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TOSHIBA Photocoupler GaAs Ired & Photo-Triac

# TLP361J

Triac Drivers  
 Programmable Controllers  
 AC-Output Modules, Solid State Relays

TOSHIBA TLP361J consists of a zero-voltage-crossing turn-on photo-triac optically coupled to a gallium arsenide infrared-emitting diode in a four-lead plastic DIP package.

- Peak off-state voltage: 600 V (min)
- Trigger LED current: 10 mA (max)
- On-state current: 100 mA (max)
- Isolation voltage: 5000 Vrms (min)
- Zero crossing Function
- UL approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service No. 5A, File No.E67349
- CQC approved:GB4943.1,GB8898 Japan Factory
- Option (D4) VDE approved : DIN EN60747-5-5 ,EN60065,EN60950-1 (Note1) EN62368-1(Pending) (Note1)

**(Note 1) : When a EN60747-5-5 approved type is needed, please designate “Option(D4)”**

Maximum operating insulation voltage : 890 Vpk  
 Maximum permissible overvoltage : 8000 Vpk

•Construction mechanical rating

	7.62 mm pitch TLPXXX type	10.16 mm pitch TLPXXXF type
Creepage distance	7.0 mm (min)	8.0 mm (min)
Clearance	7.0 mm (min)	8.0 mm (min)
Insulation thickness	0.4 mm (min)	0.4 mm (min)

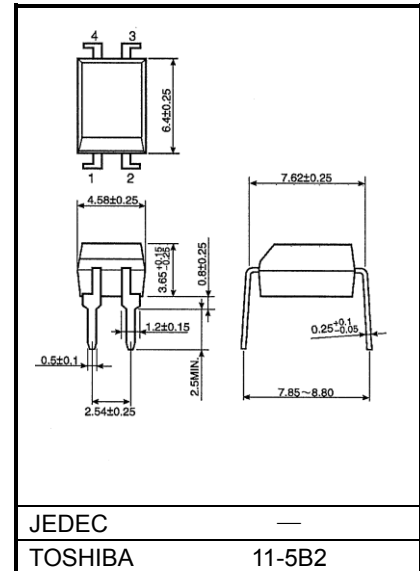
•Trigger LED current

Classification*	Trigger LED current (mA)		Marking of classification
	VT=3V, Ta=25°C		
	Min	Max	
(IFT7)		7	T7
Standard	—	10	T7, blank

\*Example: “(IFT7)”; “TLP361J(IFT7)”

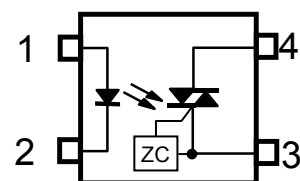
(Note) When specifying the application type name for certification testing, be sure to use the standard product type name, e.g. TLP361J(IFT7): TLP361J

Unit: mm



Weight: 0.26 g (typ.)

**Pin Configuration (top view)**



- 1: Anode
- 2: Cathode
- 3: Triac Terminal
- 4: Triac Terminal

Start of commercial production  
 2003-06

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

Characteristic		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	Ta = 25°C	I <sub>T(RMS)</sub>	100	mA
		Ta = 70°C		50	
	On-state current derating (Ta ≥ 25°C)	ΔI <sub>T</sub> / °C	-1.1	mA / °C	
	Peak on-state current (100 μs pulse, 120 pps)	I <sub>TP</sub>	2	A	
	Peak non-repetitive surge current (Pw = 10 ms)	I <sub>TSM</sub>	1.2	A	
	Output power dissipation	P <sub>O</sub>	300	mW	
	Output power dissipation derating (Ta ≥ 25°C)	ΔP <sub>O</sub> / °C	-3.0	mW / °C	
	Junction temperature	T <sub>j</sub>	115	°C	
Storage temperature range	T <sub>stg</sub>	-55~125	°C		
Operating temperature range	T <sub>opr</sub>	-40~100	°C		
Lead soldering temperature (10s)	T <sub>sol</sub>	260	°C		
Isolation voltage (AC, 1 minute, R.H. ≤ 60%)	(Note 1) BV <sub>S</sub>	5000	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 1: Pins 1 and 2 are shorted together and pins 3 and 4 are shorted together.

**Recommended Operating Conditions**

Characteristic	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.

