

TOSHIBA Photocoupler GaAs IRed & Photo-Triac

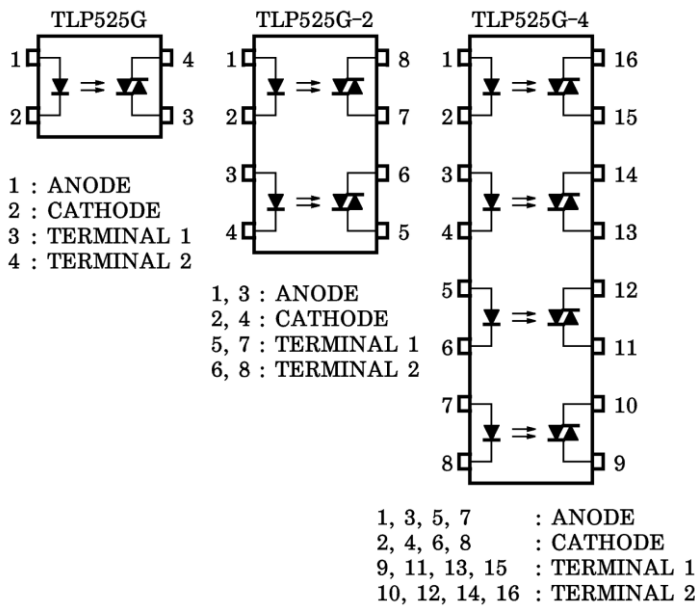
TLP525G, TLP525G-2, TLP525G-4

Triac Drive
 Programmable Controllers
 AC-Output Module
 Solid State Relay

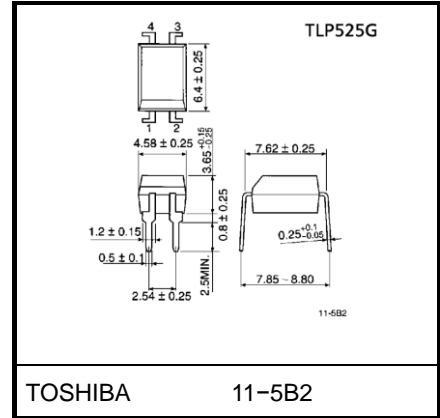
The TOSHIBA TLP525G, -2 and -4 consist of a photo-triac optically coupled to a gallium arsenide infrared emitting diode. The TLP525G-2 offers two isolated channels in an eight lead plastic DIP package, while the TLP525G-4 provides four isolated channels in a sixteen lead plastic DIP package.

- Peak off-stage voltage: 400 V (min)
- Trigger LED current: 10 mA (max)
- Peak on-stage current: 2 Apk (max)
- Isolation voltage: 2500 V_{rms} (min)
- UL approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service No. 5A, File No.E67349

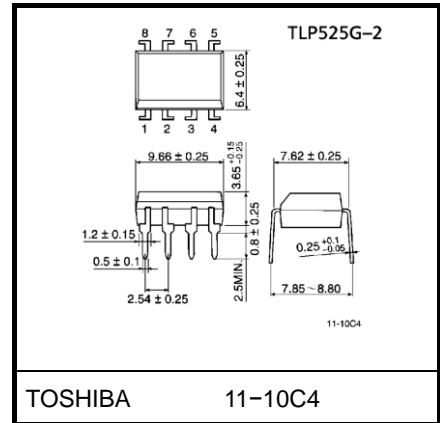
Pin Configurations (top view)



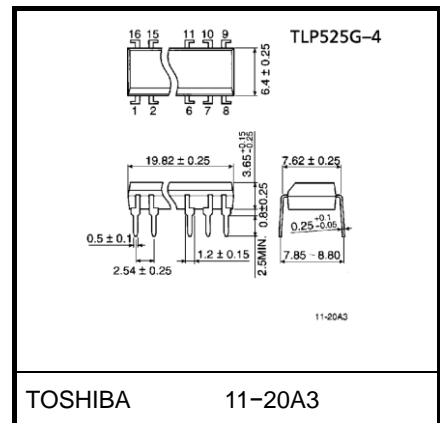
Unit: mm



Weight: 0.26g (typ.)



Weight: 0.54g (typ.)



Weight: 1.1g (typ.)

