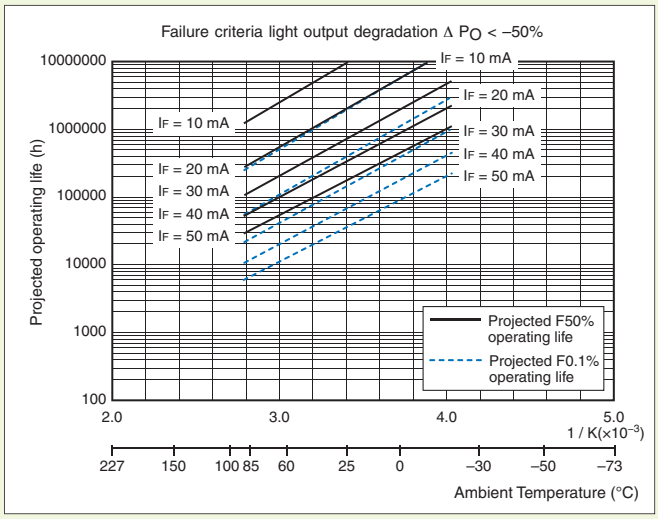
③ GaAℓAs (DH) LED Projected Light Output Degradation Data

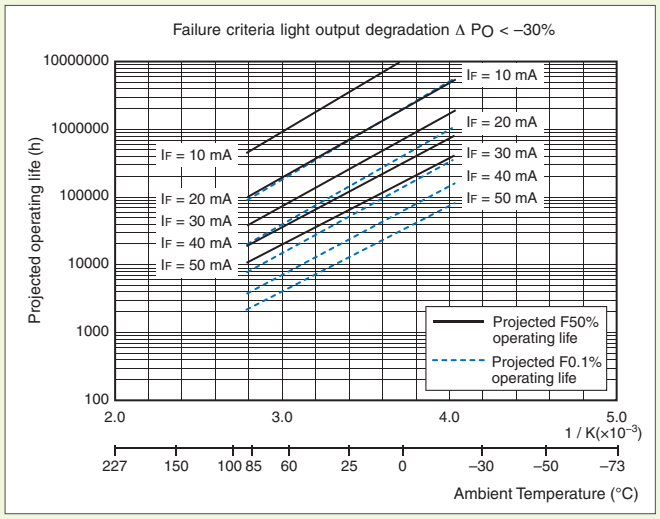






③ GaAℓAs (DH) LED Projected Operating Life Data





The above operating life data are estimates extrapolated from long-term light output degradation over a single wafer lot and are shown as reference only. Operating conditions exceeding the maximum ratings are not guaranteed.

④ GaAℓAs (MQW) LED Projected Light Output Degradation and Operating Life Data

Toshiba is now preparing the light output degradation and operating life data for GaAℓAs LEDs.
These data are available for individual LEDs. Ask your local Toshiba sales representative.

Note

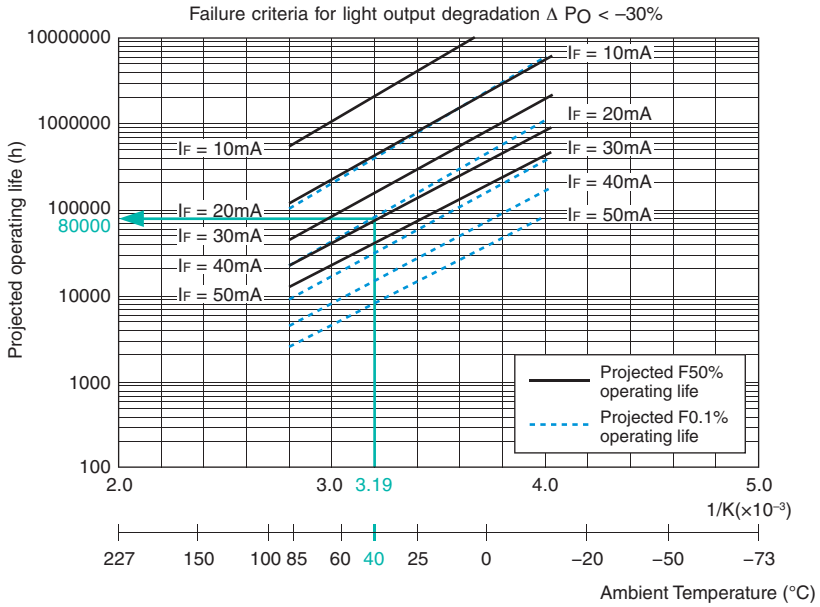
9 Device Degradation

Reading the Projected LED Operating Life Graph

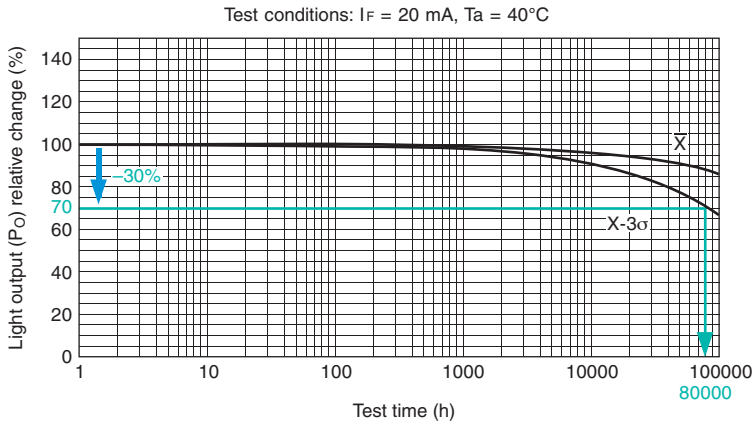
For example, let's calculate the operating life of the GaAs LED, based on the data shown on page 60.
Here is an example of how to read an operating life, assuming that the ambient temperature (Ta) is 40°C and that the failure criterion is a 30% decrease in light output.
Suppose that the initial LED current, IF, is 20 mA. Since the horizontal axis of the failure criteria graph is the reciprocal of absolute temperature, it is necessary to convert the ambient temperature (Ta) to the reciprocal of absolute temperature (T):

$$T = \frac{1}{Ta + 273.15} = \frac{1}{40 + 273.15} \fallingdotseq 3.19 \times 10^{-3}$$

The graph shows the projected lifetimes for F50% and F0.1% cumulative failure probabilities in solid and dashed lines respectively. Normally, it is recommended to use F0.1% lines.
As X = 3.19, its intersection with the IF = 20 mA line for F0.1% is approximately 80,000 hours. (This figure is for reference only.)



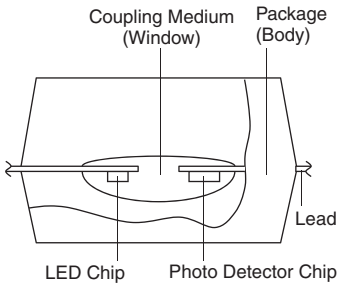
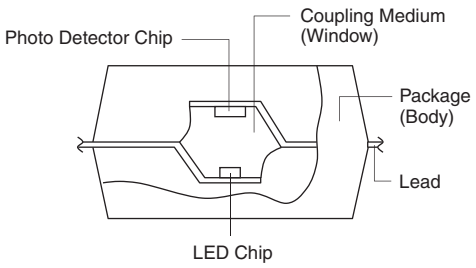
You can also estimate the projected operating life from the projected light output degradation data.



10 Safety Standard Approvals

Toshiba offers a wide selection of photocouplers with a transistor output, IC output, thyristor output and triac output, as well as photorelays certified to UL (USA), cUL (Canada), VDE (Germany), BSI (Britain) and SEMKO (Sweden).

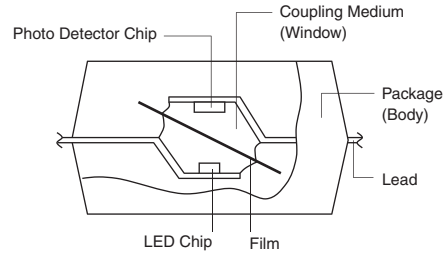
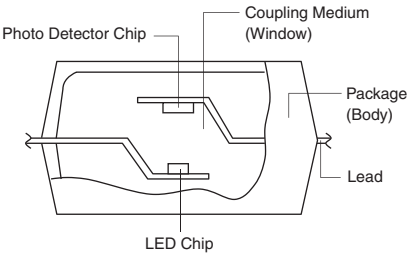
Safety Standard Approvals for Photocouplers (DIN EN60747-5-2)

Mechanical Construction		Reflective Photocouplers in Single-Molded Packages			Transmissive Photocouplers in Single-Molded Packages				
Internal Construction									
Package		**SOP4/SOP16**		**MFSOP6**	**MFSOP6**	**SO8** (2 ch)	**2.54SOP 4/6/8**	**DIP**	**DIP** (F type)
Construction Mechanical Ratings (min)	Isolation Creepage Path (mm)	4.0	5.0	4.0	4.0	4.2	4.0	6.4/7.0	8.0
	Isolation Clearance (mm)	4.0	5.0	4.0	4.0	4.2	4.0	6.4/7.0	8.0
	Isolation Thickness (mm)	0.4	0.4	0.4	–	–	–	(0.4)	(0.4)
	Internal Creepage Path (mm)	–	–	–	–	–	–	–	–
VDE/TÜV DIN EN 60747-5-2	Max. Working Insulation Voltage (Viorm)	565 Vpk	707 Vpk	565 Vpk	565 Vpk	565 Vpk	565 Vpk	630 Vpk /890 Vpk	1140 Vpk
	Highest Allowable Overvoltage (Viotm)	4000 Vpk	6000 Vpk	6000 Vpk	4000 Vpk	4000 Vpk	2500 Vpk	4000 Vpk	6000 Vpk

Certified Devices	IC Output					**TLP2105 TLP2108 TLP2166A TLP2116 TLP2117**		**TLP350 TLP351**	**TLP350F TLP351F**
	Transistor Output	**TLP280 TLP280-4 TLP281 TLP281-4**	**TLP284 TLP284-4 TLP285 TLP285-4**	**TLP180 TLP181**	**TLP127**				
	Triac/Thyrsitor Output			**TLP260J TLP261J**	**TLP160G TLP160J TLP161G TLP161J**			**TLP560G TLP560J TLP561G TLP561J**	
	Photorelay						**TLP176A TLP176D TLP176G TLP197G TLP206G**	**TLP227G TLP227G-2 TLP597G**	

The table above lists photocouplers and photorelays that have already been approved as of January 2011. The information herein is subject to change. For the latest information, please contact your nearest Toshiba sales representative.

