

TOSHIBA Photocoupler Photo Relay

# TLP797J

Telecommunication

Measurement Instrumentation

FA

The TOSHIBA TLP797J consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).

The TLP797J is a bi-directional switch can replace mechanical relays in many applications.

- 6 pin DIP (DIP6)
- 1-form-A
- Peak off-state voltage: 600 V (min)
- Trigger LED current: 5 mA (max)
- On-state current: 100 mA (max)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 5000 Vrms (min)
- UL approval: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service No. 5A, File No.E67349
- Option (D4) VDE approved : DIN EN60747-5-5 (Note1)  
Maximum operating insulation voltage: 890 Vpk  
Maximum permissible over voltage: 6000 Vpk

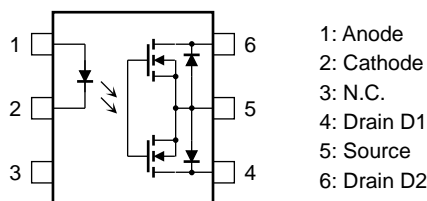
**(Note 1) : When a EN60747-5-5 approved type is needed, please designate “Option(D4)”**

- Construction mechanical rating

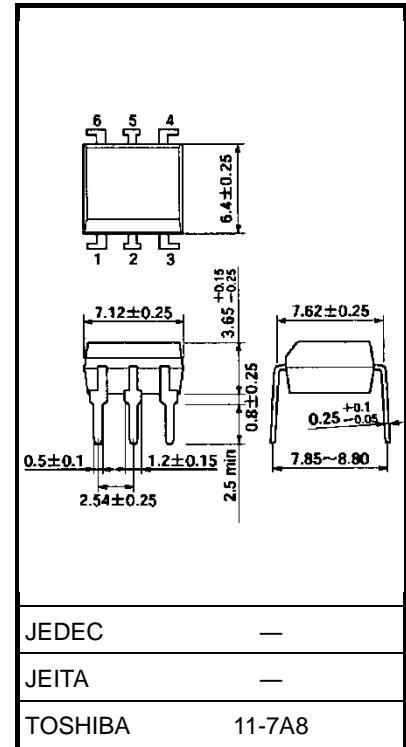
	7.62 mm pitch standard type	10.16 mm pitch TLPXXXXF type
Creepage distance	7.0 mm (min)	8.0 mm (min)
Clearance	7.0 mm (min)	8.0 mm (min)
Insulation thickness	0.4 mm (min)	0.4 mm (min)

Note: When applying safety standard certification, use the standard part number, e.g., TLP797J.

## Pin Configurations (top view)

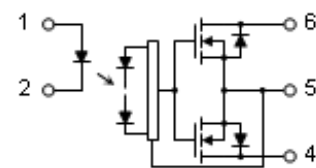


Unit: mm



Weight: 0.4 g (typ.)

## Schematic



Start of commercial production  
2001/07

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

Characteristics		Symbol	Rating	Unit	
LED	Forward current	$I_F$	50	mA	
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.5	mA/°C	
	Peak forward current (100 μs pulse, 100 pps)	$I_{FP}$	1	A	
	Reverse voltage	$V_R$	5	V	
	Diode power dissipation	$P_D$	50	mW	
	Diode power dissipation derating (Ta ≥ 25°C)	$\Delta P_D / ^\circ\text{C}$	-0.5	mW/°C	
	Junction temperature	$T_j$	125	°C	
Detector	Off-state output terminal voltage	$V_{OFF}$	600	V	
	On-state current	A connection	$I_{ON}$	100	mA
		B connection		100	
		C connection		200	
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON} / ^\circ\text{C}$	-1.0	mA/°C
		B connection		-1.0	
		C connection		-2.0	
	Output power dissipation	A connection	$P_O$	430	mW
		B connection		330	
		C connection		504	
	Output power dissipation derating (Ta ≥ 25°C)	A connection	$\Delta P_O / ^\circ\text{C}$	-4.3	mW / °C
B connection		-3.3			
C connection		-5.04			
Junction temperature	$T_j$	125	°C		
Storage temperature range		$T_{stg}$	-55 to 125	°C	
Operating temperature range		$T_{opr}$	-40 to 85	°C	
Lead soldering temperature (10 s)		$T_{sol}$	260	°C	
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note 1)		$BV_S$	5000	Vrms	

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).

