

TOSHIBA Photocoupler Photorelay

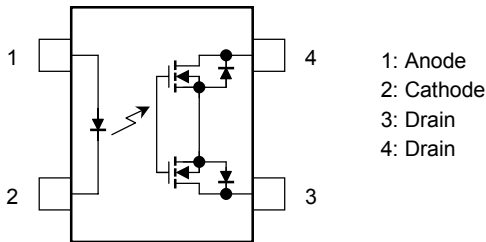
# TLP172A

Telecommunications  
 Control Equipment  
 Data Acquisition System  
 Security Equipment  
 Measurement Equipment

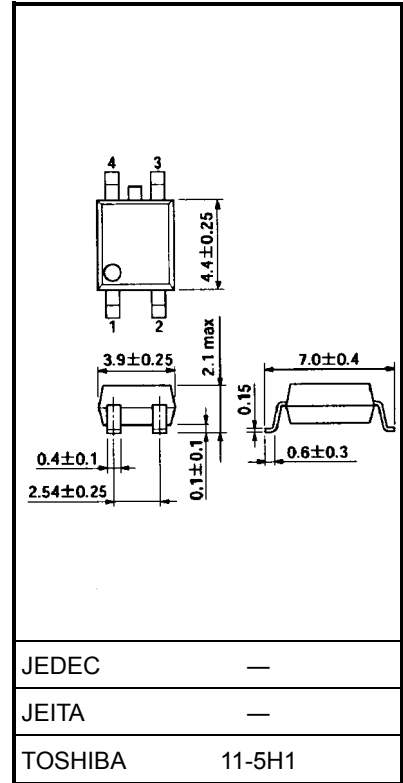
The Toshiba TLP172A consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a 4-pin SOP package. This photorelay has higher output current rating than phototransistor-type photocoupler; hence, it is suitable for use as On/Off control for high current.

- 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: 2 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1557, File No.E67349

### Pin Configuration (top view)



Unit: mm



Weight: 0.1 g (typ.)

## Maximum Rating (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
	Reverse voltage	$V_R$	5	V
	Junction temperature	$T_j$	125	°C
Detector	Off-state output terminal voltage	$V_{OFF}$	60	V
	On-state current	$I_{ON}$	400	mA
	Forward current derating (Ta ≥ 25°C)	$\Delta I_{ON}/^\circ\text{C}$	-4.0	mA/°C
	Junction temperature	$T_j$	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 min, R.H. ≤ 60%) (Note 1)		$BV_S$	1500	Vrms

Note 1: LED pins are shorted together. Detector pins are also shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	48	V
Forward current	$I_F$	5	7.5	25	mA
On-state current	$I_{ON}$	—	—	400	mA
Operating temperature	$T_{opr}$	-20	—	65	°C

## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	$I_{OFF}$	$V_{OFF} = 60 \text{ V}$	—	—	1	μA
	Capacitance	$C_{OFF}$	$V = 0, f = 1 \text{ MHz}$	—	130	—	pF

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	$I_{FT}$	$I_{ON} = 400 \text{ mA}$	—	1.6	3	mA
Return LED current	$I_{FC}$	$I_{OFF} = 100 \text{ μA}$	0.1	—	—	mA
On-state resistance	$R_{ON}$	$I_{ON} = 400 \text{ mA}, I_F = 5 \text{ mA}$	—	1	2	Ω

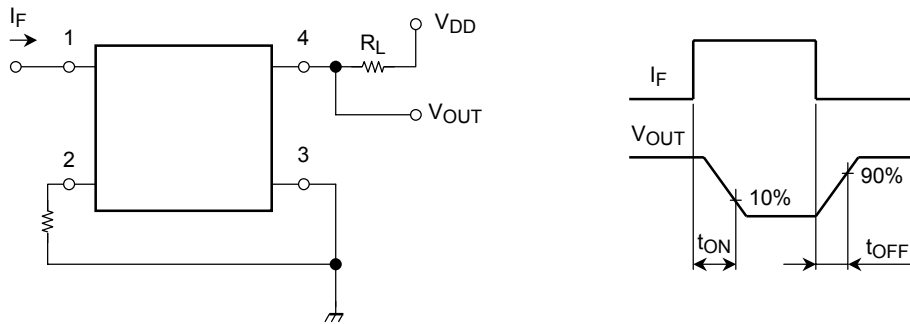
**Isolation Characteristics (Ta = 25°C)**