Start of commercial production
 1985-01

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating		Unit
			TLP525G	TLP525G-2 TLP525G-4	
LED	Forward current	I_F	50	50	mA
	Forward current derating	$I_F / ^\circ\text{C}$	-0.7 (Ta ≥ 53°C)	-0.5 (Ta ≥ 25°C)	mA / °C
	Pulse forward current	I_{FP}	1 (100μs pulse, 100pps)		A
	Reverse voltage	V_R	5		V
	Input power dissipation	P_D	50	60	mW
	Input power dissipation derating	$\Delta P_D / ^\circ\text{C}$	-0.69 (Ta ≥ 53°C)	-0.6 (Ta ≥ 25°C)	mW / °C
	Junction temperature	T_j	125		°C
Detector	Off-state output terminal voltage	V_{DRM}	400		V
	On-state RMS current	Ta = 25°C	100	80	mA
		Ta = 70°C	50	40	
	On-state current derating (Ta ≥ 25°C)	$I_T / ^\circ\text{C}$	-1.1	-0.9	mA / °C
	Peak on state current	I_{TP}	2 (100μs pulse, 120pps)		A
	Peak non-repetitive surge current (PW = 10ms)	I_{TSM}	1.2		A
	Output power dissipation	P_o	300	240	mW
	Output power dissipation derating (Ta ≥ 25°C)	$\Delta P_o / ^\circ\text{C}$	-3.0	-2.4	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	T_{sol}	260 (10s)		°C	
Isolation voltage	(Note) BVS	2500 (AC, 1minute, R.H. ≤ 60%)		V _{rms}	

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: Device considered a two terminal device: LED side pins shorted together and detector side pins shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{AC}	—	—	120	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.

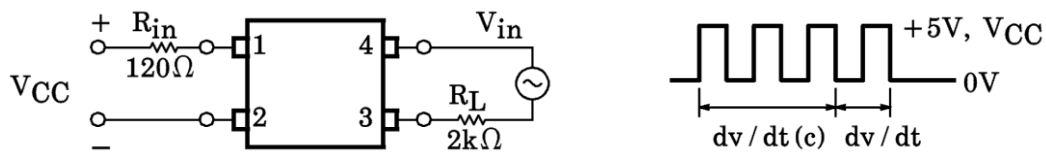
Individual Electrical Characteristics (Ta = 25°C)

