

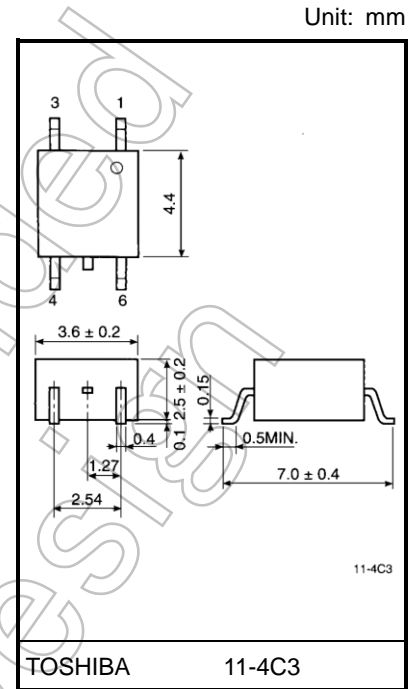
TLP166J

Triac Drivers
 Programmable Controllers
 AC-Output Modules
 Solid State Relays

The TOSHIBA mini-flat coupler TLP166J is a small-outline coupler, suitable for surface-mount assembly.

The TLP166J consists of an infrared emitting diode optically coupled to a triac-output photocoupler.

- Peak off-state voltage: 600 V (min)
- Trigger LED current: 10 mA (max)
- On-state current: 70 mA (max)
- Isolation voltage: 2500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
 File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)



Weight: 0.09 g (typ.)

Note 1: When a VDE approved type is needed, please designate the **Option(V4)**.

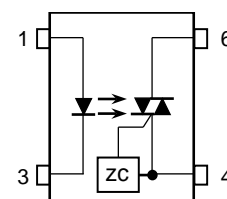
Trigger LED Current

Type (Note 2)	Trigger LED Current (mA)		Marking of Classification
	$V_T = 3\text{ V}, T_a = 25^\circ\text{C}$		
	Min	Max	
(IFT7)	—	7	T7
None	—	10	T7, blank

Note 2: e.g., IFT7: TLP166J(IFT7)

Note: When applying for safety standard certification, use the standard part number. For example, TLP166J(IFT7): TLP166J

Pin Configurations (top view)



1. Anode
3. Cathode
4. Triac Terminal
6. Triac Terminal

Start of commercial production
 1994-11

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit	
LED	Forward current	I_F	50	mA	
	Forward current derating (Ta ≥ 53°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / °C	
	Peak forward current (100µs pulse, 100pps)	I_{FP}	1	A	
	Reverse voltage	V_R	5	V	
	Diode power dissipation	P_D	100	mW	
	Diode power dissipation derating (Ta ≥ 53°C)	$\Delta P_D / ^\circ\text{C}$	-1.4	mW / °C	
	Junction temperature	T_j	125	°C	
Detector	Off-state output terminal voltage	V_{DRM}	600	V	
	On-state RMS Current	$I_{T(RMS)}$	Ta=25°C	70	mA
			Ta=70°C	40	
	On-state current derating (Ta ≥ 25°C)	$\Delta I_T / ^\circ\text{C}$	-0.67	mA / °C	
	Peak on-state current (100µs pulse, 120pps)	I_{TP}	2	A	
	Peak non-repetitive surge current (PW=10ms)	I_{TSM}	1.2	A	
	Output power dissipation	P_o	200	mW	
	Output power dissipation derating (Ta ≥ 25°C)	$\Delta P_o / ^\circ\text{C}$	-2.0	mW / °C	
Junction temperature	T_j	115	°C		
Storage temperature range		T_{stg}	-55 to 125	°C	
Operating temperature range		T_{opr}	-40 to 100	°C	
Lead soldering temperature (10 s)		T_{sol}	260	°C	
Isolation voltage (AC, 60 s, R.H. ≤ 60 %)		(Note 3) BVS	2500	Vrms	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 3: Device considered a two-terminal device; Pins 1 and 3 shorted together and Pin 4 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{AC}	—	—	240	Vac
Forward current	I_F	15	20	25	mA
Peak on-state current	I_{TP}	—	—	1	A
Operating temperature	T_{opr}	-25	—	85	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

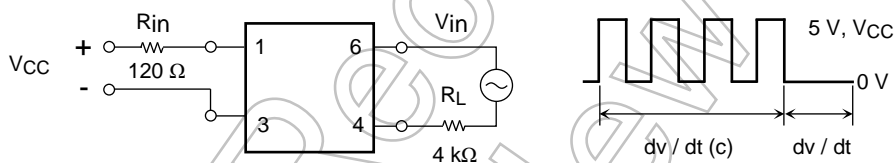
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	I_R	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	C_T	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Peak off-state current	I_{DRM}	$V_{DRM} = 600 \text{ V}$	—	10	1000	nA
	Peak on-state voltage	V_{TM}	$I_{TM} = 70 \text{ mA}$	—	1.7	2.8	V
	Holding current	I_H	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	dv / dt	$V_{in} = 240 \text{ Vrms}, T_a = 85 \text{ }^\circ\text{C}$ (Note 4)	200	500	—	V / μs
	Critical rate of rise of commutating voltage	$dv / dt(c)$	$I_T = 15 \text{ mA}, V_{in} = 60 \text{ Vrms}$ (Note 4)	—	0.2	—	V / μs

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$V_T = 3 \text{ V}$	—	—	10	mA
Inhibit voltage	V_{IH}	$I_F = \text{rated } I_{FT}$	—	—	50	V
Leakage in inhibited state	I_{IH}	$I_F = \text{rated } I_{FT}$ $V_T = \text{rated } V_{DRM}$	—	—	600	μA
Capacitance input to output	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, R.H. \leq 60 \%$	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BVS	AC, 60 s	2500	—	—	Vrms

Note 4: dv / dt Test circuit



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