

# TLP172A

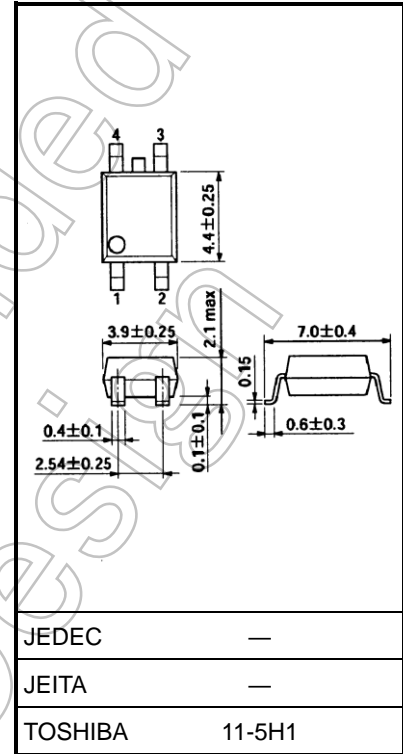
Telecommunications  
 Control Equipment  
 Data Acquisition System  
 Security Equipment  
 Measurement Equipment

Unit: mm

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.

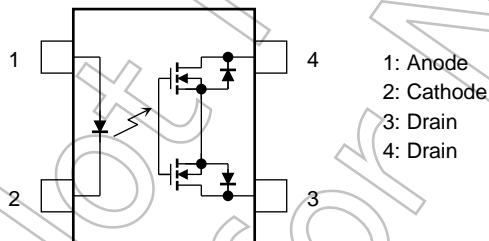
- 4-pin SOP (2.54SOP4): Height = 2.1 mm, pitch = 2.54 mm
- Normally open (1-form-A) device
- Peak off-state voltage: 60 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 400 mA (max)
- On-state resistance: 2 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL-recognized: UL 1557, File No.E67349
- 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)**.



Weight: 0.1 g (typ.)

### Pin Configuration (top view)



Start of commercial production  
 2002-03

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

Characteristics		Symbol	Rating	Unit
LED	Forward current	IF	50	mA
	Forward current derating (Ta ≥ 25°C)	ΔIF/°C	-0.5	mA/°C
	Reverse voltage	VR	5	V
	Diode power dissipation	PD	50	mW
	Diode power dissipation derating (Ta ≥ 25°C)	ΔPD /°C	-0.5	mW/°C
	Junction temperature	Tj	125	°C
Detector	Off-state output terminal voltage	VOFF	60	V
	On-state current	ION	400	mA
	Forward current derating (Ta ≥ 25°C)	ΔION/°C	-4.0	mA/°C
	Output power dissipation	PC	290	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔPC / °C	-2.9	mW / °C
	Junction temperature	Tj	125	°C
Storage temperature		Tstg	-55 to 125	°C
Operating temperature		Topr	-40 to 85	°C
Lead soldering temperature (10 s)		Tsol	260	°C
Isolation voltage (AC, 60 s, 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	Typ.	Max	Unit
Supply voltage	VDD	—	—	48	V
Forward current	IF	5	7.5	25	mA
On-state current	ION	—	—	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	Typ.	Max	Unit
LED	Forward voltage	VF	IF = 10 mA	1.0	1.15	1.3	V
	Reverse current	IR	VR = 5 V	—	—	10	μA
	Capacitance	CT	V = 0 V, f = 1 MHz	—	30	—	pF
Detector	Off-state current	IOFF	VOFF = 60 V	—	—	1	μA
	Capacitance	COFF	V = 0 V, f = 1 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	$I_{FC}$	$I_{OFF} = 100 \text{ } \mu\text{A}$	0.1	—	—	mA
On-state resistance	$R_{ON}$	$I_{ON} = 400 \text{ mA}, I_F = 5 \text{ mA}$	—	1	2	$\Omega$

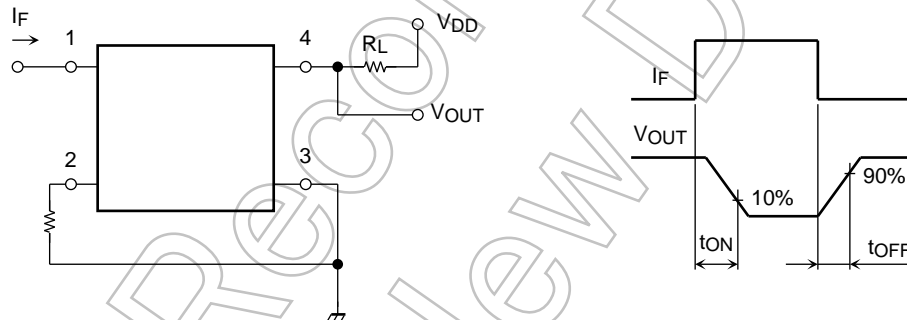
## Isolation Characteristics (Ta = 25°C)