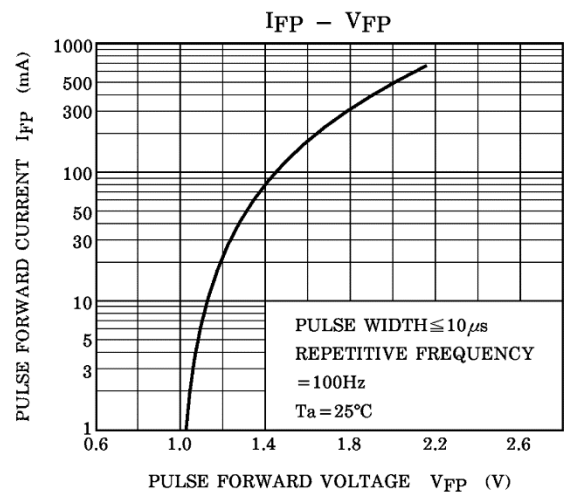
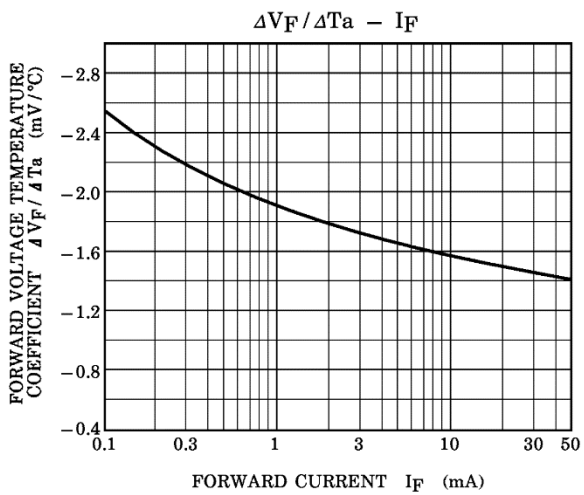
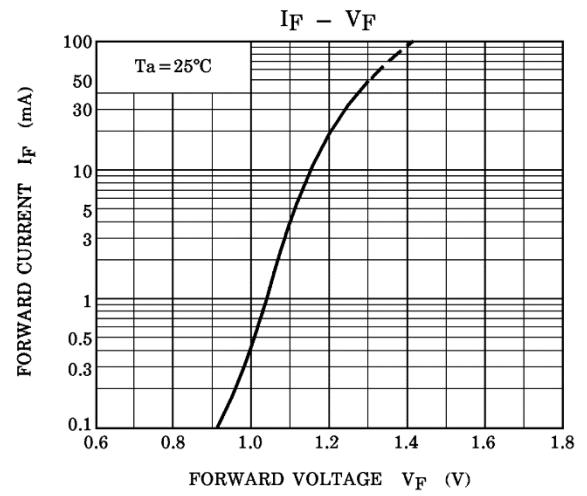
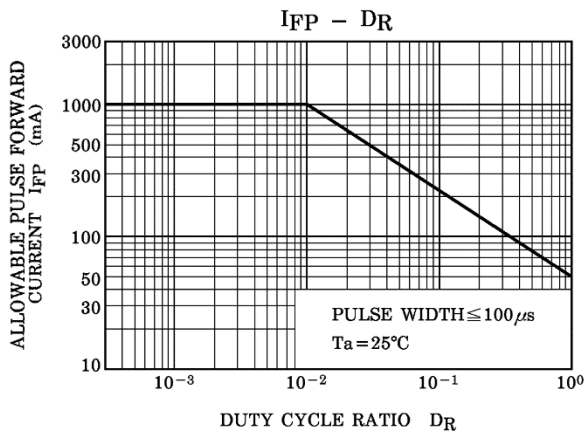
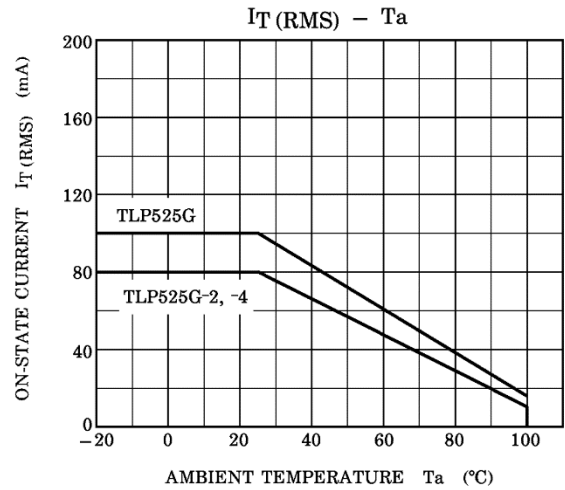
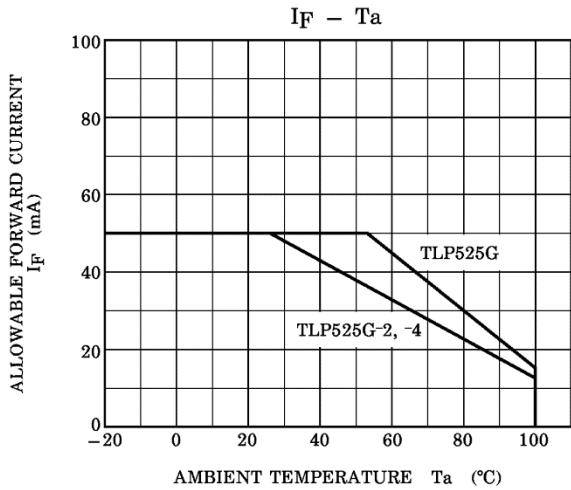
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V_F = 0\text{V}, f = 1\text{MHz}$	—	30	—	pF
Detector	Peak off-state current	I_{DRM}	$V_{DRM} = 400\text{V}$	—	10	100	nA
	Peak on-state voltage	V_{TM}	$I_{TM} = 100\text{mA}$	—	1.7	3.0	V
	Holding current	I_H	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	dv/dt	$V_{in} = 120\text{V}_{rms}, T_a = 85^\circ\text{C}$ (Figure 1)	200	500	—	V/ μs
	Critical rate of rise of commutating voltage	$dv/dt(c)$	$V_{in} = 30\text{V}_{rms}, I_T = 15\text{mA}$ (Figure 1)	—	0.2	—	V/ μs

