TOSHIBA Photocoupler Photorelay

TLP170J

Modem Fax Cards, Modems in PC

Telecommunications PBX Security Equipment Measurement Equipment

The Toshiba TLP170J consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a 4-pin SOP package. This photorelay requires 1mA of LED current to turn it on. It is suitable for applications that need electrical power savings.

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, Pitch = 2.54 mm •
- 1-Form-A •
- Peak OFF-state voltage: 600 V (min)
- Trigger LED current: 1 mA (max)
- ON-state current: 90 mA (max)
- ON-state resistance: 40Ω (max, t < 1 s)
- ON-state resistance: 60Ω (max, continuous)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1577, File No.E67349
- c-UL recognized CSA Component Acceptance Service No. 5A File No.E67349

Weight: 0.1 g (typ.)

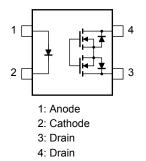
<u>0.4±0.1</u>

2.54±0.25

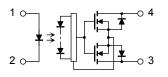
JEDEC

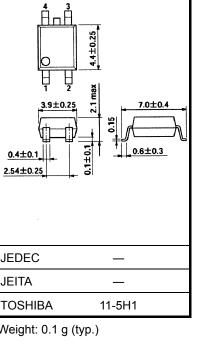
JEITA

Pin Configuration (top view)



Internal Circuit





Unit: mm

Absolute Maximum Rating (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
	Forward current	١ _F	50	mA
LED	Forward current derating (Ta \ge 25°C)	∆l _F /°C	-0.5	mA/°C
	Pulse forward current (100 μs pulse, 100 pps)	I _{FP}	1	A
	Reverse voltage	V _R	5	V
	Junction temperature	Tj	125	°C
	OFF-state output terminal voltage	VOFF	600	V
	ON-state current	I _{ON}	90	mA
Detector	ON-state current derating (Ta \ge 25°C)	∆l _{ON} /°C	-0.9	mA/°C
	Junction temperature	Tj	125	°C
Storage temperature range		T _{stg}	-55~125	°C
Operating temperature range		T _{opr}	-40~85	°C
Lead soldering temperature (10 s)		T _{sol}	260	°C
Isolation voltage (AC, 1 min, R.H. \leq 60%) (Note 1)		BVS	1500	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: LED side pins shorted together, and detector side pins shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	V _{DD}	_	_	480	V
Forward current	١ _F	_	2	25	mA
ON-state current	I _{ON}	_	_	70	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.

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
	Forward voltage	VF	I _F = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I _R	$V_R = 5 V$	_	_	10	μA
	Capacitance	CT	V = 0, f = 1 MHz	_	30	_	pF
Detector	OFF-state current	I _{OFF}	V _{OFF} = 600 V	_	1	1000	nA
Delector	Capacitance	COFF	V = 0, f = 1 MHz		75		pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I _{FT}	I _{ON} = 90 mA	_	0.4	1	mA
Return LED current	I _{FC}	I _{OFF} = 100 μA	0.1	_	_	mA
ON-state resistance	RON	I _{ON} = 90 mA, I _F = 2 mA, t < 1 s	_	_	40	Ω
ON-State resistance		$I_{ON} = 90$ mA, $I_F = 2$ mA, continuous	_	45	60	

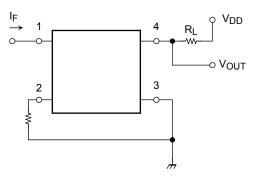
Isolation Characteristics (Ta = 25°C)

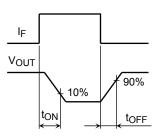
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	$V_{S} = 0 V, f = 1 MHz$	—	0.8	_	pF
Isolation resistance	R _S	$V_S=500~V,~R.H.\leq 60\%$	$5 imes 10^{10}$	10 ¹⁴	_	Ω
		AC, 1 min	1500	_	_	Vrms
Isolation voltage	BVS	AC, 1 s, in oil	— 3000	_	VIIIIS	
		DC, 1 min, in oil	—	3000	_	Vdc

Switching Characteristics (Ta = 25°C)

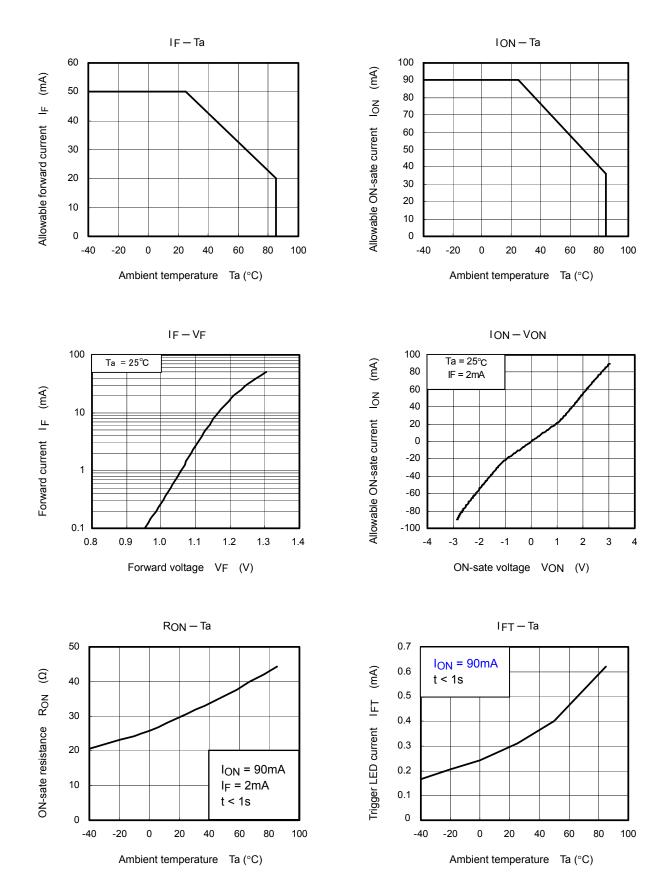
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	ton		_	2.0	8.0	
Turn-on time	t _{ON}		_	_	5.0	ms
Turn-off time	toff			0.5	3.0	

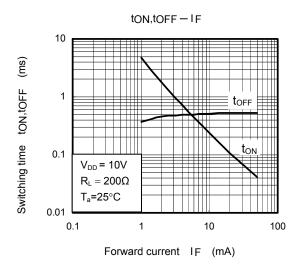
Note 2: Switching time test circuit

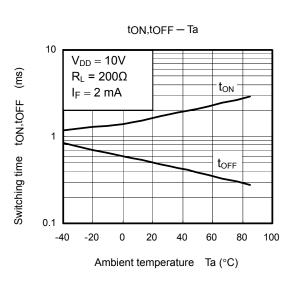


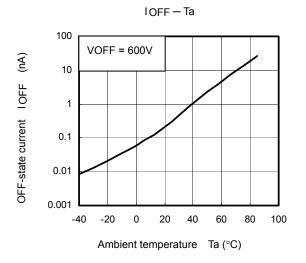


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