TOSHIBA Photocoupler Photorelay

# **TLP172A**

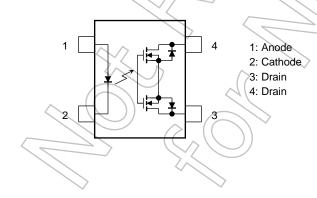
Telecommunications
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Data Acquisition System
Security Equipment
Measurement Equipment

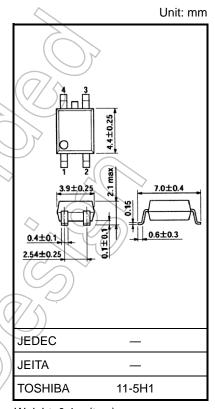
The Toshiba TLP172A consists of an infrared emitting diode optically coupled to a photo-MOSFET in a 4-pin SOP package. This photorelay has higher output current rating than phototransistor-type photocoupler; hence, it is suitable for use as On/Off control for high current.

- 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:  $2 \Omega$  (max)
- Isolation voltage: 1500 Vrms (min)
- UL-recognized: UL 1557, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)

Note 1: When a VDE approved type is needed, please designate the **Option(V4)**.

### Pin Configuration (top view)





Weight: 0.1 g (typ.)

Start of commercial production 2002-03

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

	Characteristics	Symbol	Rating	Unit
	Forward current	lF	50	mA
. 50	Forward current derating (Ta ≥ 25°C)	ΔIF/°C	-0.5	mA/°C
	Reverse voltage	VR	5	V
LED	Diode power dissipation	PD	50	mW
	Diode power dissipation derating (Ta ≥25°C)	△P <sub>D</sub> /°C	-0.5	mW/°C
	Junction temperature	Tj	125	(°C)
	Off-state output terminal voltage	Voff	60	
	On-state current	Ion	400	mA
<b>.</b>	Forward current derating (Ta ≥ 25°C)	ΔION/°C	-4.0	mA/°C
Detector	Output power dissipation	Pc	290	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔPc/°C	-2.9	mW / °C
	Junction temperature	Тј (	125	°C
Storage temperature		T <sub>stg</sub>	−55/to 125	Sc /
Operating	temperature	Topr	40 to 85	°C
Lead sold	dering temperature (10 s)	T <sub>sol</sub>	260	·c
Isolation (AC, 60 s	voltage , 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

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	VDD	1	_	48	V
Forward current	lF	5	7.5	25	mA
On-state current		× –	_	400	mA
Operating temperature	Topr	-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	IF = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5 V	_	_	10	μΑ
	Capacitance	Ст	V = 0 V, f = 1 MHz	_	30	_	pF
Detector	Off-state current	loff	Voff = 60 V	_	_	1	μА
	Capacitance	Coff	V = 0 V, f = 1 MHz	_	130	_	pF

TLP172A



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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I <sub>FT</sub>	I <sub>ON</sub> = 400 mA	_	1.6	3	mA
Return LED current	IFC	I <sub>OFF</sub> = 100 μA	0.1	_	_	mA
On-state resistance	Ron	I <sub>ON</sub> = 400 mA, I <sub>F</sub> = 5 mA	<u> </u>	1	2	Ω

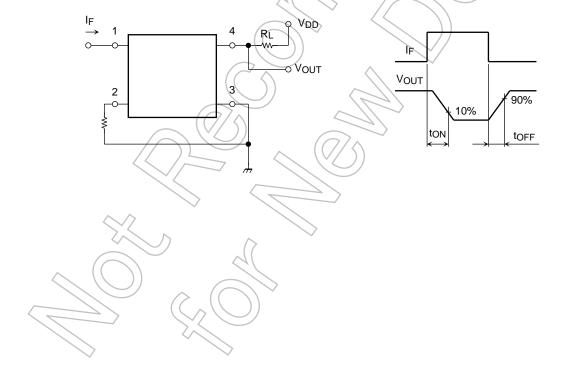
### **Isolation Characteristics (Ta = 25°C)**

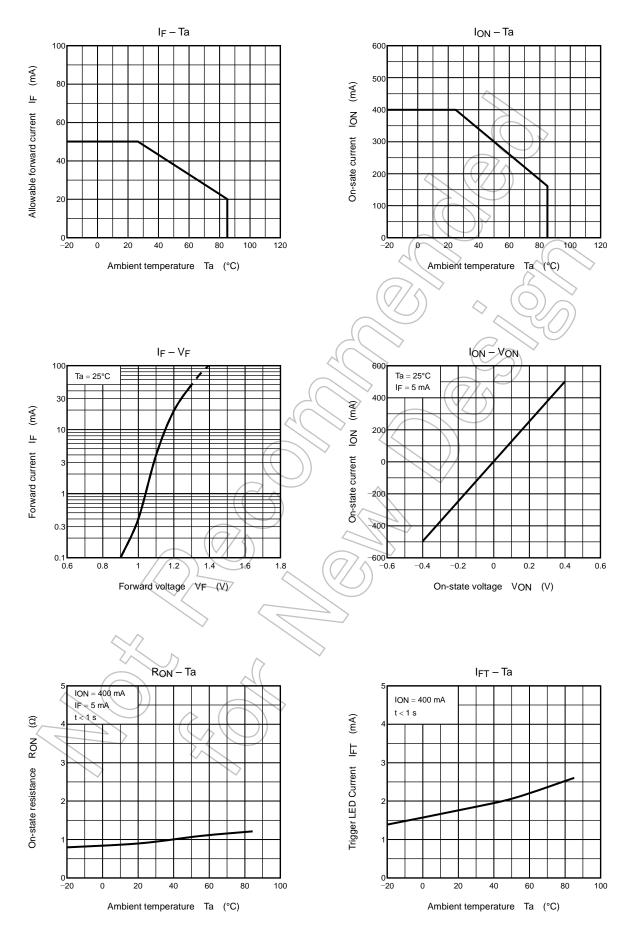
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	Cs	Vs = 0 V, f = 1 MHz	_	8.0	_	pF
Isolation resistance	Rs	V <sub>S</sub> = 500 V, R.H. ≤ 60 %	5 × 10 <sup>10</sup>	10 <sup>14</sup>		Ω
Isolation voltage	BVs	AC, 60 s	1500			Vrms

### **Switching Characteristics (Ta = 25°C)**

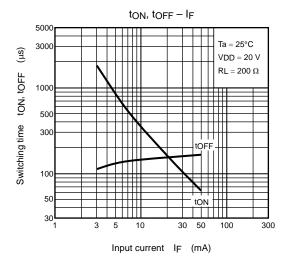
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	ton	$R_L = 200 \Omega$	(Note 2)	0.8	2	ms
Turn-off time	toff	$V_{DD} = 20 \text{ V}, \text{ I}_F = 5 \text{ mA}$		0.1	0.5	1115

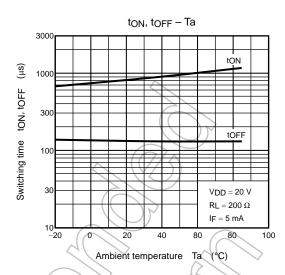
Note 2: Switching time test circuit

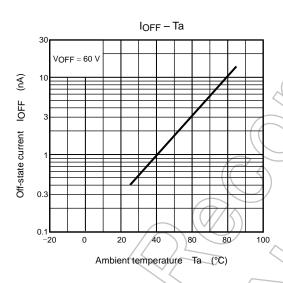




NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.







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