TOSHIBA Photocoupler Photorelay

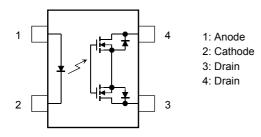
TLP172A

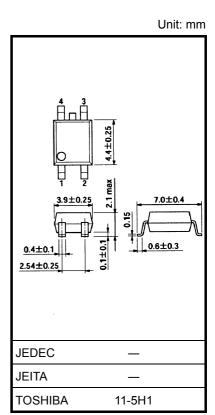
Telecommunications
Control Equipment
Data Acquisition System
Security Equipment
Measurement Equipment

The Toshiba TLP172A consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a 4-pin SOP package. This photorelay has higher output current rating than phototransistor-type photocoupler; hence, it is suitable for use as On/Off control for high current.

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, pitch = 2.54 mm
- Normally open (1-form-A) device
- Peak off-state voltage: 60 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 400 mA (max)
- On-state resistance: 2Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1557, File No.E67349

Pin Configuration (top view)





Weight: 0.1 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
	Forward current	lF	50	mA
LED	Forward current derating (Ta ≥ 25°C)	ΔI _F /°C	-0.5	mA/°C
	Reverse voltage	V_{R}	5	V
	Junction temperature	Tj	125	°C
	Off-state output terminal voltage	V _{OFF}	60	V
Detector	On-state current	I _{ON}	400	mA
Detector	Forward current derating (Ta ≥ 25°C)	Δl _{ON} /°C	-4.0	mA/°C
	Junction temperature	Tj	125	°C
Storage temperature		T _{stg}	-55 to 125	°C
Operating temperature		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)		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: LED pins are shorted together. Detector pins are also shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	V_{DD}	_	_	48	V
Forward current	lF	5	7.5	25	mA
On-state current	I _{ON}	_	_	400	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	V _F	I _F = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I _R	V _R = 5 V	_	_	10	μΑ
	Capacitance	C _T	V = 0, f = 1 MHz	_	30	_	pF
Detector	Off-state current	loff	V _{OFF} = 60 V	_	_	1	μΑ
	Capacitance	C _{OFF}	V = 0, f = 1 MHz		130		pF

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Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I _{FT}	I _{ON} = 400 mA	_	1.6	3	mA
Return LED current	I _{FC}	I _{OFF} = 100 μA	0.1	_	_	mA
On-state resistance	R _{ON}	I _{ON} = 400 mA, I _F = 5 mA	_	1	2	Ω

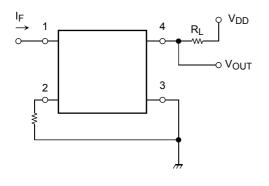
Isolation Characteristics (Ta = 25°C)

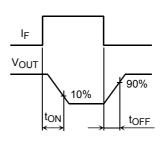
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	V _S = 0 V, f = 1 MHz	_	8.0	_	pF
Isolation resistance	R _S	V _S = 500 V, R.H. ≤ 60%	5 × 10 ¹⁰	10 ¹⁴	_	Ω
		AC, 1 minute	1500	_	_	Vrms
Isolation voltage	BV_S	AC, 1 second, in oil	_	3000	_	VIIIIS
		DC, 1 minute, in oil	_	3000	_	Vdc

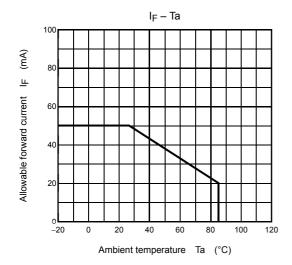
Switching Characteristics (Ta = 25°C)

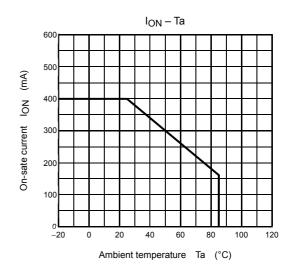
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	t _{ON}	$R_L = 200 \Omega$ (注 2)	_	0.8	2	mo
Turn-off time	toff	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	_	0.1	0.5	ms

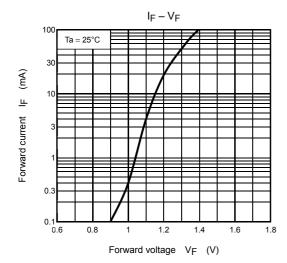
Note 2: Switching time test circuit

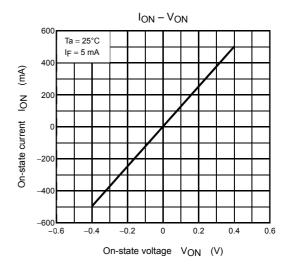


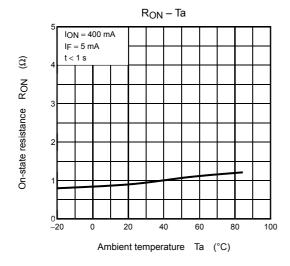


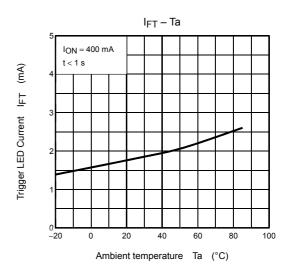


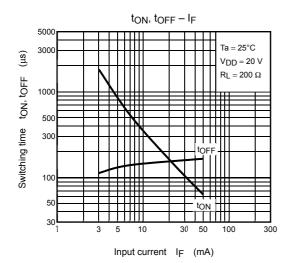


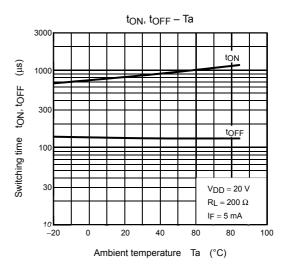


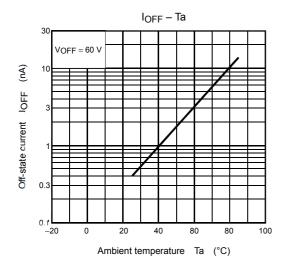












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