Safety Standard Approvals for Photocouplers (DIN EN60747-5-2) (Continued)

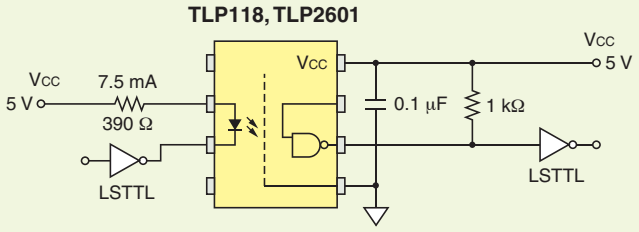
Mechanical Construction		Transmissive Photocouplers with an Insulating Film in Single-Molded Packages					Transmissive Photocouplers in Double-Molded Packages			
Internal Construction										
Package		**SO8** (1 ch)	**SDIP6**	**SDIP6** (F type)	**DIP**	**DIP** (F type)	**MFSOP6**	**SO6**	**DIP**	**DIP** (F type)
Construction Mechanical Ratings (min)	Isolation Creepage Path (mm)	4.2	7.0	8.0	6.4/7.0	8.0	4.0	5.0	6.5/7.0	8.0
	Isolation Clearance (mm)	4.2	7.0	8.0	6.4/7.0	8.0	4.0	5.0	6.5/7.0	8.0
	Isolation Thickness (mm)	0.4	0.4	0.4	0.4/0.5	0.4/0.5	–	0.4	0.4/0.5	0.4/0.5
	Internal Creepage Path (mm)	–	–	–	–	–	–	–	4.0	4.0
VDE/TÜV DIN EN 60747-5-2	Max. Working Insulation Voltage (Viorm)	565 Vpk	890 Vpk	1140 Vpk	890 Vpk	1140 Vpk	565 Vpk	707 Vpk	890 Vpk /1130 Vpk	890 Vpk /1130 Vpk
	Highest Allowable Overvoltage (Viotm)	6000 Vpk	8000 Vpk	8000 Vpk	6000 Vpk /8000 Vpk	6000 Vpk /8000 Vpk	4000 Vpk /6000 Vpk	6000 Vpk	6000 Vpk /8000 Vpk	6000 Vpk /8000 Vpk
Certified Devices	IC Output	**TLP2403 TLP2405 TLP2408 TLP2409**	**TLP701 TLP705 TLP715 TLP716 TLP718 TLP719**	**TLP701F TLP705F TLP715F TLP716F TLP718F TLP719F**	**TLP350H TLP351H TLP750 TLP751 TLP759**	**TLP350HF TLP351HF TLP750F TLP751F TLP759F**	**TLP105 TLP108 TLP114A TLP116 TLP117 TLP2066**	**TLP109 TLP116A TLP104 TLP151**		
	Transistor Output				**TLP620 TLP620-2 TLP620-4 TLP627 TLP627-2 TLP627-4 TLP731 TLP732**	**TLP620F TLP620F-2 TLP621F TLP621F-2**			**TLP733 TLP734 TLP781**	**TLP733F TLP734F TLP781F**
	Triac/Thyrsitor Output				**TLP360J TLP361J TLP363J TLP3022(S) TLP3023(S) TLP3042(S) TLP3043(S) TLP3052(S) TLP3062(S) TLP3063(S) TLP3064(S) TLP3082(S) TLP3762(S) TLP3782(S) TLP3783(S)**	**TLP360JF TLP361JF TLP363JF TLP3022F(S) TLP3023F(S) TLP3042F(S) TLP3043F(S) TLP3052F(S) TLP3062F(S) TLP3063F(S) TLP3064F(S) TLP3082F(S) TLP3762F(S) TLP3782F(S) TLP3783F(S)**	**TLP165J TLP166J**	**TLP265J TLP266J**	**TLP762J TLP763J TLP748J**	**TLP762JF TLP763JF TLP748JF**

The table above lists photocouplers and photorelays that have already been approved as of January 2011. The information herein is subject to change. For the latest information, please contact your nearest Toshiba sales representative.

11 Photocoupler Application Circuit Examples

1 Digital Interface Applications

High Speed

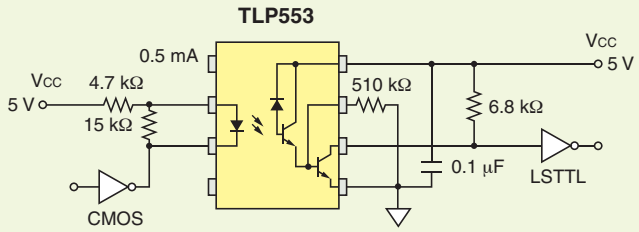


The **TLP2601** allows high-speed data transmission at up to approximately 5 MHz.

Data rate of left-side circuit

f (typ.): 5 Mbit/s (duty cycle ≅ 1/2)

Low Input Current Drive

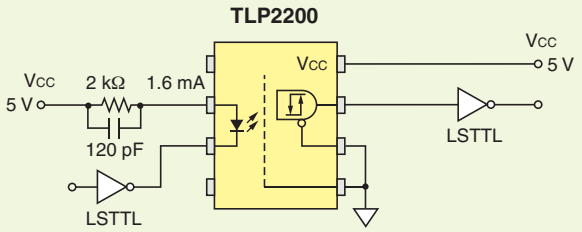


The high-CTR (current transfer ratio) **TLP553** allows operation with low input current (0.5 mA) and direct driving with a CMOS signal.

Data rate of left-side circuit

f (typ.): 50 kbit/s (duty cycle ≅ 1/2)

No Pull-up Resistor Required

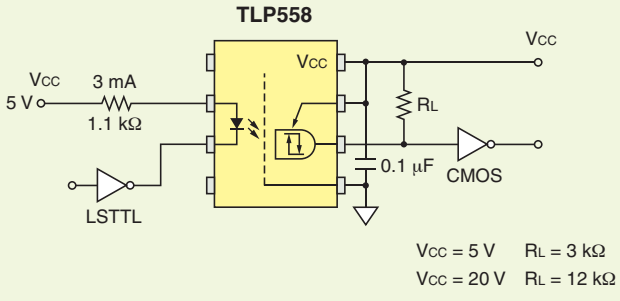


When the **TLP2200** with a 3-state output is used, the next-stage logic gate can be actuated without using a pull-up resistor.

Data rate of left-side circuit

f (typ.): 1 Mbit/s (duty cycle ≅ 1/2)

High Vcc Tolerance



By using the **TLP558** which tolerates V_{CC} up to 20 V, CMOS logic gates and other components can be driven without design restrictions on V_{CC}.

Data rate of left-side circuit

f (typ.): 1 Mbit/s (duty cycle ≅ 1/2)

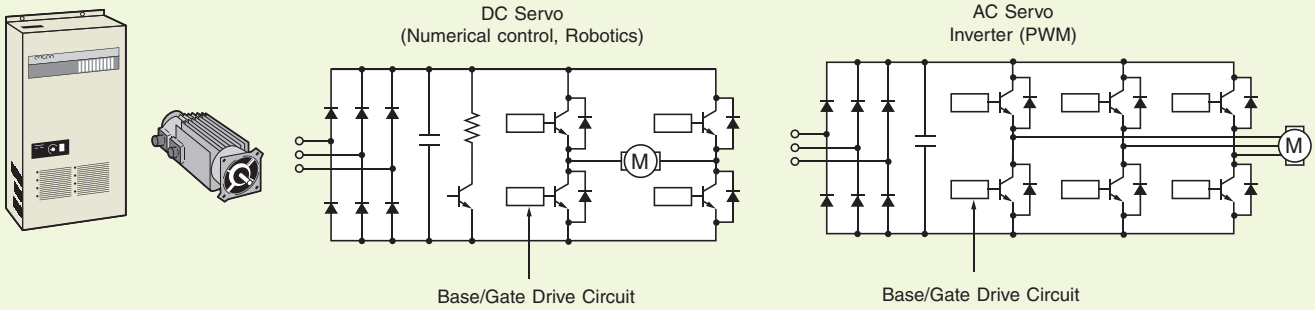
11 Photocoupler Application Circuit Examples

2 Inverter and AC-DC Servo Applications

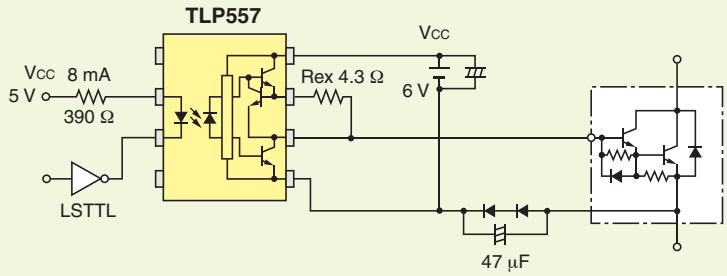
[Photo-IC couplers: high-speed base/gate drive applications]

TLP109/TLP2409
TLP550/TLP559
TLP759

- GTR Direct Drive — **TLP557**
- IGBT / Power MOS Direct Drive
  - (for medium-power IGBTs): **TLP350/TLP358/TLP700**
  - (for small-power IGBTs): **TLP351/TLP701/TLP705**
- High-Speed — **TLP118/TLP554**

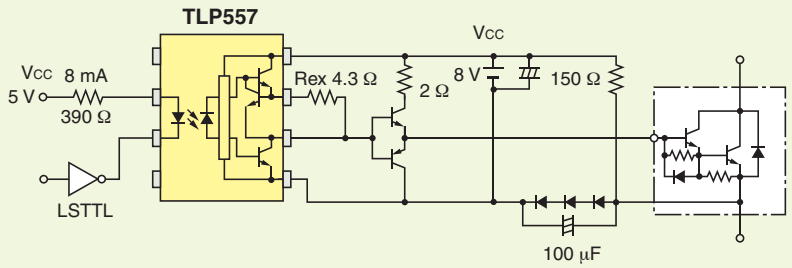


Driving the Base of a 15-A-Class GTR (Giant Transistor) Module



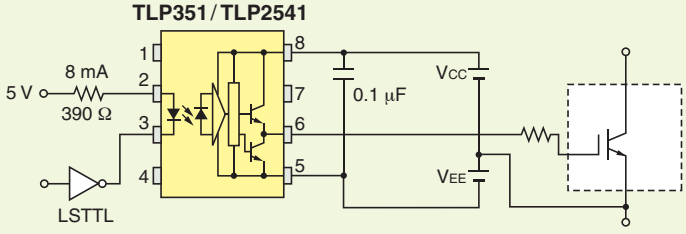
The **TLP557** drives the base of a GTR directly. An external resistor, Rex, is connected between pins 6 and 7. This resistor causes the base current to become constant and stabilizes the GTR drive.

