TOSHIBA Photocoupler IRED & Photo-Thyristor

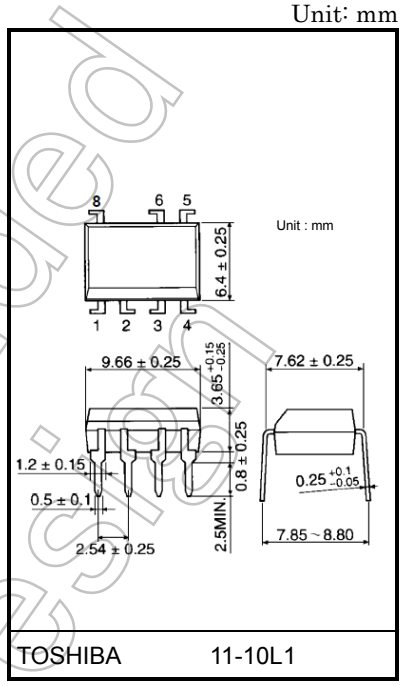
TLP549J

Office Machine
Household Use Equipment
Solid State Relay
Switching Power Supply

The TOSHIBA TLP549J consists of a photo-thyristor optically coupled to an infrared emitting diode in a seven lead plastic DIP package.

- Peak off-state voltage: 600 V (min)
- Trigger LED current: 7 mA (max)
- On-state current: 150 mA (max)
- Isolation voltage: 2500 V_{rms} (min)
- UL-recognized: UL 1577, File No.E67349

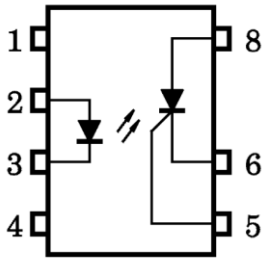
Unit: mm



TOSHIBA	11-10L1

Weight: 0.53 g (typ.)

Pin Configuration (top view)



1: N.C.
2: ANODE (LED)
3: CATHODE (LED)
4: N.C.
5: GATE
6: CATHODE (SCR)
8: ANODE (SCR)

Start of commercial production
2009-07

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating (Ta ≥ 53°C)	ΔI_F / °C	−0.7	mA / °C
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Diode power dissipation	P_D	100	mW
	Diode power dissipation derating (Ta ≥ 53°C)	ΔP_D /°C	-1.4	mW/°C
Detector	Peak forward voltage (R_{GK} = 27kΩ)	V_{DRM}	600	V
	Peak reverse voltage (R_{GK} = 27kΩ)	V_{RRM}	600	V
	On−state current	$I_{T\ (RMS)}$	150	mA
	On−state current derating (Ta ≥ 25°C)	ΔI_T / °C	−2.0	mA / °C
	Peak on−state current (100 μs pulse, 120 pps)	I_{TP}	3	A
	Peak one cycle surge current	I_{TSM}	2	A
	Peak reverse gate voltage	V_{GM}	5	V
	Output power dissipation	P_O	150	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔP_O / °C	−1.5	mW / °C
Operating temperature range		T_{opr}	−40 to100	°C
Storage temperature range		T_{stg}	−55 to 125	°C
Lead soldering temperature (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 60 s, R.H. ≤ 60 %) (Note 1)		BV_S	2500	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 1: Device Considered a two terminal device; pins 1, 2, 3 and 4 shorted together and pins 5, 6 and 8 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{AC}	—	—	240	V_{ac}
Forward current	I_F	10	—	25	mA
Operating temperature	T_{opr}	−25	—	85	°C
Gate to cathode resistance	R_{GK}	—	27	33	kΩ
Gate to cathode capacitance	C_{GK}	—	0.01	0.1	μF

Note 2: 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.

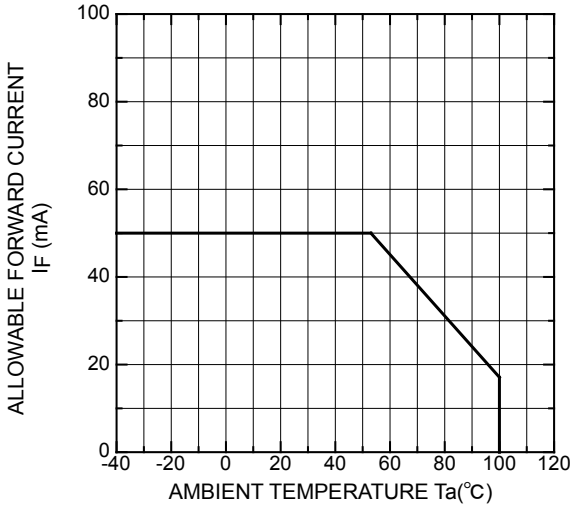
Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition		Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA		1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V		—	—	10	μA
	Capacitance	C_T	VF = 0 V, f = 1 MHz		—	30	—	pF
Detector	Off−state current	I_{DRM}	V_{AK} = 600 V, R_{GK} = 27 kΩ		—	—	5	μA
	Reverse current	I_{RRM}	V_{KA} = 600 V, R_{GK} = 27 kΩ		—	—	5	μA
	On−state voltage	V_{TM}	I_{TM} = 100 mA, I_F = 7 mA		—	1.25	1.45	V
	Holding current	I_H	R_{GK} = 27 kΩ		—	0.5	1	mA
	Off−state dv/dt	dv/dt	V_{AK} = 420 V, R_{GK} = 27 kΩ		5	—	—	V/μs
	Capacitance	C_j	V = 0 V, f = 1 MHz Anode to gate	Anode to gate	—	5	—	pF
				Gate to cathode	—	500	—	