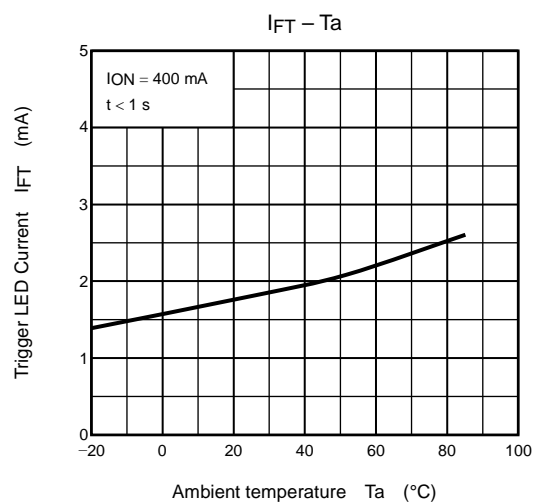
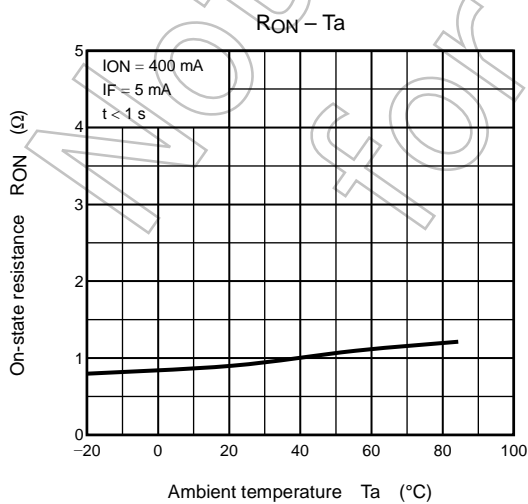
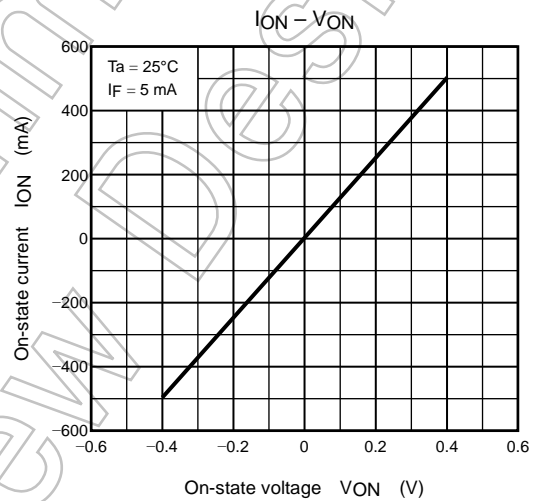
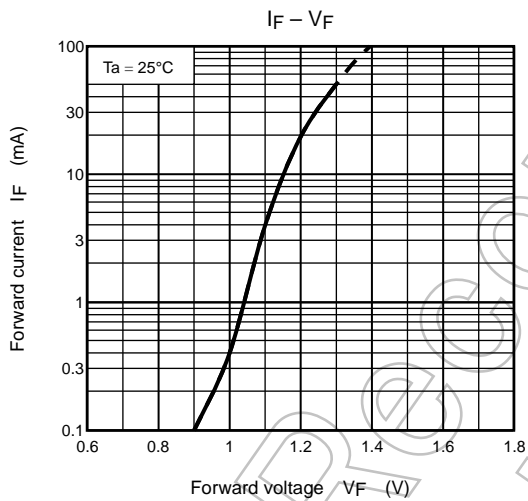
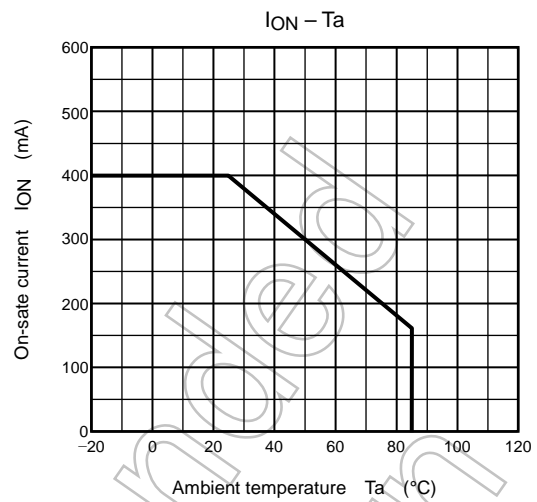
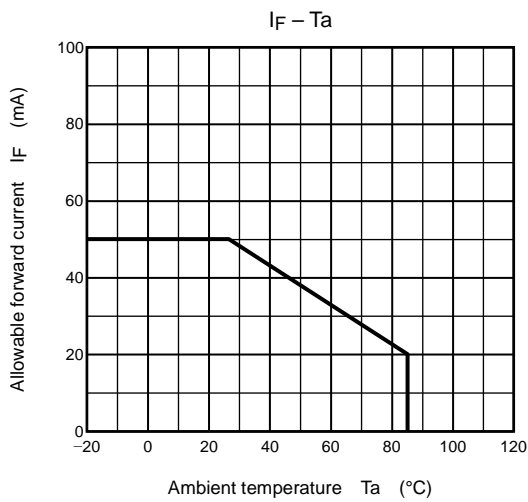
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60 \%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 60 s	1500	—	—	Vrms