Driving the Base of a 100-A-Class GTR Module



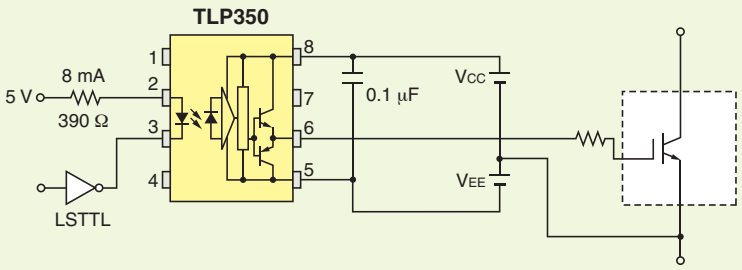
The **TLP557** photo-IC coupler and two booster transistors can drive a high-power GTR.

Driving the Gate of a 15-A-Class IGBT (Insulated Gate Bipolar Transistor) Module



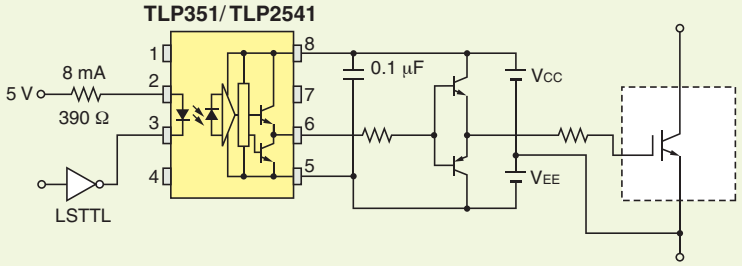
The **TLP151**, **TLP351**, **TLP701**, **TLP705** and **TLP2541** high-speed photo-IC photocouplers can drive a low-power IGBT directly.

Driving the Gate of a 50-A-Class IGBT Module



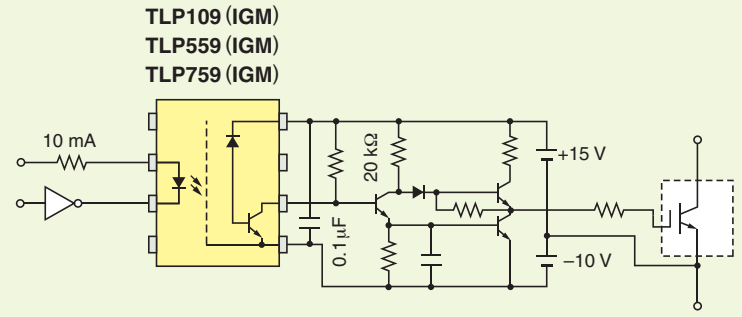
The **TLP350** and **TLP700** can drive a medium-power IGBT directly.

Driving the Gate of a 400-A-Class IGBT Module



The **TLP351**, **TLP701**, **TLP705** or **TLP2541** high-speed photo-IC photocoupler and two booster transistors can drive a high power IGBT.

Driving the Gate of an IGBT Module Using an IGM Photocoupler



IGM photocouplers are suitable for driving an intelligent power module (IPM). These photocouplers guarantee symmetrical low-to-high and high-to-low propagation delays ($|t_{PLH} - t_{PHL}|$) and provides a high common mode transient immunity.

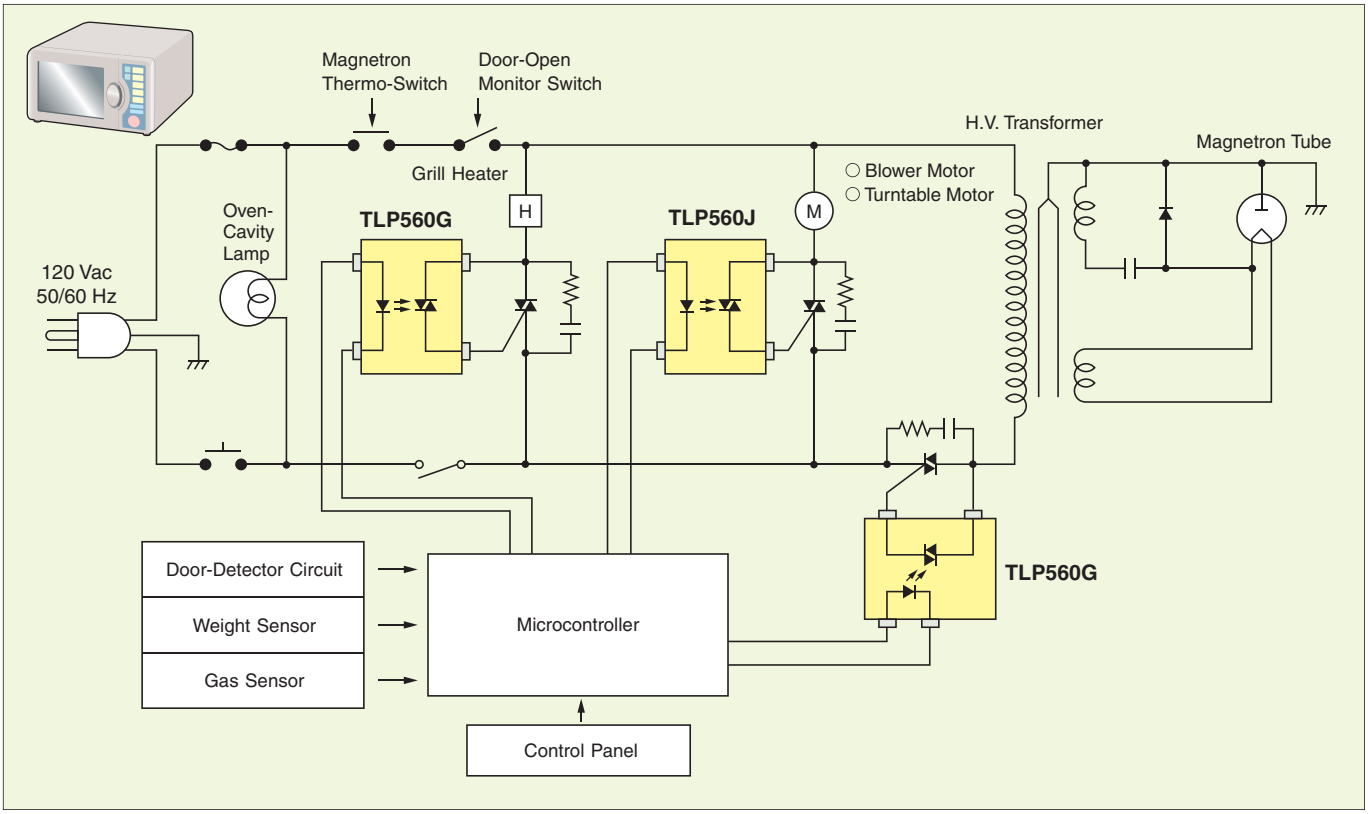
IGM Selection

Part Number	Package	BVs (Vrms)	V_O/V_{CC}	CTR	$\lvert t_{PLH} - t_{PHL} \rvert$	CM_H	CM_L
TLP109 (IGM)	SO6	3750	20 V / 30 V max	25% min 75% max @I_F = 10 mA V_{CC} = 4.5 V V_O = 0.4 V	0.7 μs max @I_F = 10 mA R_L = 20 kΩ	10000 V / μs min @I_F = 0 mA R_L = 20 kΩ V_{CM} = 1500 Vp-p	– 10000 V / μs min @I_F = 10 mA R_L = 20 kΩ V_{CM} = 1500 Vp-p
TLP559 (IGM)	DIP8	2500					
TLP759 (IGM)	DIP8	5000					

