

TOSHIBA Photocoupler GaAs IRED & Photo-Triac

## TLP161J

Triac Drive  
Programmable Controllers  
AC-Output Module  
Solid State Relay

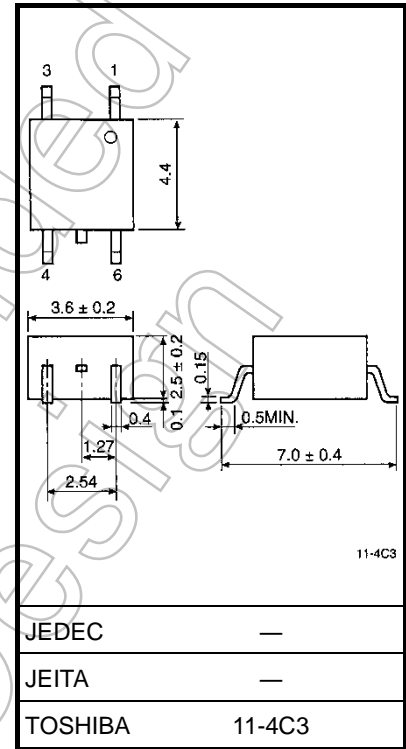
The TOSHIBA mini flat coupler TLP161J is a small outline coupler, suitable for surface mount assembly.

The TLP161J consists of a photo triac, optically coupled to a gallium arsenide infrared emitting diode.

- 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 approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service  
No. 5A, File No.E67349
- Option (V4) VDE approved : DIN EN60747-5-5 (Note1)

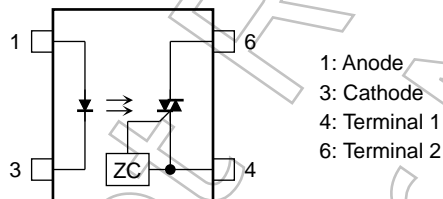
(Note 1) : When a EN60747-5-5 approved type is needed,  
please designate "Option(V4)"

Unit: mm



Weight: 0.09 g (typ.)

### Pin Configurations



### Trigger LED Current

Classification (*)	Trigger LED Current (mA)		Marking of Classification
	V <sub>T</sub> = 3 V, T <sub>a</sub> = 25°C		
	Min	Max	
(IFT7)	—	7	T7
Standard	—	10	T7, Blank

\*: Ex. (IFT7): TLP161J (IFT7)

Note: Application type name for certification test, please use standard product type name, i.e.  
TLP161J (IFT7): TLP161J

Start of commercial production  
1988-04

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
LED	Forward current	I <sub>F</sub>	50	mA
	Forward current derating (Ta ≥ 53°C)	ΔI <sub>F</sub> /°C	-0.7	mA/°C
	Peak forward current (100 μs pulse, 100 pps)	I <sub>FP</sub>	1	A
	Reverse voltage	V <sub>R</sub>	5	V
	Diode power dissipation	P <sub>D</sub>	100	mW
	Diode power dissipation derating (Ta ≥ 53°C)	ΔP <sub>D</sub> /°C	-1.4	mW/°C
	Junction temperature	T <sub>j</sub>	125	°C
Detector	Off-state output terminal voltage	V <sub>DRM</sub>	600	V
	On-state RMS current	I <sub>T(RMS)</sub>	70	mA
			40	
	On-state current derating (Ta ≥ 25°C)	ΔI <sub>T</sub> /°C	-0.67	mA/°C
	Peak on-state current (100 μs pulse, 120 pps)	I <sub>TP</sub>	2	A
	Peak non-repetitive surge current (P <sub>W</sub> = 10 ms)	I <sub>TSM</sub>	1.2	A
	Output power dissipation	P <sub>O</sub>	200	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔP <sub>O</sub> /°C	-2.0	mW/°C
	Junction temperature	T <sub>j</sub>	115	°C
Storage temperature range		T <sub>stg</sub>	-55 to 125	°C
Operating temperature range		T <sub>opr</sub>	-40 to 100	°C
Lead soldering temperature (10 s)		T <sub>sol</sub>	260	°C
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note)		BV <sub>S</sub>	2500	V <sub>rms</sub>

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: 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 <sub>AC</sub>	—	—	240	V <sub>ac</sub>
Forward current	I <sub>F</sub>	15	20	25	mA
Peak on-state current	I <sub>TP</sub>	—	—	1	A
Operating temperature	T <sub>opr</sub>	-25	—	85	°C

