

TOSHIBA Photocoupler IRED & Photo-Triac

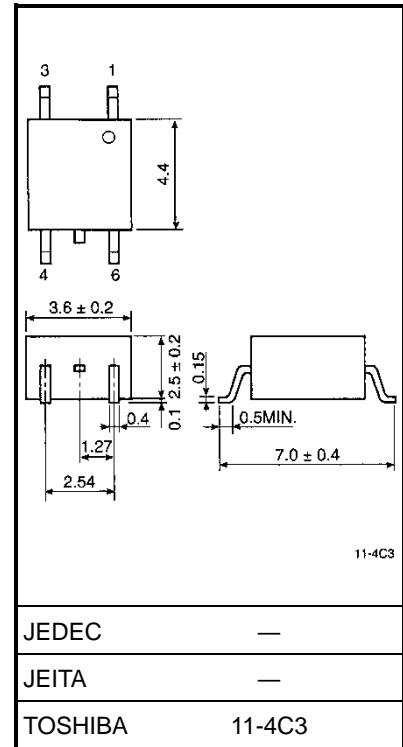
TLP163J

Triac Drive
 Programmable Controllers
 AC-Output Modules
 Solid State Relay

The TOSHIBA mini-flat coupler TLP163J is housed in a small outline package, suitable for surface-mount assembly. The TLP163J consists of an infrared emitting diode optically coupled to a photo-triac coupler. The TLP163J features a greater capacity to withstand external noise than that of the TLP161J.

- Zero-voltage crossing turn-on
- 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

Unit: mm



Weight: 0.09 g (typ.)

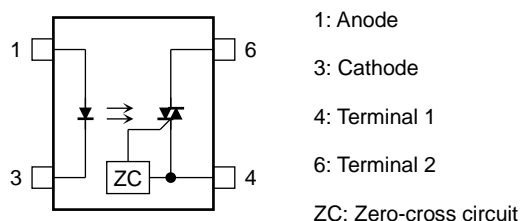
Trigger LED Current

Classification (*)	Trigger LED Current (mA)		Marking of Classification
	$V_T = 3 \text{ V}, T_a = 25^\circ\text{C}$		
	Min	Max	
(IFT7)	—	7	T7
Standard	—	10	T7, Blank

*: e.g., (IFT7): TLP163J(IFT7)

Note: A part number for a certification test, use the standard part number, i.e. TLP163J(IFT7): TLP163J

Pin Configurations



Start of commercial production
 2006-10

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		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
	Input power dissipation	P _D	100	mW
	Input power dissipation derating (Ta ≥ 53°C)	ΔP _D /°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	Ta = 25°C	70	mA
		Ta = 70°C	40	
	On-state current derating (Ta ≥ 25°C)	ΔI _T /°C	-0.67	mA/°C
	Peak on-state current (100 μs pulse, 120 pps)	I _{TP}	2	A
	Peak non-repetitive surge current (PW = 10 ms)	I _{TSM}	1.2	A
	Output power dissipation	P _O	200	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔP _O /°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 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 and 3 shorted together and pins 4 and 6 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _{AC}	—	—	240	V _{ac}
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)

Characteristics		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	$V = 0 \text{ V}, f = 1 \text{ MHz}$	—	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	$V_{in} = 240 \text{ Vrms}, T_a = 85 \text{ }^\circ\text{C}$ (Figure 1)	200	500	—	$\text{V}/\mu\text{s}$
	Critical rate of rise of commutating voltage	$dv/dt(c)$	$V_{in} = 60 \text{ Vrms}, I_T = 15 \text{ mA}$ (Figure 1)	—	0.2	—	$\text{V}/\mu\text{s}$

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$V_T = 3 \text{ V}$	—	—	10	mA
Inhibit voltage	V_{IH}	$I_F = \text{Rated } I_{FT}$	—	—	20	V
Leakage in inhibited state	I_{IH}	$I_F = \text{Rated } I_{FT}, V_T = \text{Rated } V_{DRM}$	—	200	600	μA
Turn-on time	t_{ON}	$V_D = 3 \rightarrow 1.5 \text{ V}, R_L = 20 \text{ } \Omega,$ $I_F = \text{Rated } I_{FT} \times 1.5$	—	30	100	μs
Impulse noise durability	V_N	$t_N = 1 \text{ } \mu\text{s},$ snubber condition $120 \text{ } \Omega + 0.1 \text{ } \mu\text{F}$ (Note 3)	—	2000	—	V

Isolation Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance (input to output)	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60 \%$	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 60 s	2500	—	—	Vrms

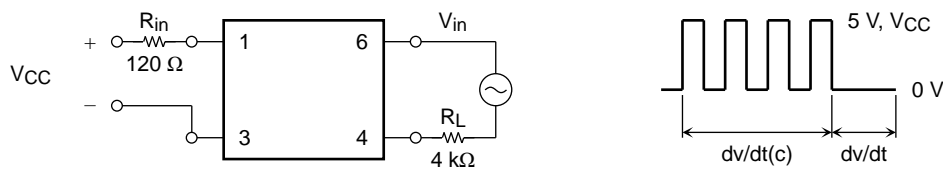
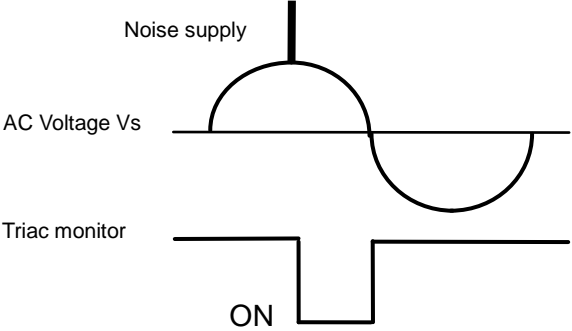
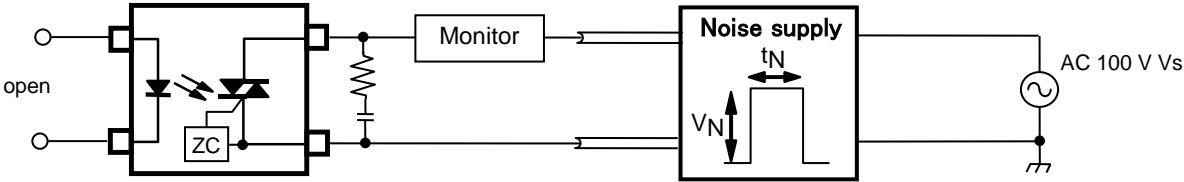


Figure 1 dv/dt Test Circuit

Note 3: impulse noise durability test circuit



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