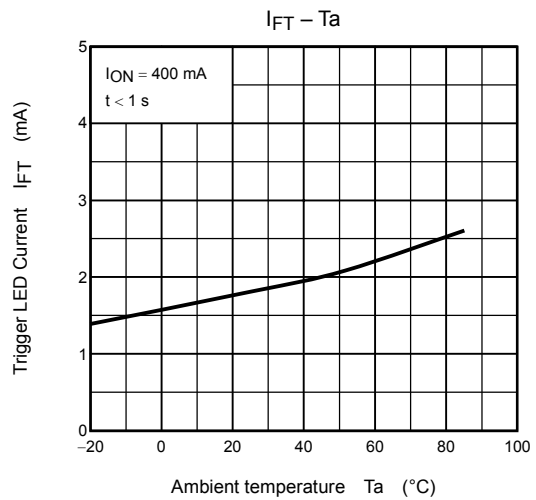
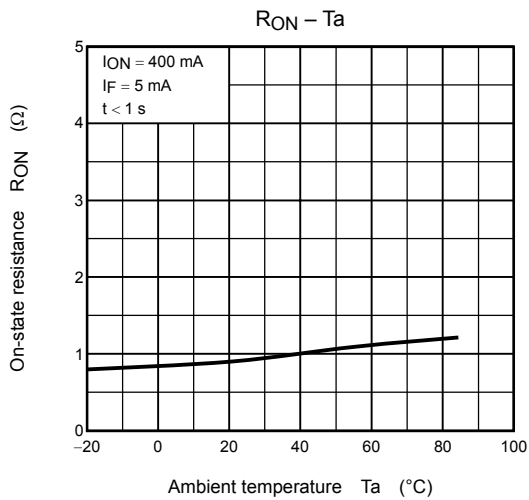
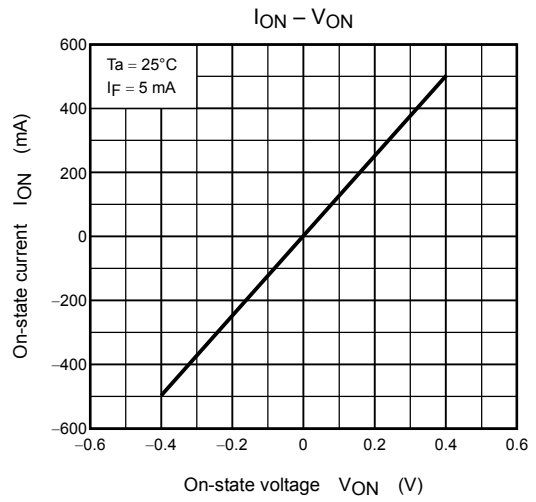
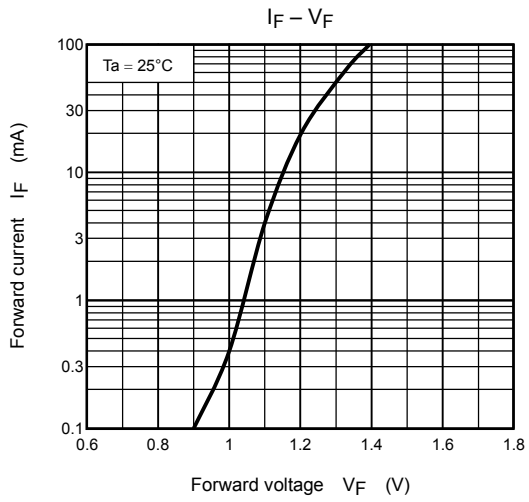
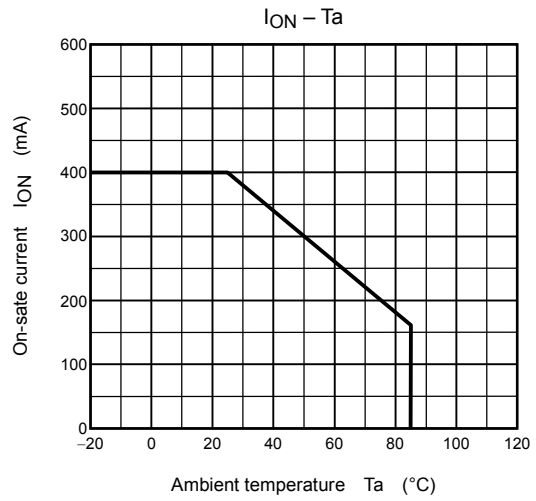
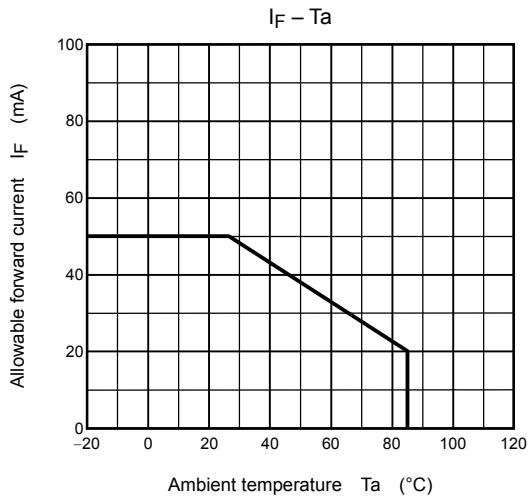
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60%	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation voltage	BV <sub>S</sub>	AC, 1 min	1500	—	—	Vrms
		AC, 1 s, in oil	—	3000	—	
		DC, 1 min, in oil	—	3000	—	Vdc