## Switching Characteristics (Ta = 25°C)

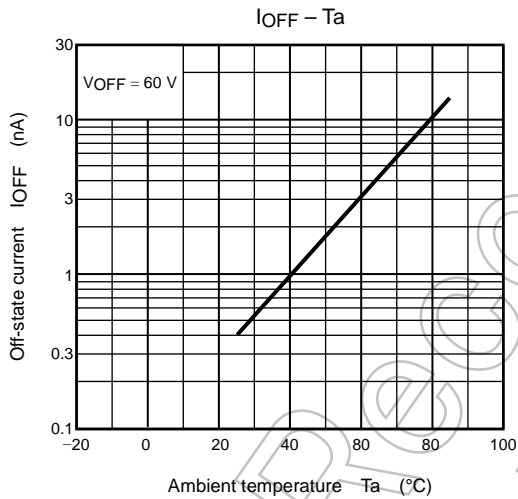
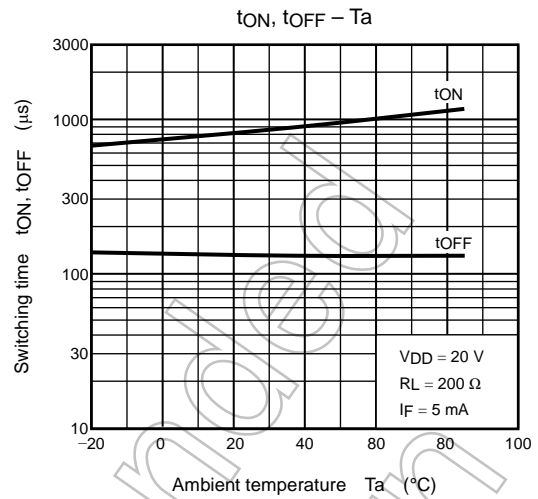
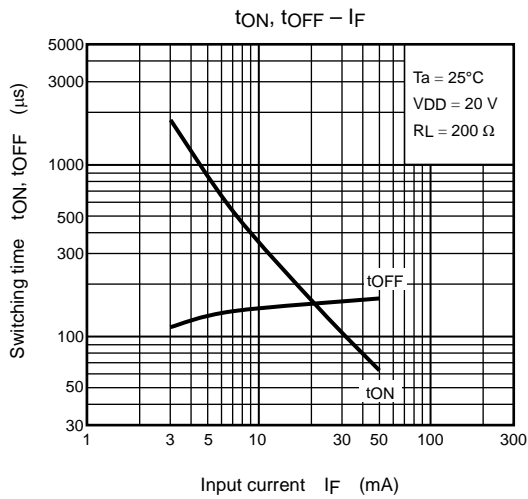
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	$t_{ON}$	$R_L = 200 \text{ } \Omega$ (Note 2) $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	—	0.8	2	ms
Turn-off time	$t_{OFF}$		—	0.1	0.5	

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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