## 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	$\mu\text{A}$
	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	$V_{TM}$	$I_{TM} = 100 \text{ mA}$	—	1.7	3.0	V
	Holding current	$I_H$	—	—	0.6	—	mA
	Critical rate of rise of off-state voltage	$dv/dt$	$V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Note 2)	200	500	—	$\text{V}/\mu\text{s}$
	Critical rate of rise of commutating voltage	$dv/dt(c)$	$V_{in} = 60 \text{ Vrms}, I_T = 15 \text{ mA}$ (Note 2)	—	0.2	—	$\text{V}/\mu\text{s}$

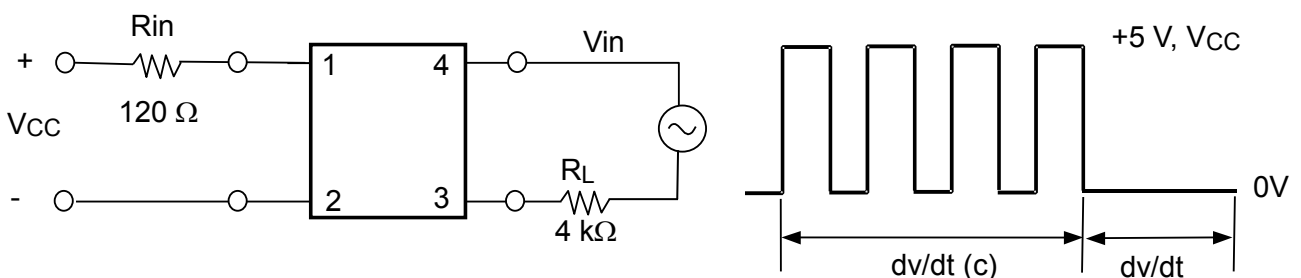
## Coupled Electrical Characteristics (Ta = 25°C)

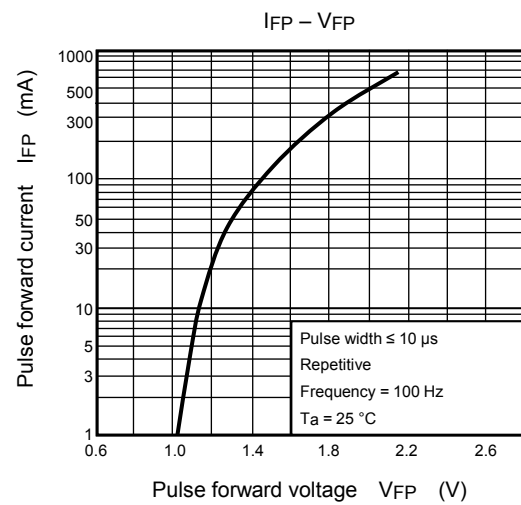