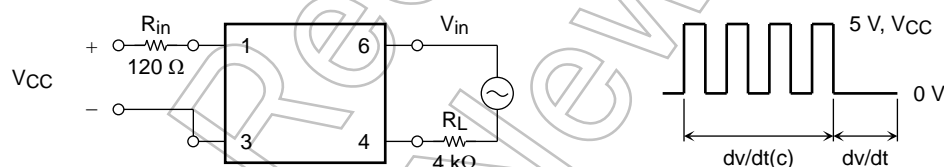
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

**Individual Electrical Characteristics (Ta = 25°C)**

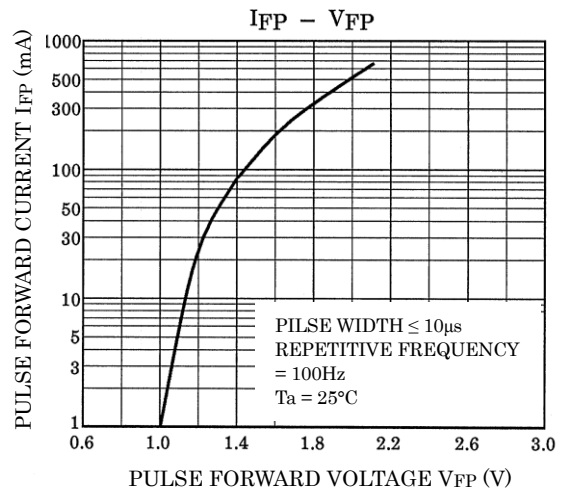
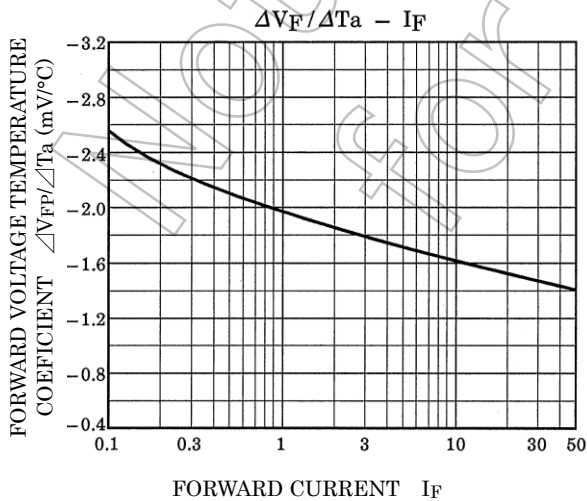
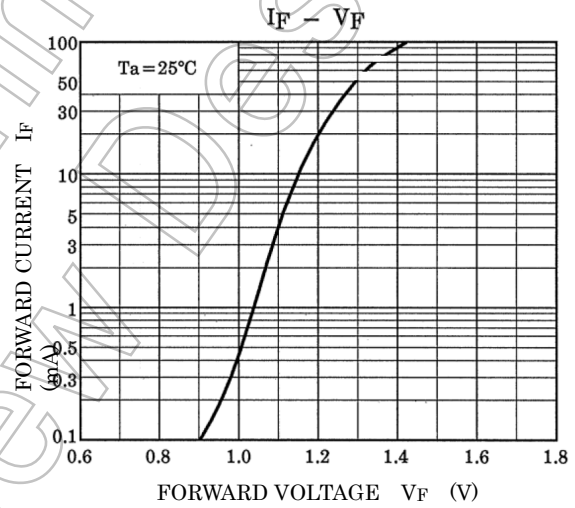
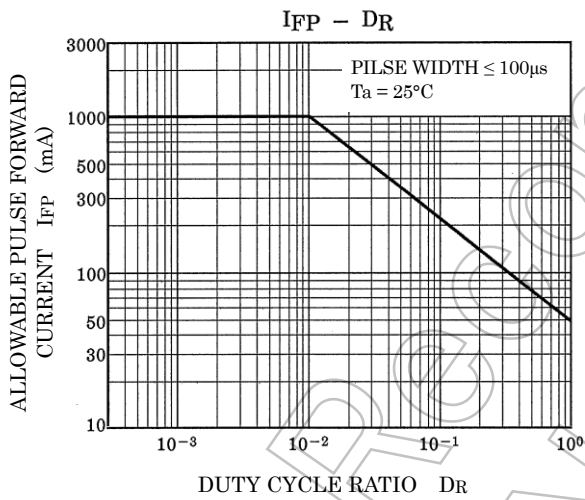
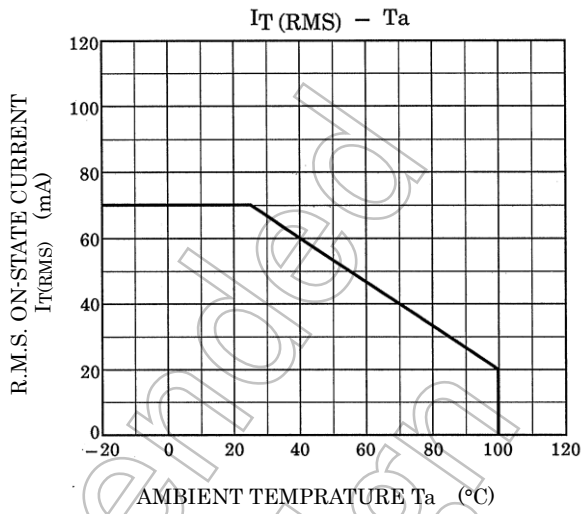
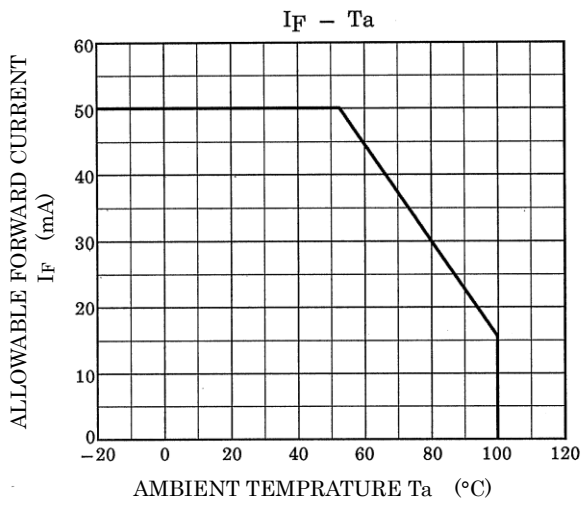
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Peak off-state current	$I_{DRM}$	$V_{DRM} = 600 \text{ V}$	—	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	$dv/dt$	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Figure 1)	200	500	—	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	—	V/ $\mu\text{s}$