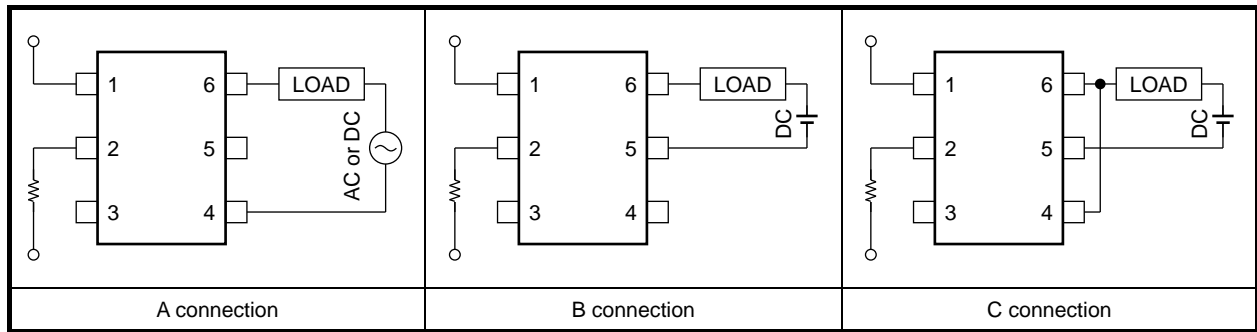
Note 1: Device considered a two-terminal device: Pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	480	V
Forward current	$I_F$	7.5	15	25	mA
On-state current	$I_{ON}$	—	—	100	mA
Operating temperature	$T_{opr}$	-20	—	65	°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.

## Circuit Connections



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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5 V	—	—	10	μA
	Capacitance	C <sub>T</sub>	V = 0 V, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I <sub>OFF</sub>	V <sub>OFF</sub> = 600 V	—	—	1	μA
	Capacitance	C <sub>OFF</sub>	V = 0 V, f = 1 MHz	—	120	—	pF

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		I <sub>FT</sub>	I <sub>ON</sub> = 100 mA	—	1.6	5	mA
Close LED current		I <sub>FC</sub>	I <sub>OFF</sub> = 100 μA	0.1	—	—	mA
On-state resistance	A connection	R <sub>ON</sub>	I <sub>ON</sub> = 100 mA, I <sub>F</sub> = 10 mA, t < 1 s	—	25	35	Ω
	B connection		I <sub>ON</sub> = 100 mA, I <sub>F</sub> = 10 mA	—	30	45	
	C connection		I <sub>ON</sub> = 100 mA, I <sub>F</sub> = 10 mA	—	23	35	
	C connection		I <sub>ON</sub> = 200 mA, I <sub>F</sub> = 10 mA	—	12	—	

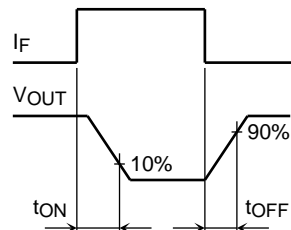
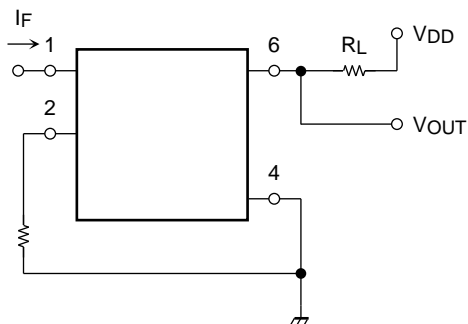
## Isolation Characteristics (Ta = 25°C)

