TOSHIBA Photocoupler Photo Relay

TLP797J

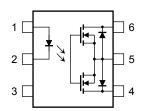
Telecommunication Measurement Instrumenation FA

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.

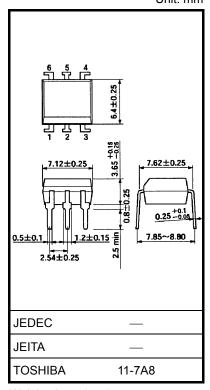
- 6 pin DIP (DIP6)
- 1-form-A
- Peak off-state voltage: 600 V (min)
- Trigger LED current: 5 mA (max)
- On-state current: 100 mA (max)
- On-state resistance: 35Ω (max)
- Isolation voltage: 5000 Vrms (min)

Pin Configurations (top view)



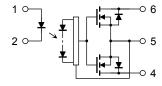
- 1: Anode
- 2: Cathode
- 3: N.C.
- 4: Drain D1
- 5: Source
- 6: Drain D2

Unit: mm



Weight: 0.4 g (typ.)

Schematic



Absolute Maximum Ratings (Ta = 25°C)

	Characteristics		Symbol	Rating	Unit	
LED	Forward current		l _F	50	mA	
	Forward current de (Ta ≥ 25°C)	erating	ΔI _F /°C	-0.5	mA/°C	
	Peak forward curre (100 μs pulse, 100		I _{FP}	1	А	
	Reverse voltage		V _R	5	V	
	Junction temperatu	ıre	Tj	125	°C	
	Off-state output ter	minal voltage	V _{OFF}	600	V	
	On-state current	A connection		100		
		B connection	I _{ON}	100	mA	
Detector		C connection		200		
Detector	On-state current derating	A connection		-1.0		
		B connection	Δl _{ON} /°C	-1.0	mA/°C	
	(Ta ≥ 25°C)	C connection		-2.0		
	Junction temperatu	ıre	Tj	125	°C	
Storage temperature range			T _{stg}	T _{stg} –55 to 125		
Operating temperature range			T _{opr}	-40 to 85	°C	
Lead solde	Lead soldering temperature (10 s)			Γ _{sol} 260		
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note)			BVS	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).

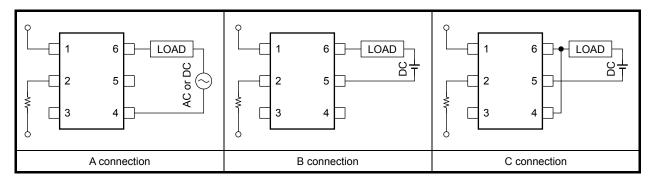
Note: Device considered a two-terminal device: Pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	V_{DD}	_	_	480	V
Forward current	IF	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	Тур.	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	μΑ
	Capacitance	C _T	V = 0, $f = 1$ MHz	_	30	_	pF
Detector	Off-state current	l _{OFF}	V _{OFF} = 600 V	_	_	1	μΑ
	Capacitance	C _{OFF}	V = 0, $f = 1$ MHz		120		pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current		I _{FT}	I _{ON} = 100 mA	_	1.6	5	mA
Close LED current		I _{FC}	I _{OFF} = 100 μA	0.1	_	_	mA
	A connection	R _{ON}	$I_{ON} = 100 \text{ mA}, I_F = 10 \text{ mA}, t < 1 \text{ s}$	_	25	35	Ω
On-state resistance	A connection		I _{ON} = 100 mA, I _F = 10 mA	_	30	45	
Off-state resistance	B connection		I _{ON} = 100 mA, I _F = 10 mA	_	23	35	22
	C connection		I _{ON} = 200 mA, I _F = 10 mA	_	12	_	

Isolation Characteristics (Ta = 25°C)