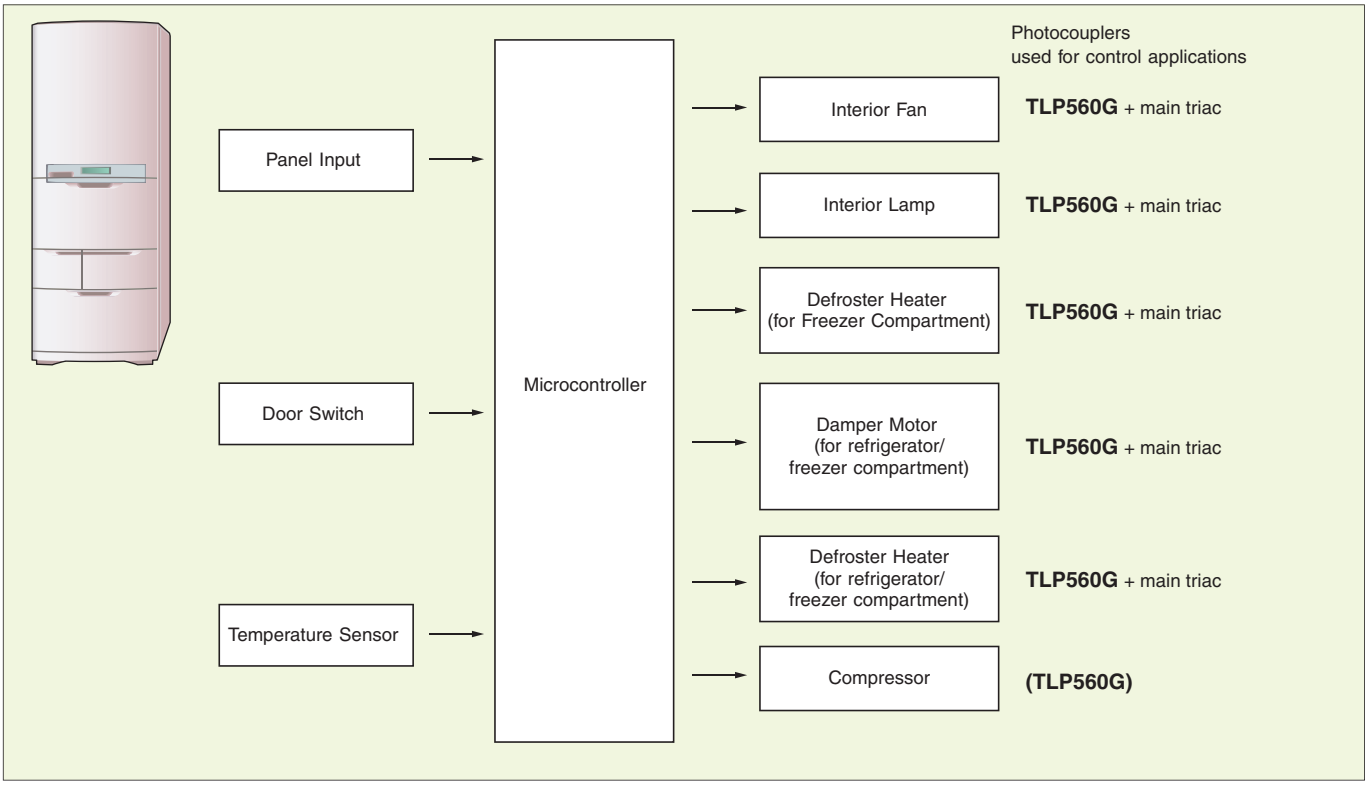
11 Photocoupler Application Circuit Examples

3 Home Appliance Applications

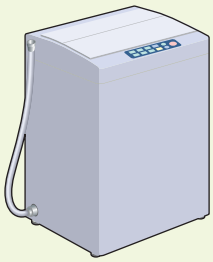
Electric Oven/Grills

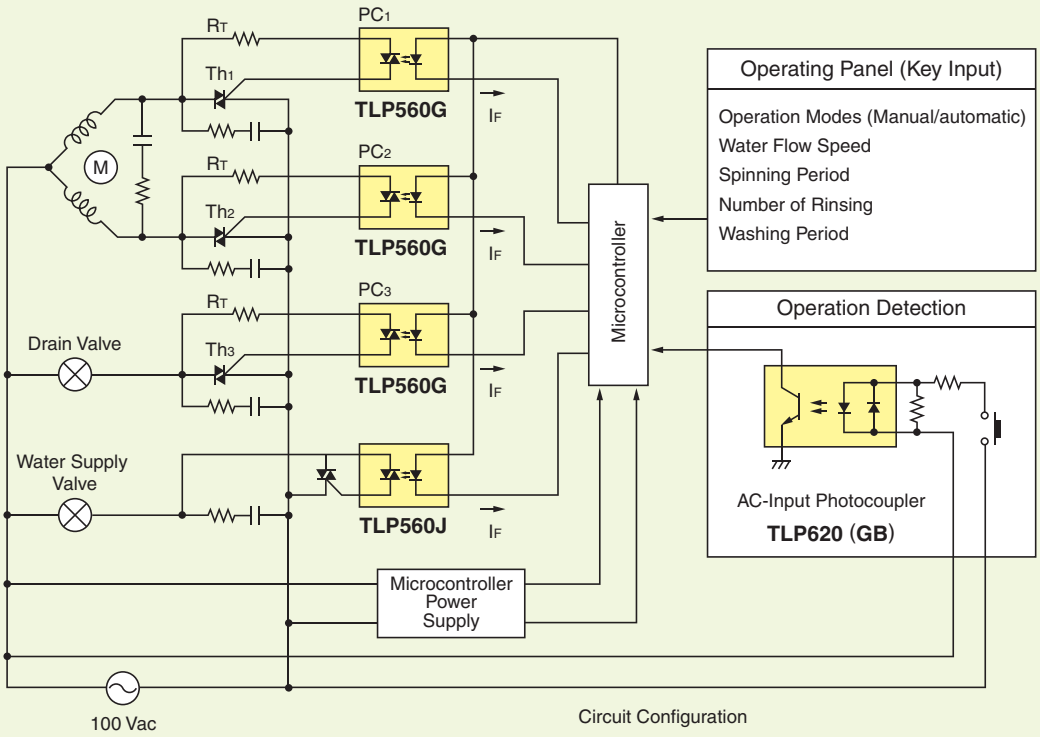


Refrigerator Block Diagram



Automatic Washing Machines

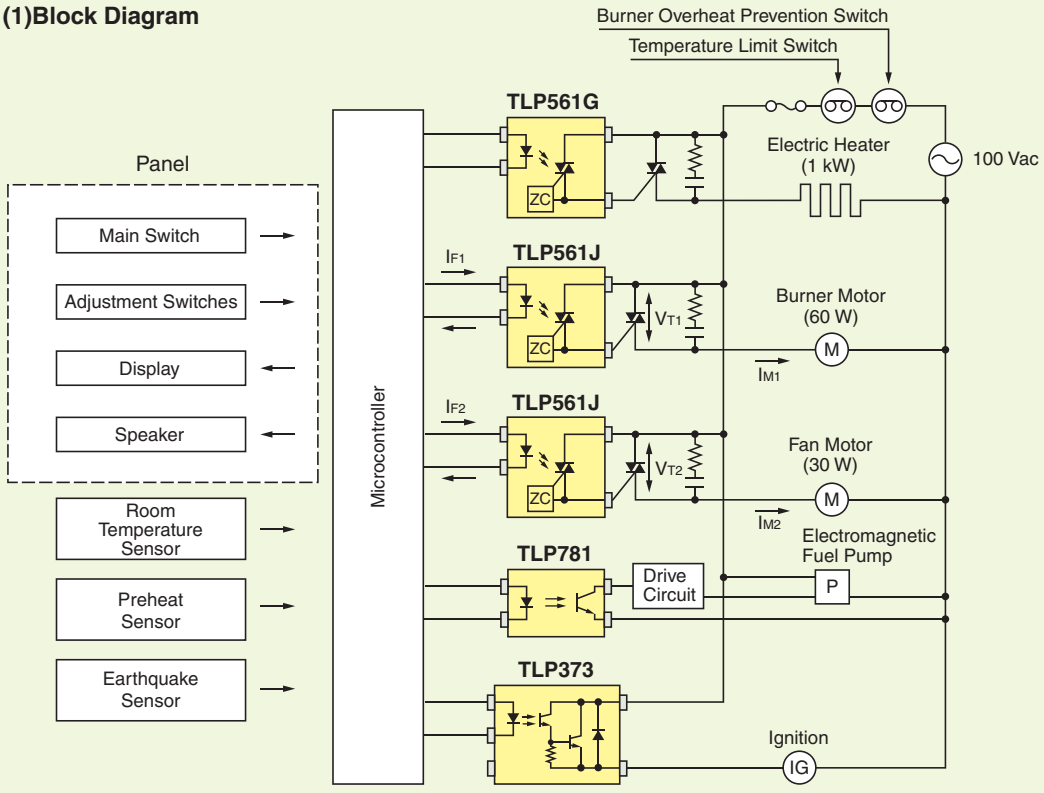




Circuit Configuration

Fan Heaters

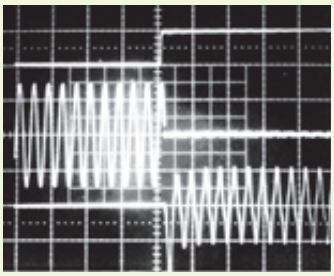
(1)Block Diagram



4 Home Appliance Applications (Continued)

(2)Waveform Examples

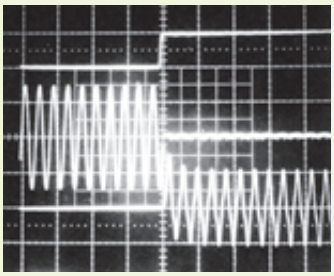
1. Example of Operating Waveform for Burner Motor



Trigger Point

waveforms			
Top:	I_{F1}	20 mA/div
Medium:	V_{T1}	100 V/div
Bottom:	I_{M1}	1 A/div
Horizontal:	time	50 ms/div