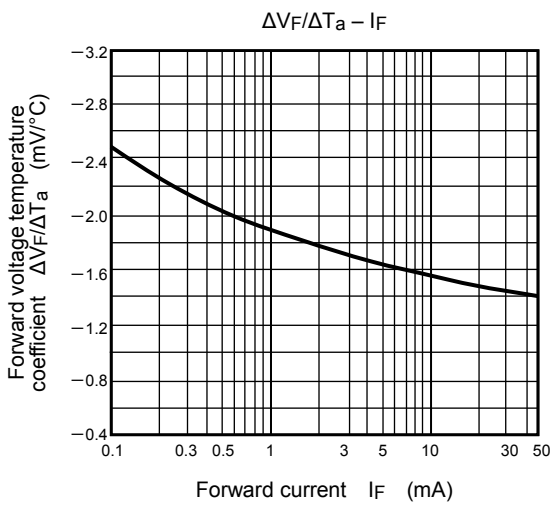
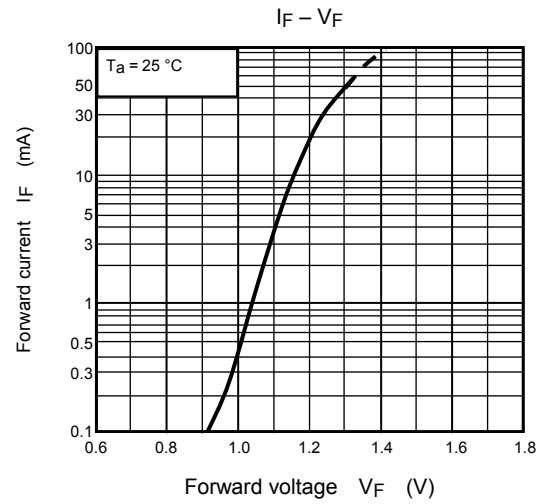
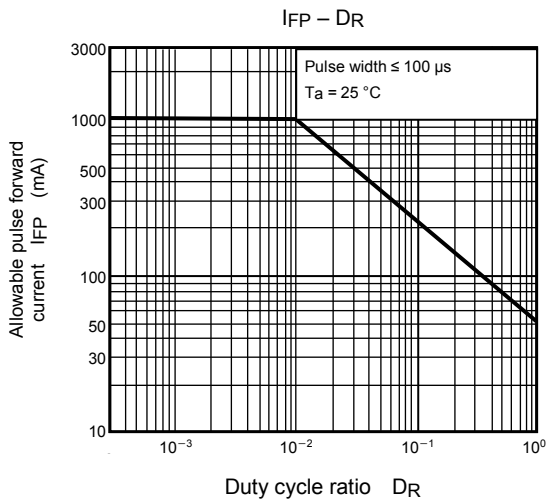
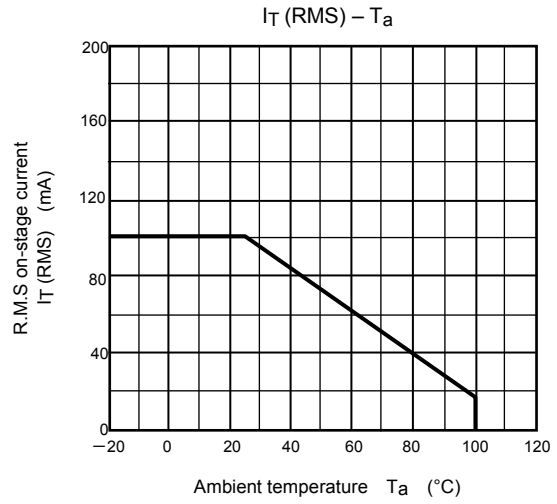
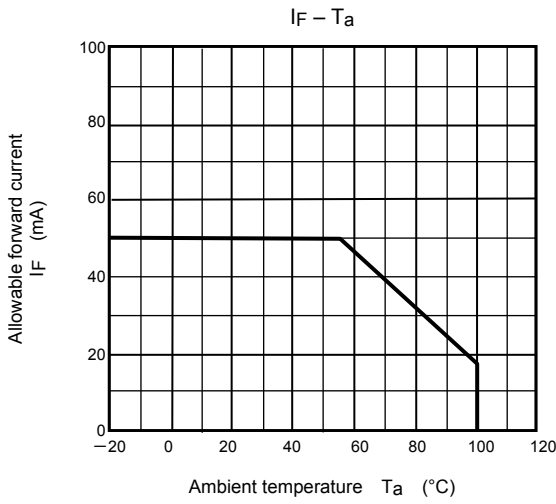
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	$I_{FT}$	$V_T = 3 \text{ V}$	—	—	10	mA
Inhibit voltage	$V_{IH}$	$I_F = \text{Rated } I_{FT}$	—	—	20	V
Leakage in inhibited state	$I_{IH}$	$I_F = \text{Rated } I_{FT}$ $V_T = \text{Rated } V_{DRM}$	—	200	600	$\mu\text{A}$
Turn-on time	$t_{ON}$	$V_D = 3 \rightarrow 1.5 \text{ V}, R_L = 20 \Omega$ $I_F = \text{Rated } I_{FT} \times 1.5$	—	30	100	$\mu\text{s}$