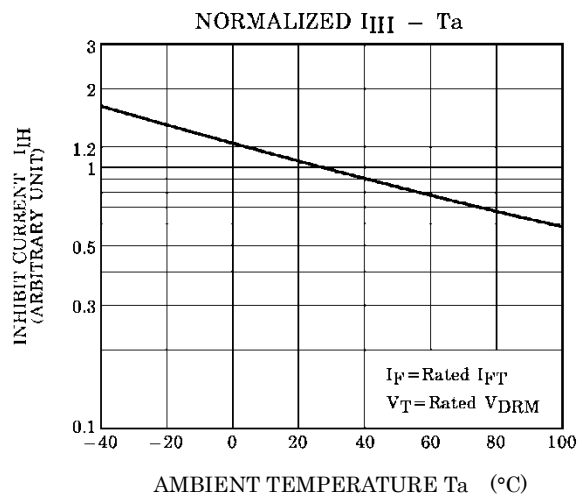
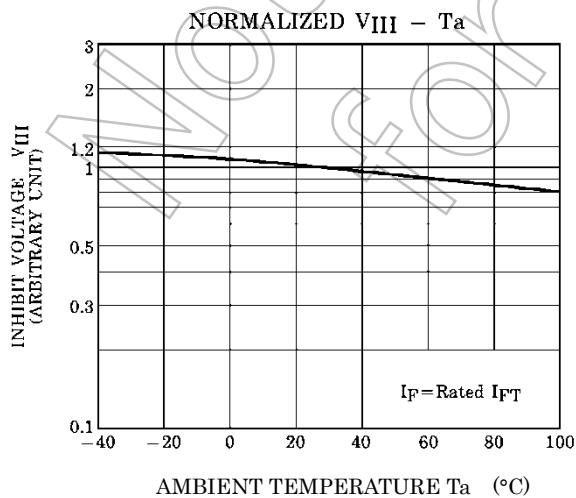
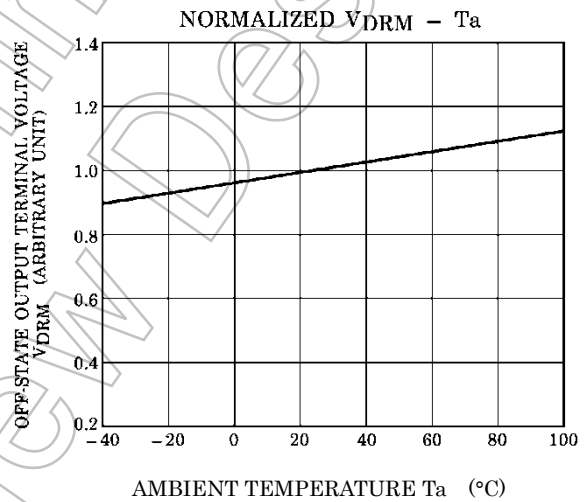
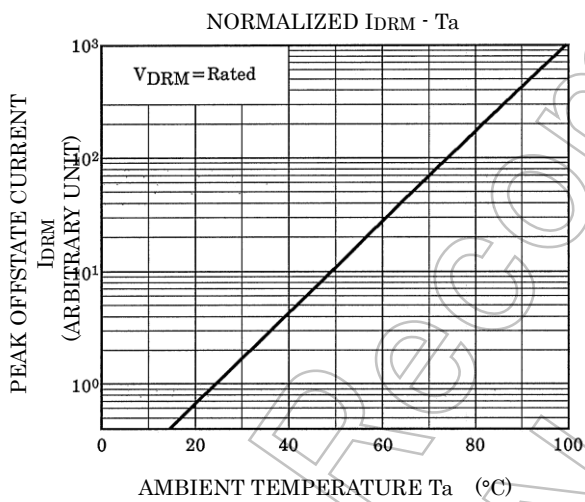
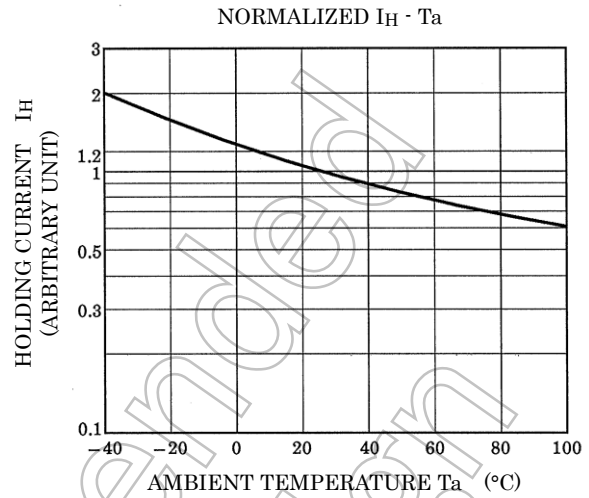
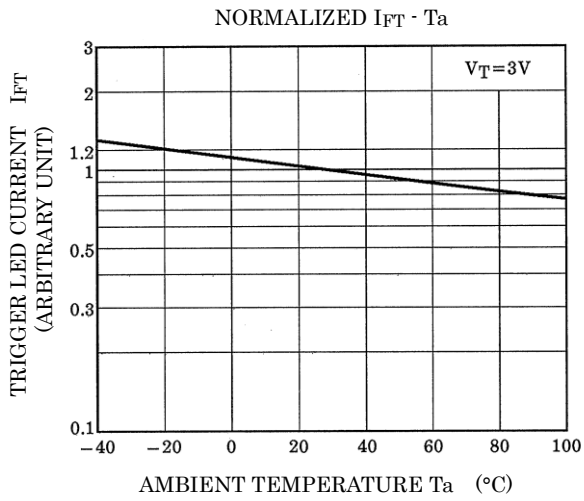
**Coupled Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	$I_{FT}$	$V_T = 3 \text{ V}$	—	5	10	mA
Inhibit voltage	$V_{IH}$	$I_F = \text{Rated } I_{FT}$	—	—	50	V
Leakage in inhibited state	$I_{IH}$	$I_F = \text{Rated } I_{FT}, V_T = \text{Rated } V_{DRM}$	—	200	600	$\mu\text{A}$
Capacitance (input to output)	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc



**Figure 1 dv/dt Test Circuit**





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