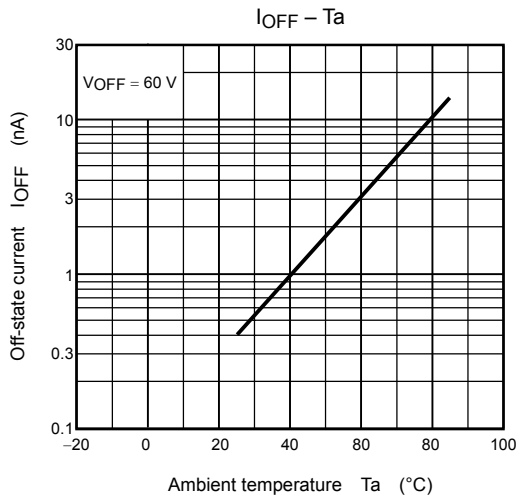
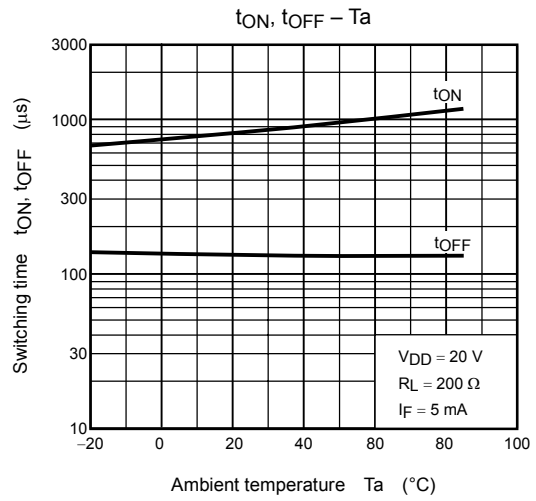
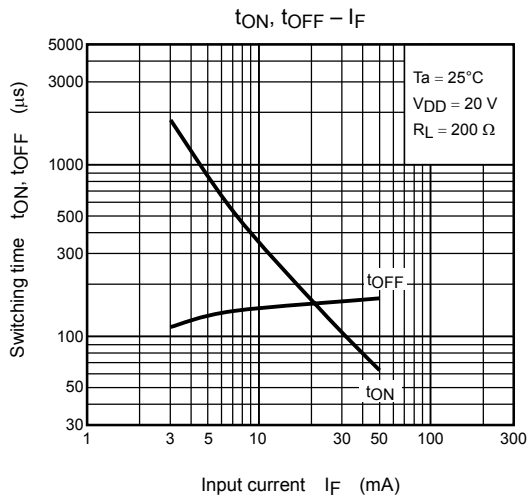
**Switching Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω (注 2)	—	0.8	2	ms
Turn-off time	t <sub>OFF</sub>	V <sub>DD</sub> = 20 V, I <sub>F</sub> = 5 mA	—	0.1	0.5	

Note 2: Switching time test circuit







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