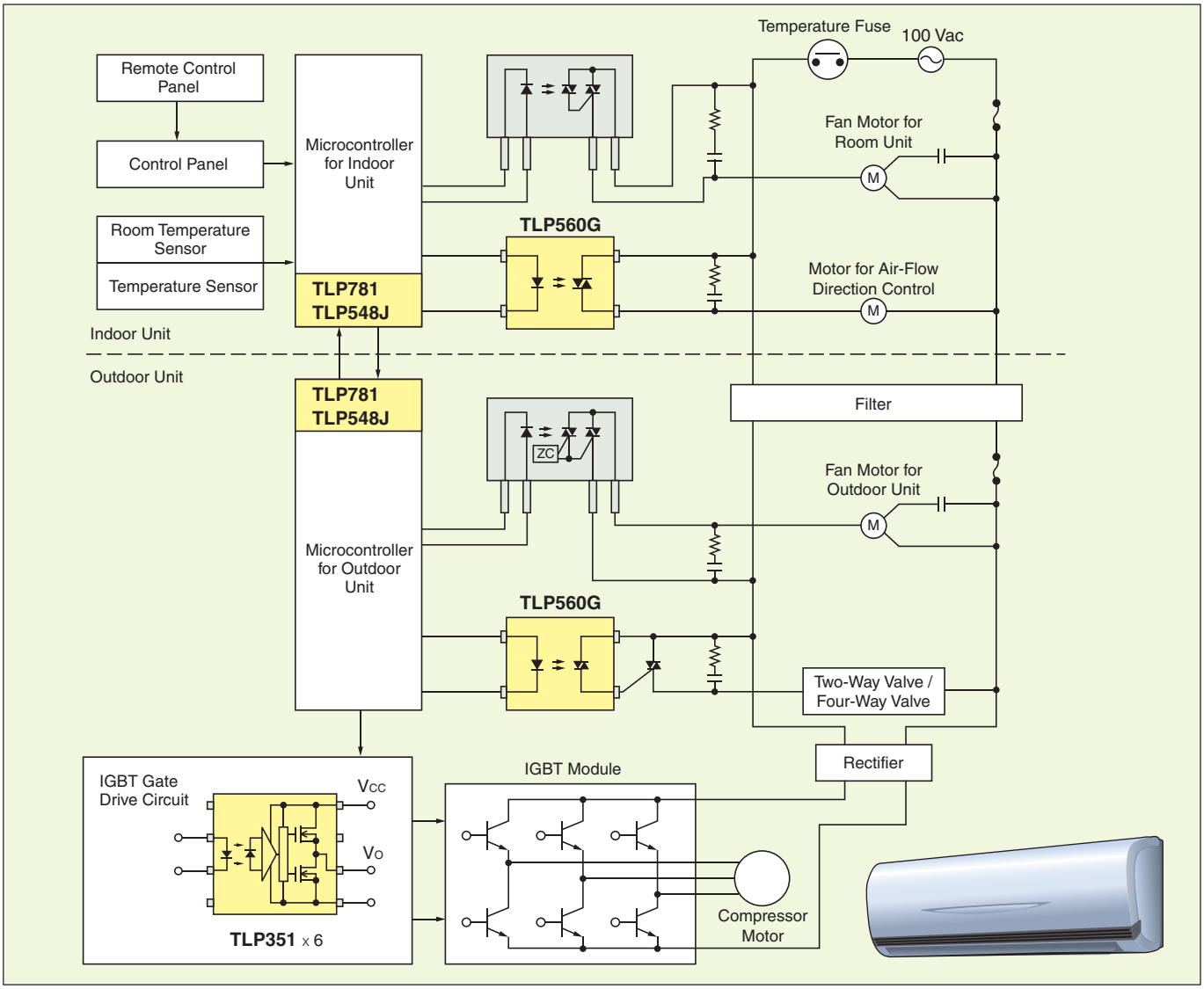
2. Example of Operating Waveform for Fan Motor



Trigger Point

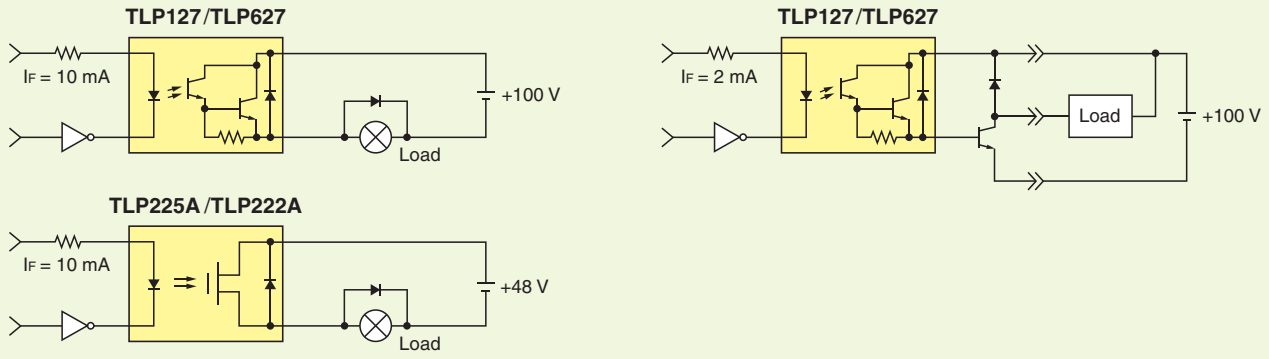
waveforms			
Top:	I_{F2}	20 mA/div
Medium:	V_{T2}	100 V/div
Bottom:	I_{M2}	0.5 A/div
Horizontal:	time	50 ms/div

Inverter Air Conditioners

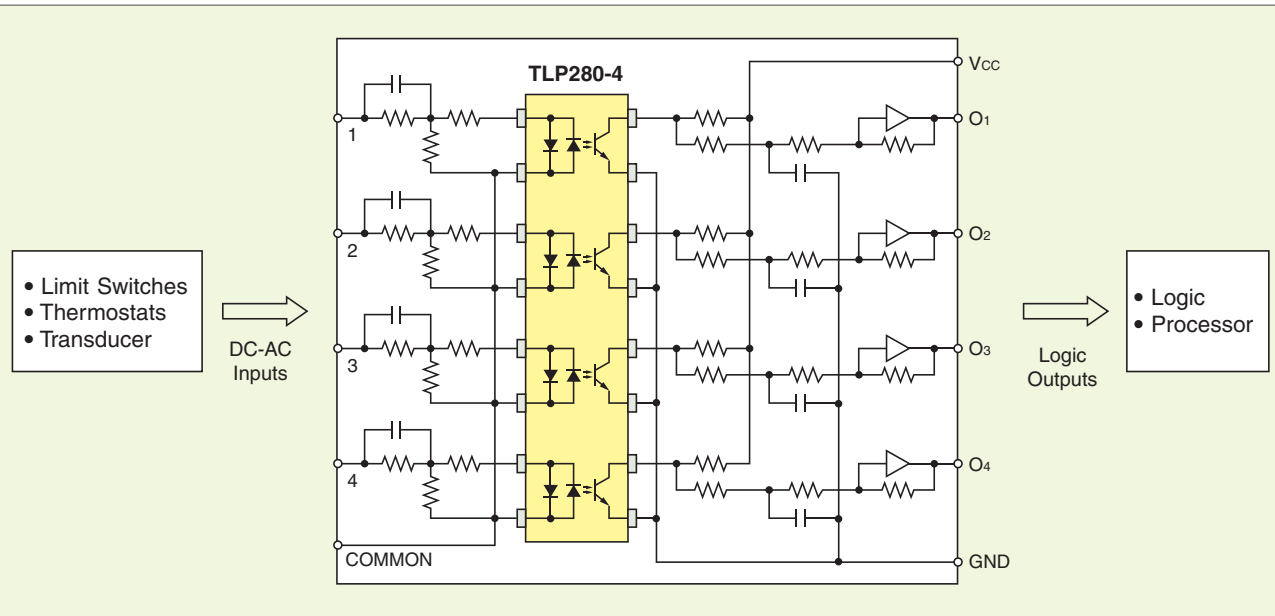


5 Programmable Controller Applications

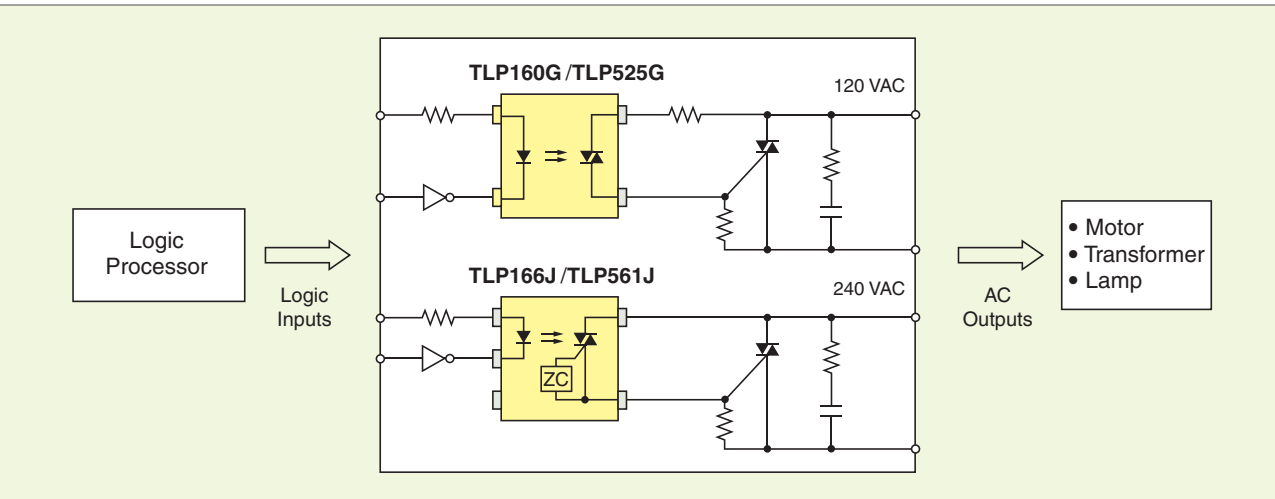
DC Output for Sequencers



AC Input for Sequencers

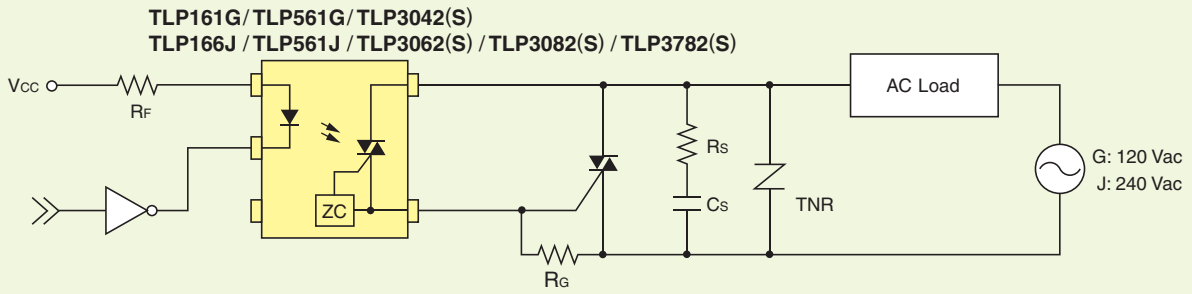


120-/240-Vac Output for Sequencers and Solid State Relays (SSRs)