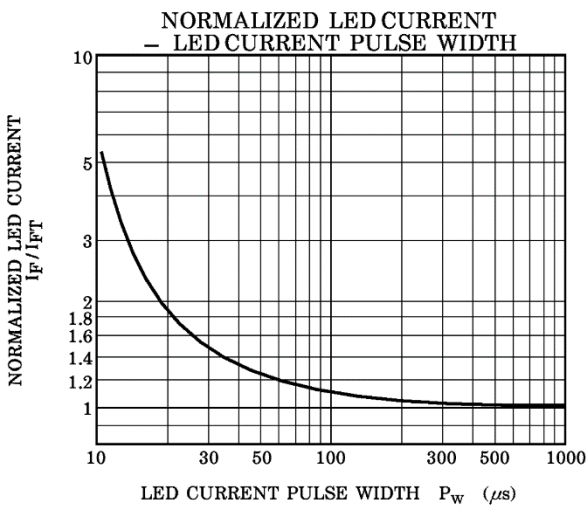
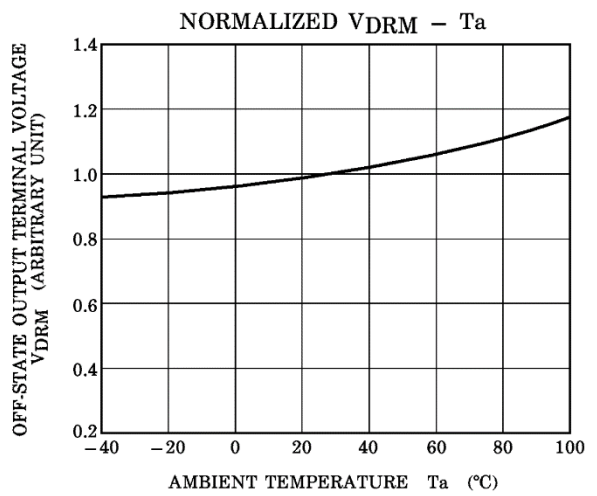
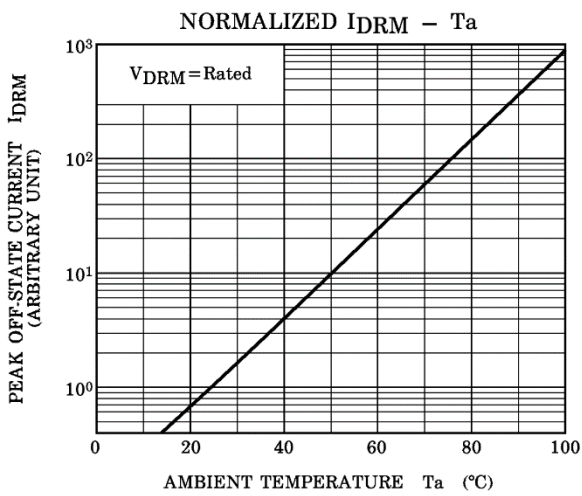
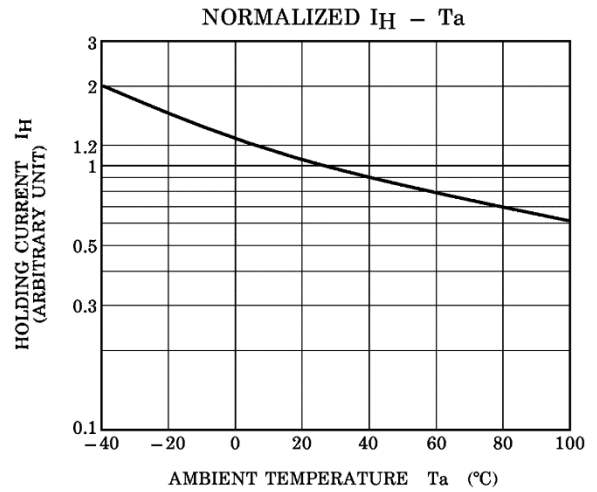
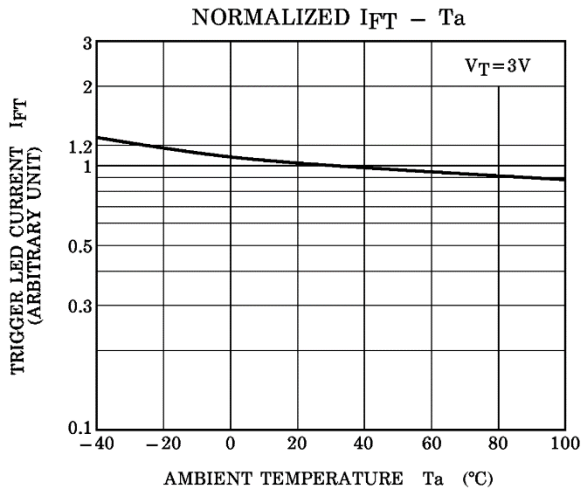
Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Trigger LED current	I_{FT}	$V_T = 3\text{V}$	—	5	10	mA
Capacitance input to output	C_S	$V_S = 0\text{V}, f = 1\text{MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	2500	—	—	V_{rms}
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc

Fig.1 dv/dt Test Circuit







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