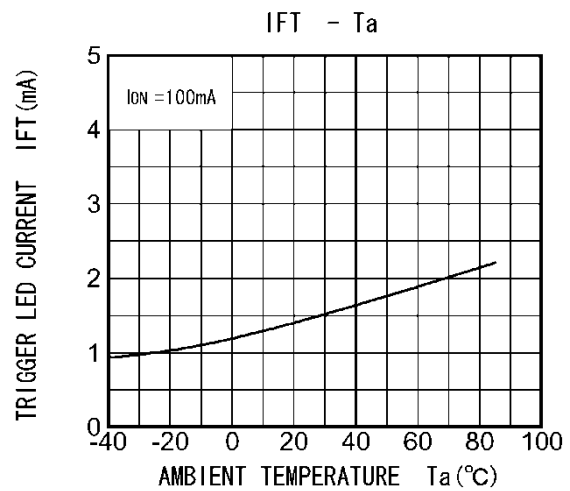
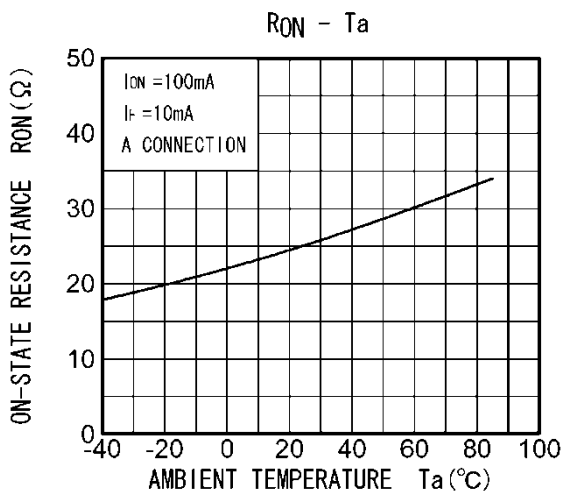
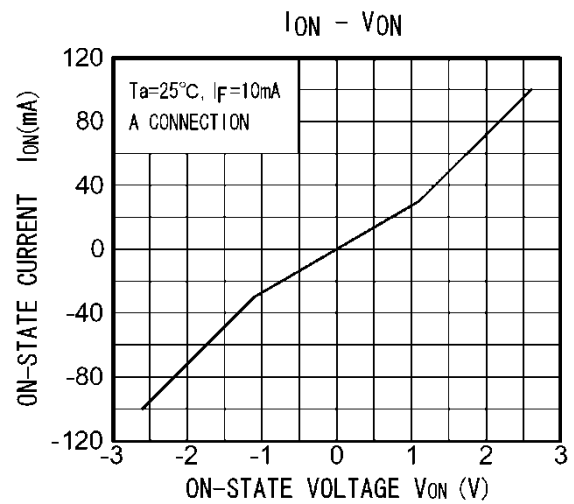
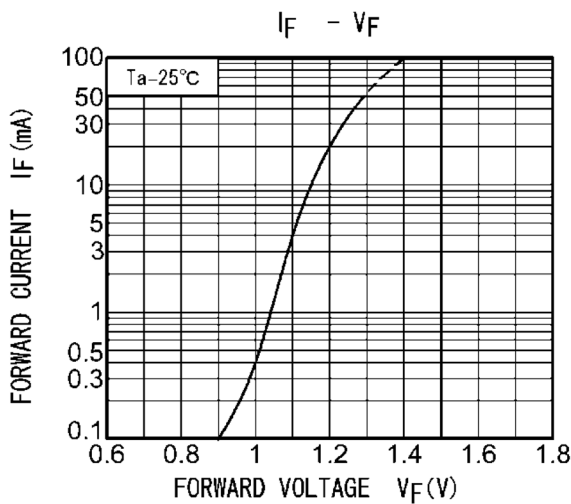
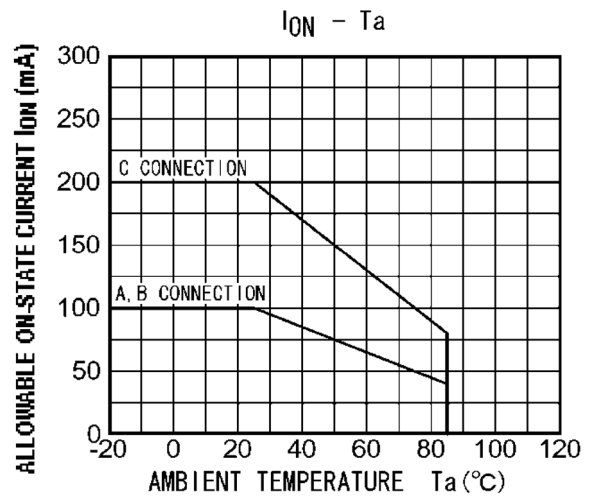
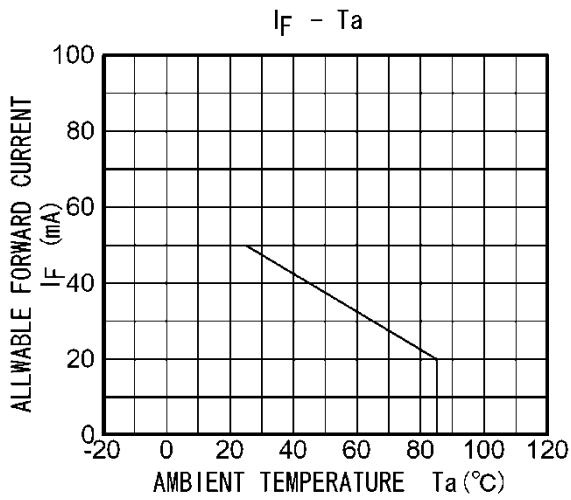
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60%	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation voltage	BVS	AC, 1 minute	5000	—	—	V <sub>rms</sub>
		AC, 1 second (in oil)	—	10000	—	
		DC, 1 minute (in oil)	—	10000	—	V <sub>dc</sub>