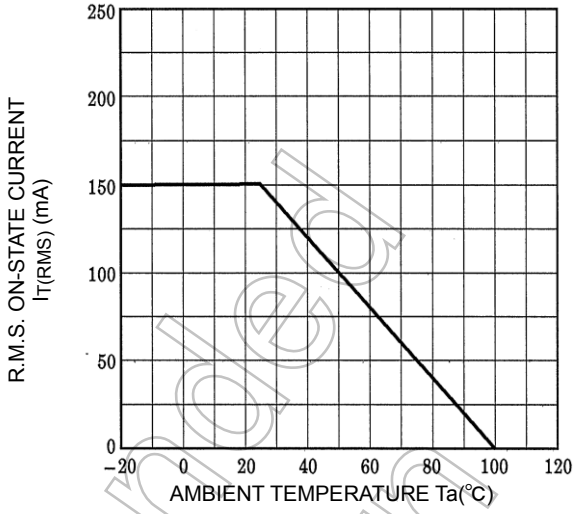
Coupled Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	V_{AK} = 6 V, R_{GK} = 27 kΩ	—	3	7	mA
Turn−on time	t_{on}	I_F = 30 mA, V_{AA} = 50 V, R_{GK} = 27 kΩ	—	10	—	μs
Capacitance (input to output)	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H. ≤ 60 %	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 60 s	2500	—	—	V_{rms}