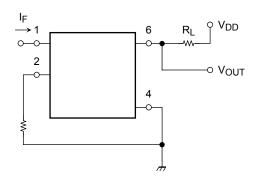
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	V _S = 0 V, f = 1 MHz	_	0.8	_	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≤ 60%	5 × 10 ¹⁰	10 ¹⁴	_	Ω
		AC, 1 minute	5000	_	_	Vrms
Isolation voltage	BVS	AC, 1 s (in oil)	_	10000	_	VIIIIS
		DC, 1 minute (in oil)	_	10000	_	Vdc

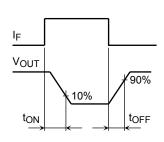
3

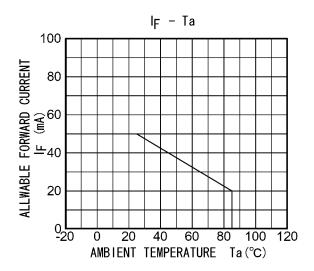
Switching Characteristics ($Ta = 25^{\circ}C$)

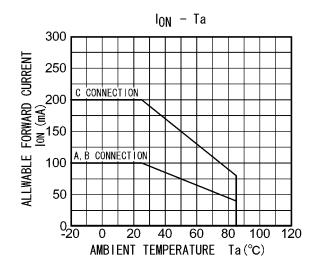
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	t _{ON}	$R_L = 200 \Omega$ (No	e) —	0.2	1.5	ms
Turn-off time	toff	$V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$		0.2	1	ms

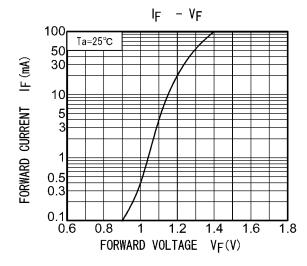
Note: Switching time test circuit

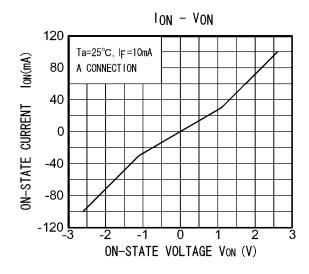


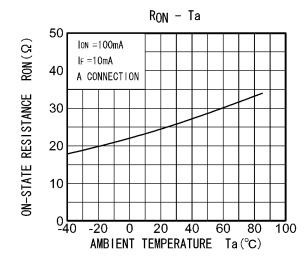


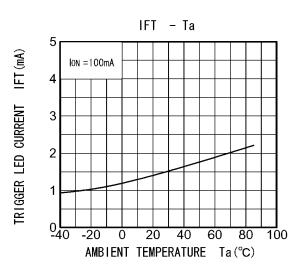




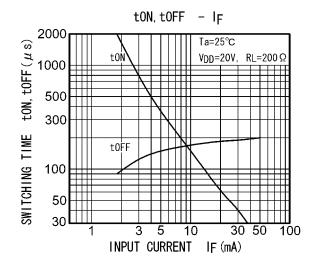


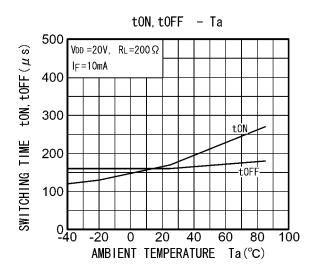






5





6 2007-10-01

RESTRICTIONS ON PRODUCT USE

20070701-EN

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor
 devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical
 stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety
 in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such
 TOSHIBA products could cause loss of human life, bodily injury or damage to property.
 In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as
 - In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in his document shall be made at the customer's own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility
 is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from
 its use. No license is granted by implication or otherwise under any patents or other rights of TOSHIBA or the third
 parties.
- Product names mentioned herein may be trademarks of their respective companies.
- GaAs(Gallium Arsenide) is used in this product. The dust or vapor is harmful to the human body. Do not break, cut, crush or dissolve chemically.
- Please contact your sales representative for product-by-product details in this document regarding RoHS
 compatibility. Please use these products in this document in compliance with all applicable laws and regulations
 that regulate the inclusion or use of controlled substances. Toshiba assumes no liability for damage or losses
 occurring as a result of noncompliance with applicable laws and regulations.