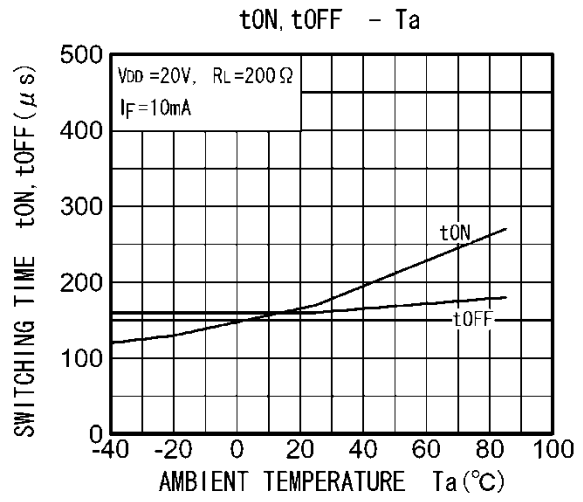
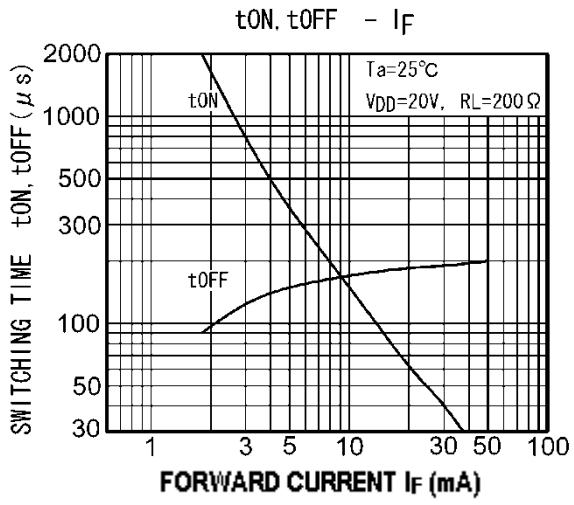
## Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω V <sub>DD</sub> = 20 V, I <sub>F</sub> = 10 mA (Note)	—	0.2	1.5	ms
Turn-off time	t <sub>OFF</sub>		—	0.2	1	ms

Note: Switching time test circuit







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