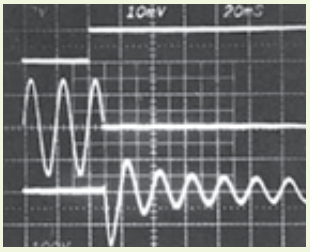


6 SSR and Power Control Circuit Applications

Zero-Crossing Phototriac Output: TLP561G/TLP561J and Mini-Flat TLP161G/TLP166J

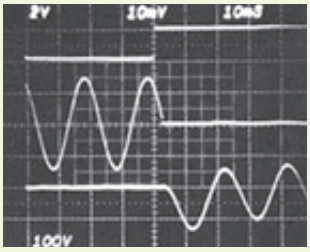


Lamp Load (1-A tungsten lamp)



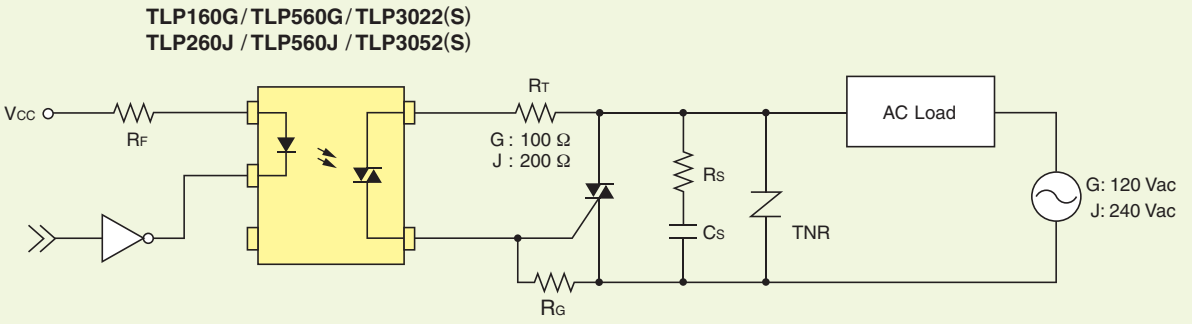
Waveforms
- Top: I_F 20 mA/div
- Medium: V_T 100 V/div
- Bottom: I_T 5 A/div

L load (2.5-A pure inductive load)

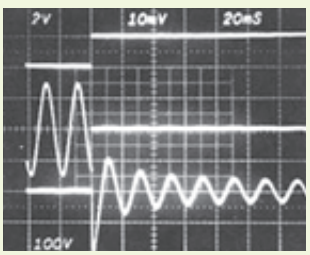


Recommended conditions
- I_F = 20 mA
- R_G = 47 Ω
- R_S = 47 Ω, C_S = 0.033 μF

Non-Zero Crossing Phototriac Output: TLP560G/TLP560J and Mini-Flat TLP160G/TLP260J

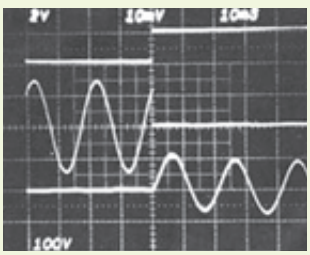


Lamp Load (1-A tungsten lamp)



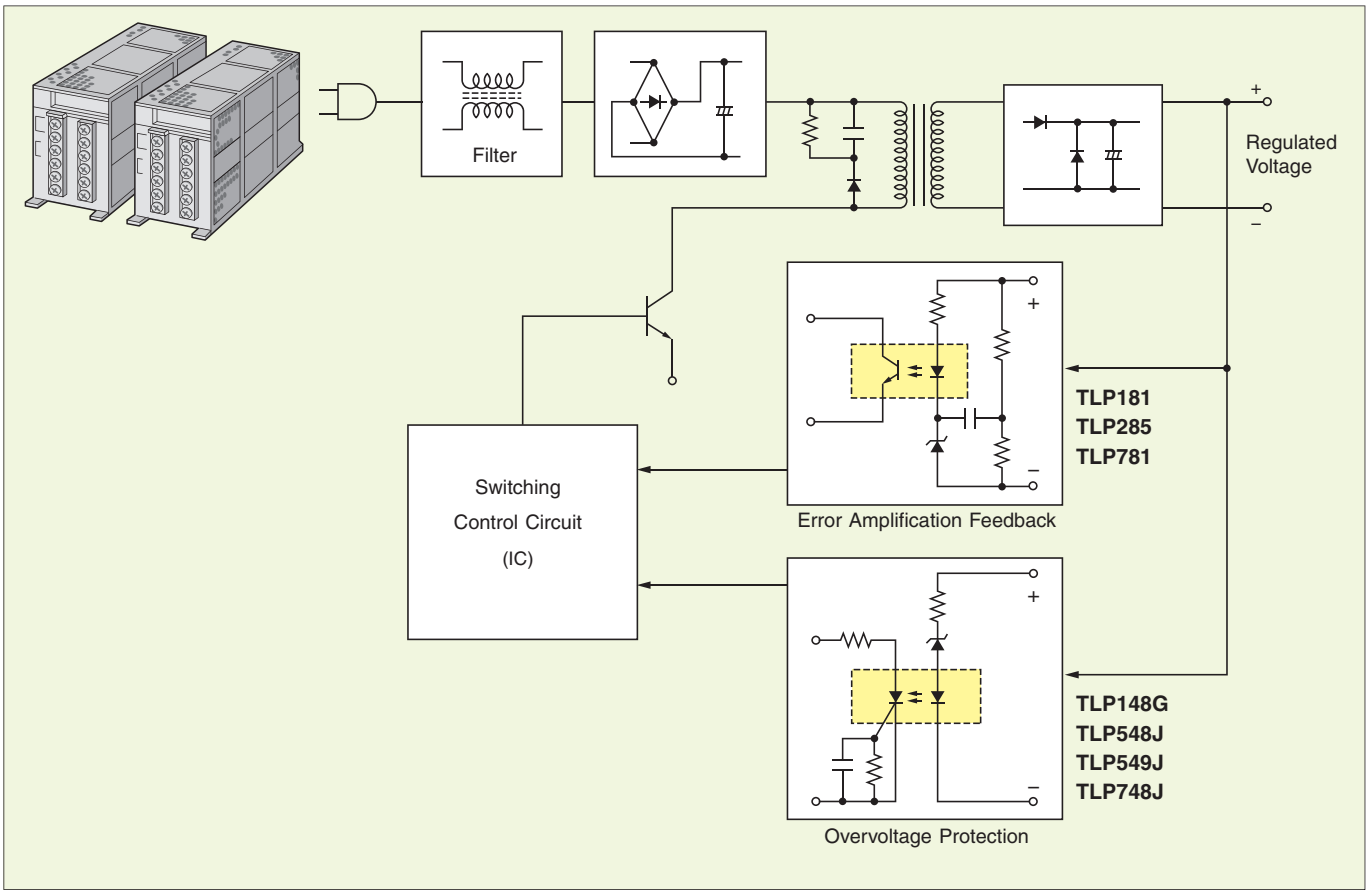
Waveforms
- Top: I_F 20 mA/div
- Medium: V_T 100 V/div
- Bottom: I_T 5 A/div

L load (2.5-A pure inductive load)



Recommended conditions
- I_F = 20 mA
- R_T = 100 Ω/200 Ω
- R_G = 47 Ω
- R_S = 47 Ω, C_S = 0.033 μF

7 Switching Power Supply Circuit Application



Transistor Output (○: Approved, as of January 2010)

Part Number	Package Type	Isolation Voltage	Safety Standard Approvals				CTR (I_C / I_F) Rank (%)		
			UL 1577	BSI 7002(EN60950)	EN60747 (Note 1)	Nordic SEMKO		Min	Max
TLP181/TLP285	MFSOP6/SOP4	3750 Vrms	○	○	○(Note 2)	○	No Rank	50	600
TLP781	DIP4	5000 Vrms	○*	○	○	○	(GB) Rank	100	600
							(Y) Rank	50	150
							(GR) Rank	100	300
							(BL) Rank	200	600
							(GRL) Rank	100	200
							(GRH) Rank	150	300
TLP750 (high-speed)	DIP8	5000 Vrms	○	○	○	○	(O) Rank	19	–
							No Rank	10	–

Thyristor Output (○: Approved, as of January 2010)

Part Number	Package Type	Isolation Voltage	Safety Standard Approvals		I_{FT} (mA)	V_{DRM} (V)
			UL 1577	EN60747 (Note 1)		
TLP148G	MFSOP6	2500 Vrms	○		10	400
TLP548J	DIP6		○		7	600
TLP748J		4000 Vrms	○	○	10	600

Note 1: EN60747-approved with option (D4)