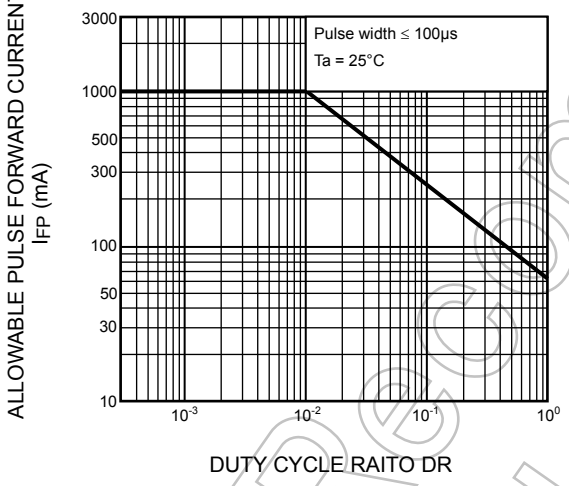
$I_F - Ta$



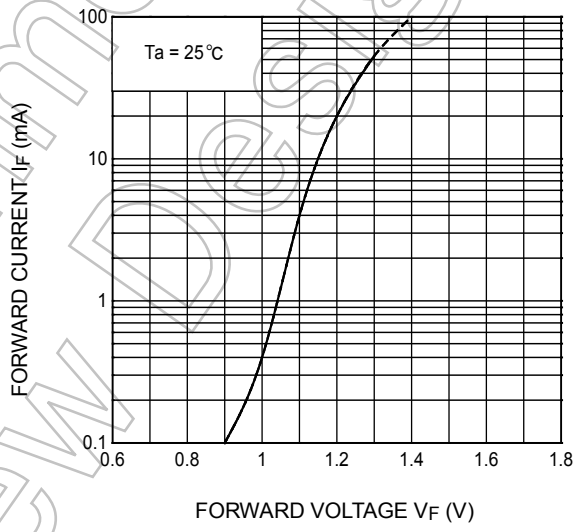
$I_{T(RMS)} - Ta$



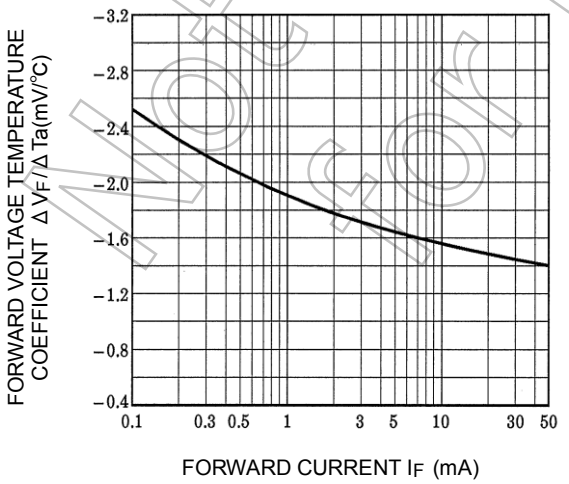
$I_{FP} - DR$



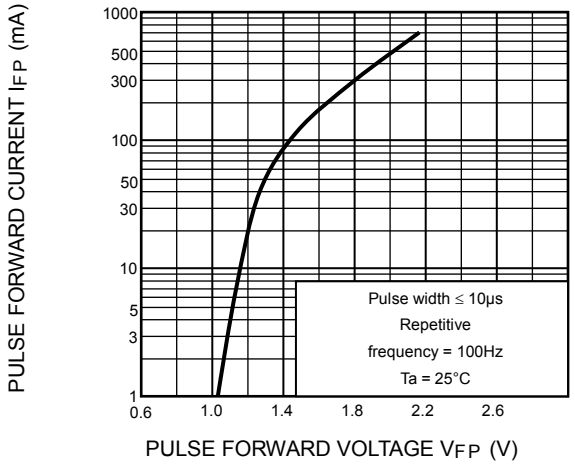
$I_F - V_F$



$\Delta V_F / \Delta Ta - I_F$

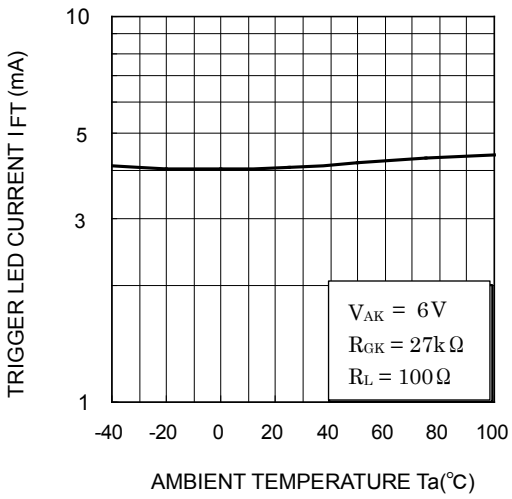


$I_{FP} - V_{FP}$

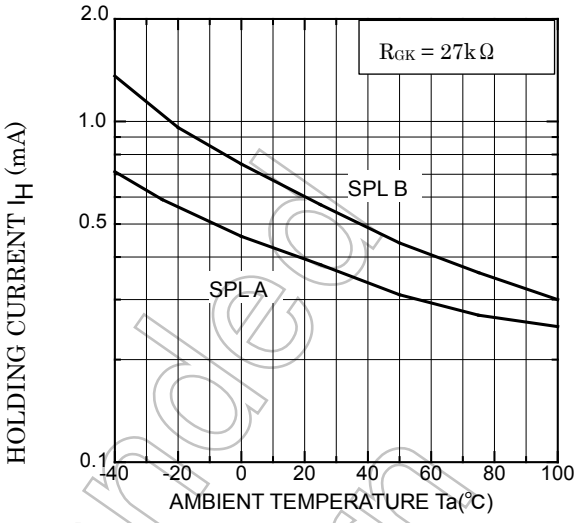


NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

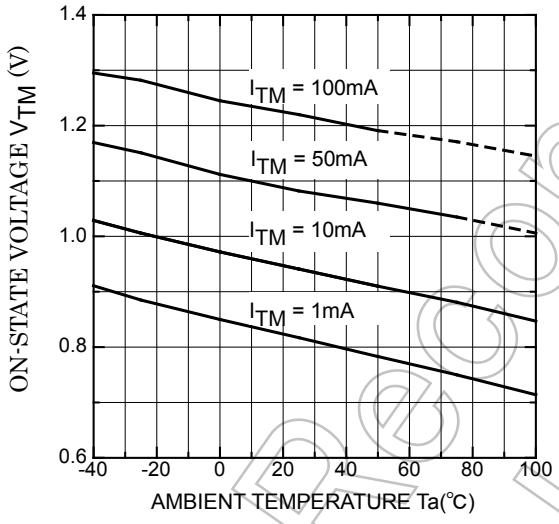
I_{FT} – Ta



I_H – Ta



V_{TM} - Ta



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