## Isolation Characteristics (Ta = 25°C)

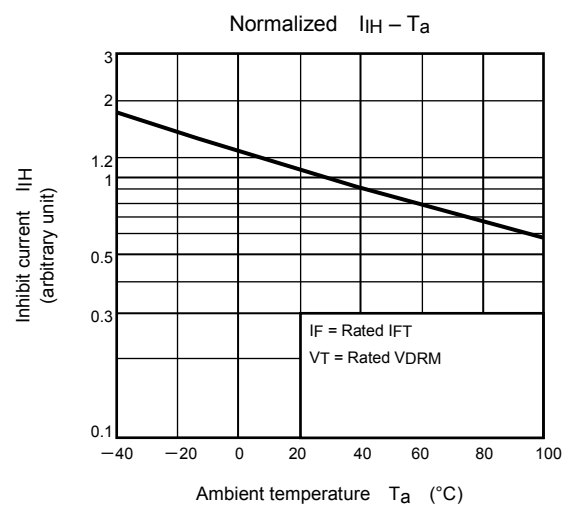
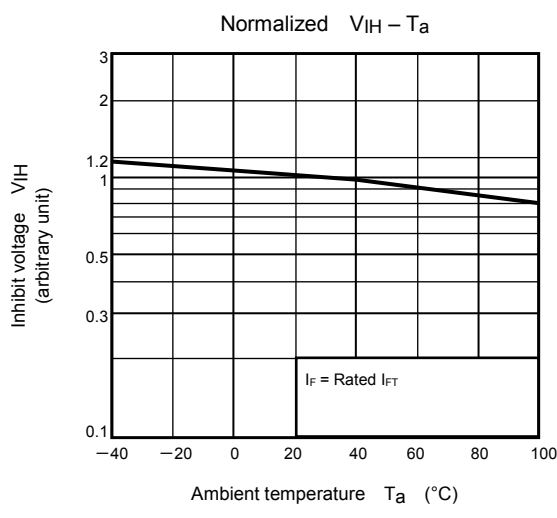
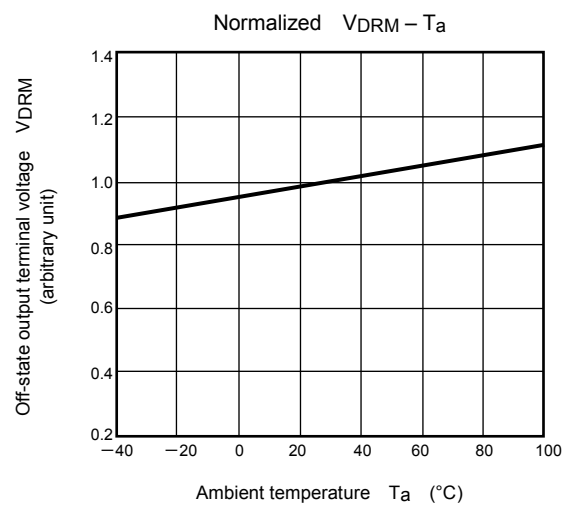
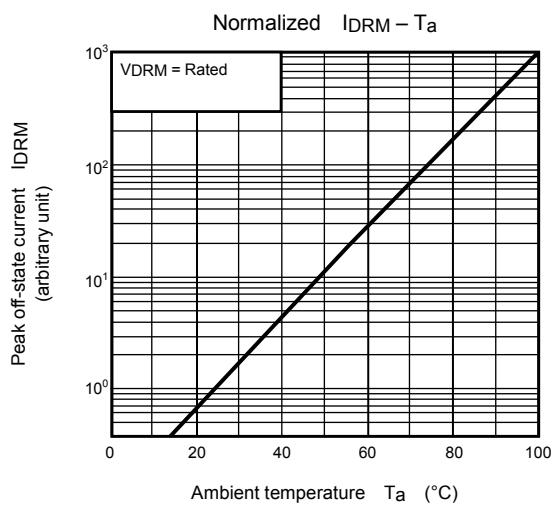
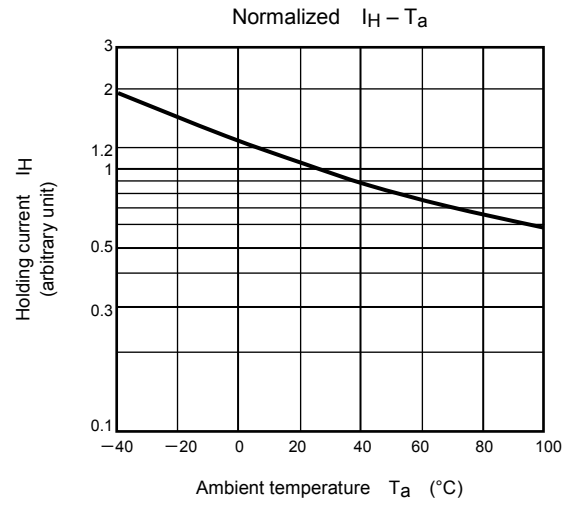
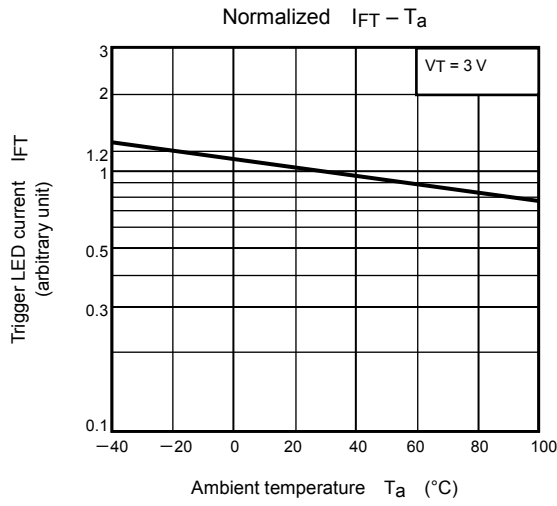
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance (input to output)	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation voltage	$B_V$	AC, 1 minute	5000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	Vrms
		DC, 1 minute, in oil	—	10000	—	Vdc

(Note 2):  $dv/dt$  test circuit





\*: The above graphs show typical characteristics.



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