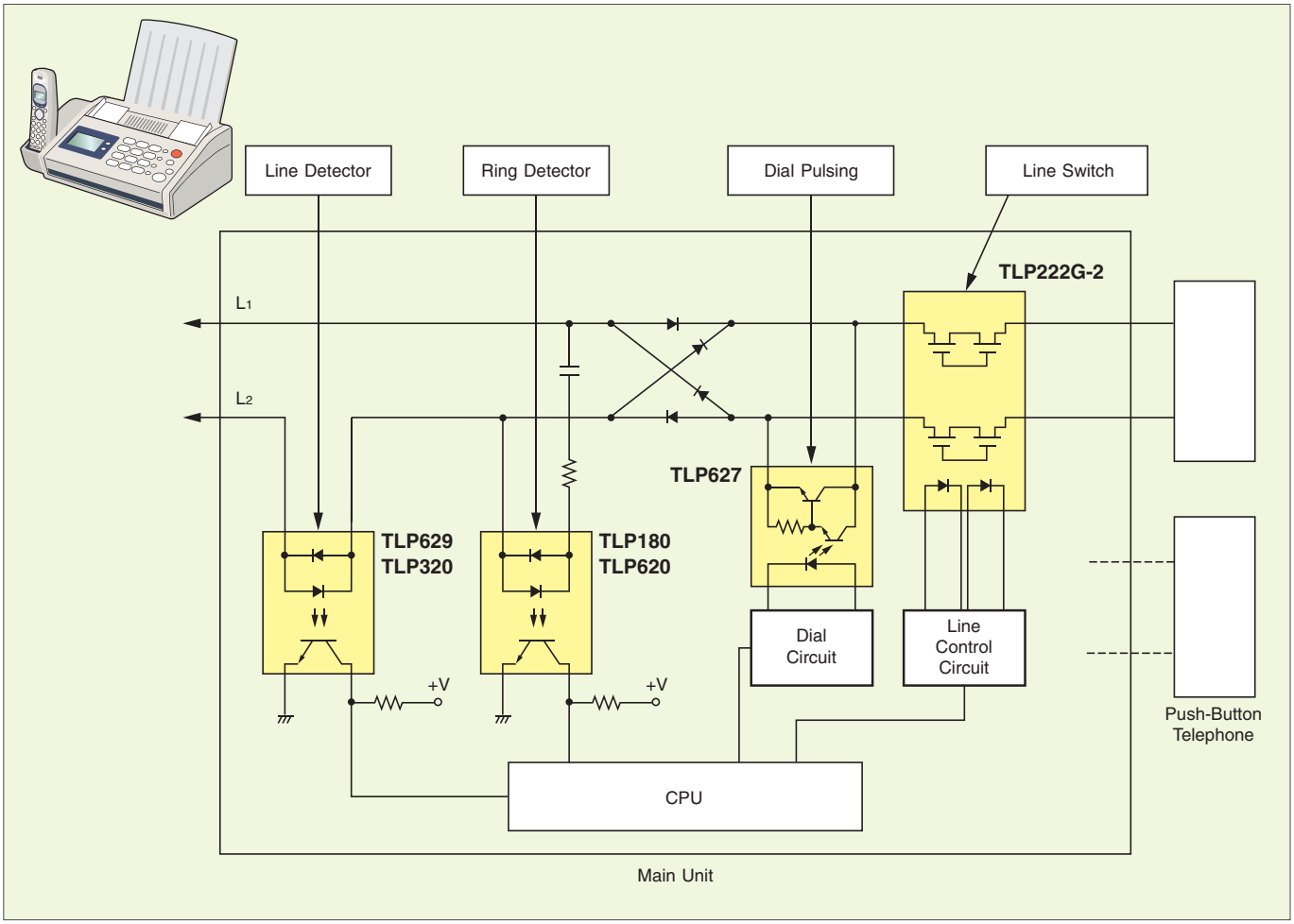
Note 2: The EN60747-5-2 safety standard for compact packages is different from those for standard DIP packages. Since the mini-flat package is a compact package, please contact your nearest Toshiba sales representative for more details.

*: Double protection

11 Photocoupler Application Circuit Examples

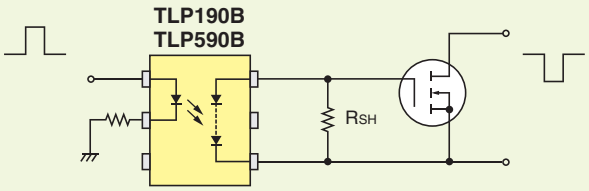
8 Push-Button Telephone Application

A variety of photocouplers are used to isolate between telephone lines (L1 and L2) and a CPU.

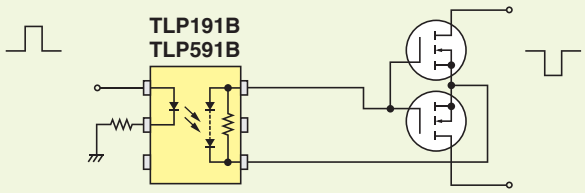


Application	Package Type	Part Number				Features
		DC Input			AC Input	
Ring Detector	DIP4	**TLP781**			**TLP620**	General single transistor output in compact packages Good cost performance
	MFSOP6 SOP4	**TLP181**	**TLP281**	**TLP285**	**TLP180** **TLP280**	
Dial Pulsing	DIP4	**TLP627**				High-V_{CEO} (300 V) Darlington transistor output in compact packages Suitable to generate a pulse dial signal
	MFSOP6	**TLP127**				
	DIP4	**TLP628**				High-V_{CEO} (350 V) single transistor output
Line Detector	DIP4	**TLP629**			**TLP320**	High LED current rating = 150 mA Directly connectable to telephone lines
Line Switch	DIP4	**TLP222G***	**TLP227G***			MOSFET-output photorelay with V_{OFF} = 400 V Crosspoint relay replacement (*: V_{OFF} = 350 V, **: V_{OFF} = 200 V)
	DIP6	**TLP592G***	**TLP597G***			
	DIP8 (Dual)	**TLP222G-2***	**TLP227G-2***			
	2.54SOP4	**TLP170G***	**TLP176D****	**TLP176G***		
	2.54SOP6	**TLP192G***	**TLP197G***			
	2.54SOP8 (Dual)	**TLP200D****	**TLP202G***	**TLP206G***		

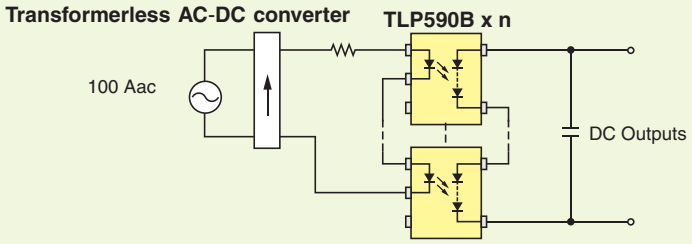
9 Photovoltaic Coupler Applications



This is the simplest power MOSFET drive circuit.
The resistor RSH for discharging the gate capacitor reduces turn-off time.
RSH is not required for the TLP591B, which has a built-in resistor.
(TON, TOFF ≅ several ms)

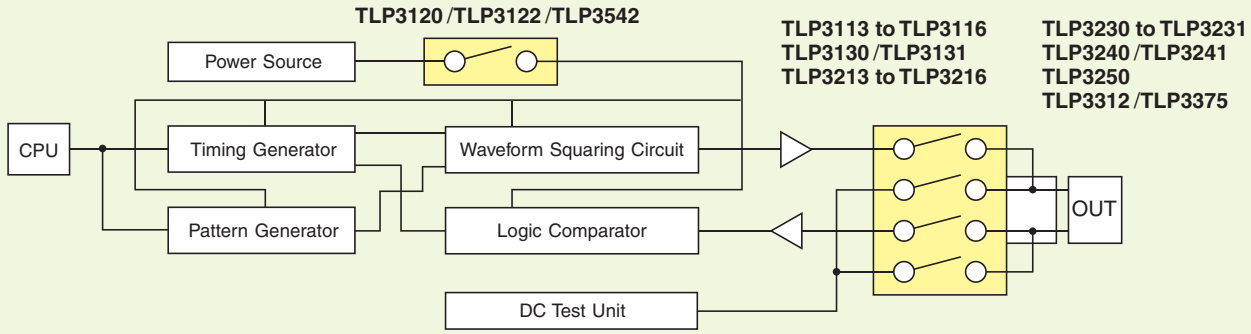


Both AC and DC drivers become possible by connecting power MOSFETs in a common-source configuration.

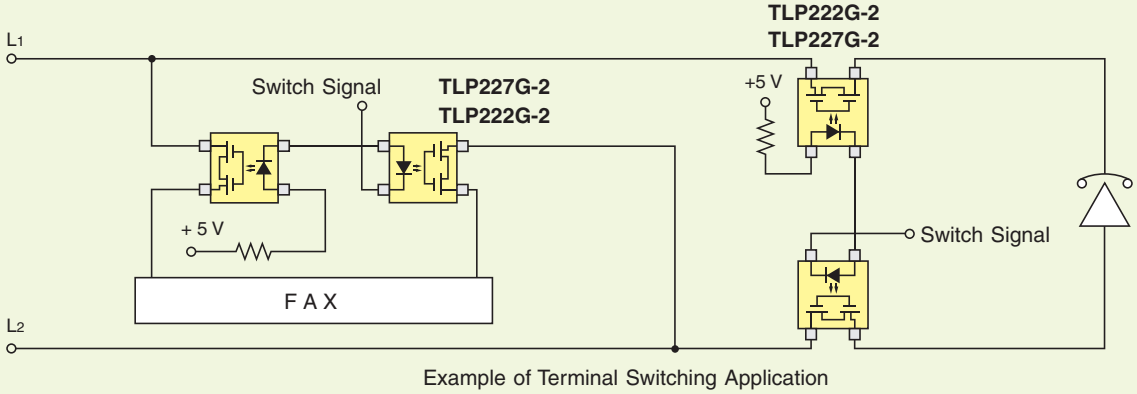


Photovoltaic couplers in a parallel-serial configuration convert AC power to DC without a transformer.
This type of configuration requires tens to hundreds of photovoltaic couplers.

10 Photorelays for Tester Application



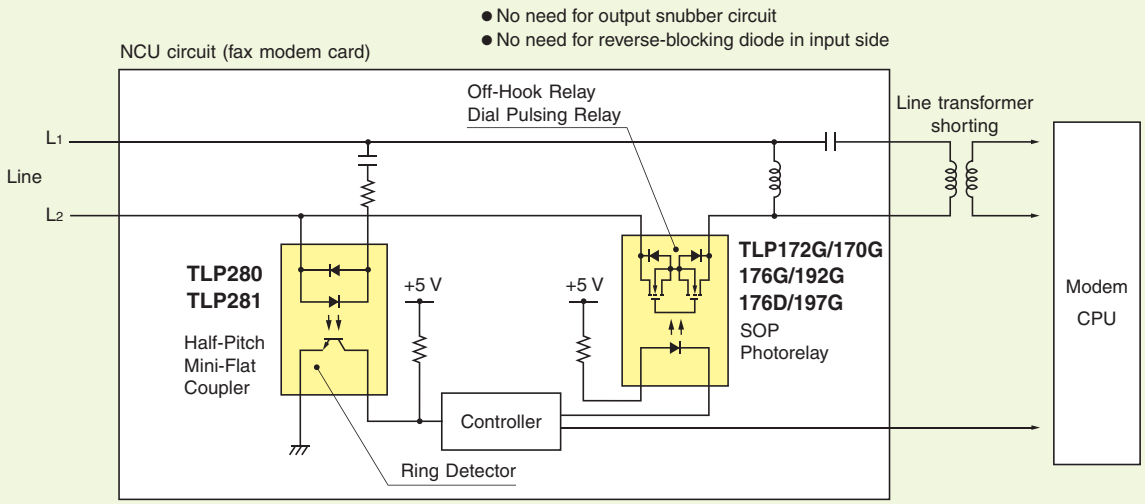
11 Photorelay (MOSFET Output) Application



Example of Terminal Switching Application

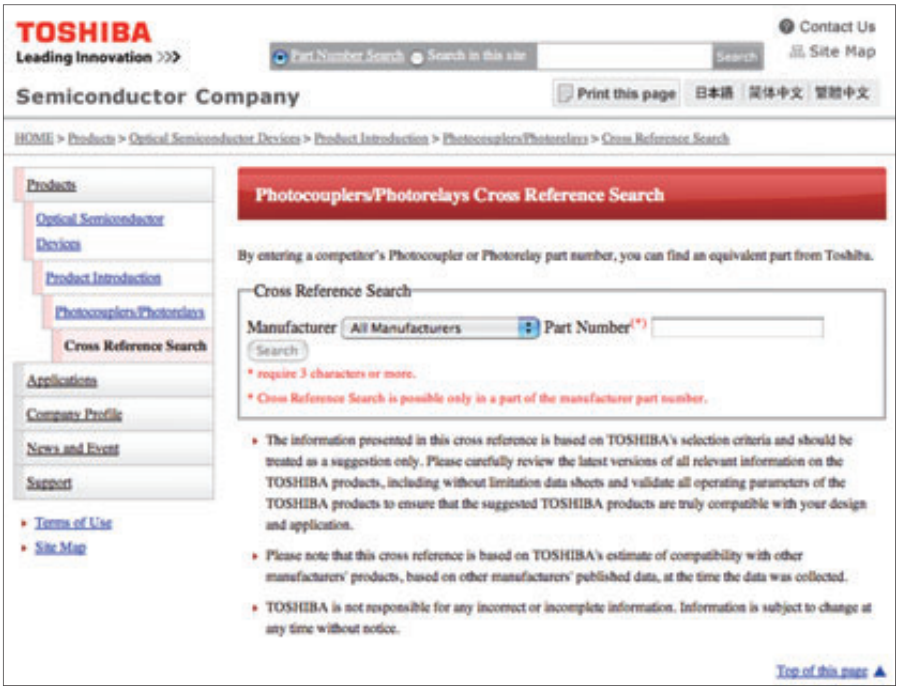
11 Photocoupler Application Circuit Examples

12 NCU Circuit (Fax Modem Card) Application



13 Competitor Part Number Cross Reference Search

The Toshiba Semiconductor webpage at http://www.semicon.toshiba.co.jp/eng/product/opto/selection/coupler/xref/index.html offers a cross reference search tool for photocouplers and photorelays.



12 Competitor Cross Reference

NEC

Part Number	Toshiba Part Number
PS2501-1	TLP781
PS2561-1	TLP781
PS2571-1	TLP781
PS2581L1	TLP781F
PS2505-1	TLP620
PS2565-1	TLP620
PS2502-1	TLP627
PS2562-1	TLP627
PS2532-1	TLP627
PS2533-1	TLP627
PS2521-1	TLP629
PS2525-1	TLP320
PS2701-1	TLP181
PS2761-1	TLP181
PS2705-1	TLP180
PS2765-1	TLP180
PS2702-1	TLP127
PS2801-1	TLP281
PS2801-4	TLP281-4
PS2861-1	TLP281
PS2805-1	TLP280
PS2805-4	TLP280-4
PS2865-1	TLP280
PS8601	TLP759
PS8602	TLP759
PS9613	TLP759 (IGM)
PS8701	TLP109
PS8101	TLP109
PS9713	TLP109 (IGM)
PS9113	TLP109 (IGM)
PS9601	TLP554
PS9614	TLP554
PS9714	TLP118
PS9114	TLP118
PS9715	TLP118
PS9115	TLP118
PS9701	TLP118
PS7141-1A	TLP597GA
PS7141-2A	TLP227GA-2
PS7141-1B	TLP4597G
PS7141-2B	TLP4227G-2
PS7141-1C	TLP4006G
PS7341C-1A	TLP594G
PS7141C-2A	TLP224G-2
PS7241-1A	TLP176GA
PS7241-2A	TLP206GA
PS7241-1B	TLP4176G
PS7241-2B	TLP4206G
PS7241-1C	TLP4026G

Panasonic

Part Number	Toshiba Part Number
AQV210	TLP592G
AQV210E	TLP597G
AQV210EH	TLP797GA
AQV210S	TLP192G
AQV212	TLP592A
AQV212S	TLP197A
AQV214	TLP597GA
AQV214E	TLP597G
AQV214EH	TLP797GA
AQV214H	TLP797GA
AQV214S	TLP197GA
AQV215	TLP597A
AQV216	TLP797J
AQV217S	TLP197D
AQV410EH	TLP4592G
AQV414	TLP4592G
AQV414E	TLP4597G
AQV414S	TLP4197G
AQW210	TLP222G-2
AQW210S	TLP202G
AQW212	TLP222A-2
AQW214	TLP227GA-2
AQW214S	TLP206GA
AQW215	TLP222A-2
AQW217	TLP222G-2
AQW414	TLP4222G-2
AQW610S	TLP4026G
AQW614	TLP4007G
AQY210EH	TLP227G
AQY210LS	TLP174G
AQY210S	TLP174G
AQY214EH	TLP227G
AQY214S	TLP176GA
AQY410EH	TLP4227G
AQY414EH	TLP4227G
AQY414S	TLP4176G
AQY221N1S	TLP3113/TLP3116
AQY221N2S	TLP3113/TLP3116
AQY221R2V	TLP3215
AQY221N2V	TLP3216

Vishay

Part Number	Toshiba Part Number
SFH614A	TLP628
SFH615A	TLP781
SFH617A	TLP781
SFH618A	TLP624
TCET1100	TLP781
SFH690xT	TLP181
TCMT1100	TLP281
TCMT4100	TLP281-4
SFH628A	TLP620
K815P	TLP627
SFH612A	TLP627
SFH619A	TLP627
SFH655A	TLP627
SFH692AT	TLP127
TCED1100	TLP627
IL66	TLP371
IL66B	TLP372
IL255	TLP330

SHARP

Part Number	Toshiba Part Number
PC123	TLP781
PC817	TLP781
PC813	TLP620
PC815	TLP627
PC357NT	TLP181
PC354NT	TLP180
PC355NT	TLP127
PC3H7	TLP281
PC3H3	TLP280
PC3H21	TLP525G
PC410	TLP118
PC942	TLP351
PC923	TLP351
S2S3	TLP260J
S2S4	TLP161J
PR36MF11NSZ	TLP3506
PR36MF12NSZ	TLP3506
S21MD3V	TLP3051 (S)
S201D01	TLP3526
S201D02	TLP3527

Fairchild

Part Number	Toshiba Part Number
FOD617	TLP781
FOD814	TLP620
FOD815	TLP627
FOD817	TLP781
FOD852	TLP627
FODM3021	TLP160G
FODM3022	TLP160G
FODM3051	TLP160J
FODM3052	TLP160J
H11A617	TLP781
H11A817	TLP781
H11AA814	TLP620
H11B815	TLP627
HMA121	TLP181
HMA124	TLP124
HMA2701	TLP181
HMHA2801	TLP281
HMHA281	TLP281
HMAA2705	TLP180
HMHAA280	TLP280
H11A1	TLP631
H11AA1	TLP630
H11AG1	TLP331
H11B1	TLP571
H11C1	TLP541G
H11D1	TLP371
H11G1	TLP371
MOC3021-M	TLP3021 (S)
MOC3022-M	TLP3022 (S)
MOC3023-M	TLP3023 (S)
MOC3041-M	TLP3041 (S)
MOC3042-M	TLP3042 (S)
MOC3043-M	TLP3043 (S)
MOC3051-M	TLP3051 (S)
MOC3052-M	TLP3052 (S)
MOC3061-M	TLP3061 (S)
MOC3062-M	TLP3062 (S)
MOC3063-M	TLP3063 (S)

Avago

Part Number	Toshiba Part Number
HCPL-M600	TLP118
HCPL-M601	TLP118
HCPL-M611	TLP118
HCPL-M452	TLP109
HCPL-M453	TLP109
HCPL-M456	TLP109
HCPL-2601	TLP2601
HCPL-2611	TLP2601
HCPL-2201	TLP555
HCPL-2530	TLP2530
HCPL-2531	TLP2531
HCPL-2630	TLP2631
HCPL-2631	TLP2631
HCPL-3120	TLP350
HCPL-3140	TLP351
HCPL-3150	TLP351
HCPL-3180	TLP350
HCPL-314J	TLP701 x2
HCPL-4504	TLP559
HCPL-0708	TLP116A
HCPL-181	TLP181
HCPL-354	TLP180
HCPL-814	TLP620

LITEON

Part Number	Toshiba Part Number
LTV-123	TLP781
LTV-816	TLP781
LTV-817	TLP781
LTV-851	TLP628
LTV-356T	TLP181
LTV-357T	TLP181
LTV-814	TLP620
LTV-814H	TLP320
LTV-354T	TLP180
LTV-815	TLP627
LTV-852	TLP627
LTV-352T	TLP127
LTV-355T	TLP127
MOC3020	TLP3020 (S)
MOC3021	TLP3021 (S)
MOC3022	TLP3022 (S)
MOC3023	TLP3023 (S)
MOC3051	TLP3051 (S)
MOC3052	TLP3052 (S)
MOC3061	TLP3061 (S)
MOC3062	TLP3062 (S)
MOC3063	TLP3063 (S)

COSMO

Part Number	Toshiba Part Number
K1010	TLP781
K2010	TLP631
K3010	TLP620
KP3020	TLP620-2
KP4010	TLP627
KP4020	TLP627-2
K5010	TLP371
K6010	TLP630
KPS2801	TLP281
KPC354NT	TLP180
KPC355NT	TLP127
KPC357NT	TLP181
KPC452	TLP127

Note: For details of equivalent devices such as electrical performance and package dimensions, please refer to the latest datasheets.

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