

TOSHIBA Photocoupler Photorelay

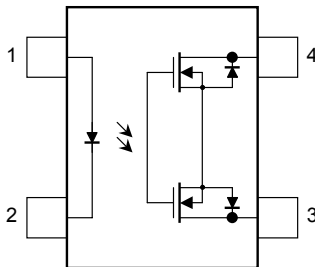
TLP4172G

Telecommunication
 Measurement Equipment
 Security Equipment
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The Toshiba TLP4172G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP package. This 1-form-B (NC) photorelay features a withstanding voltage of 350 V.

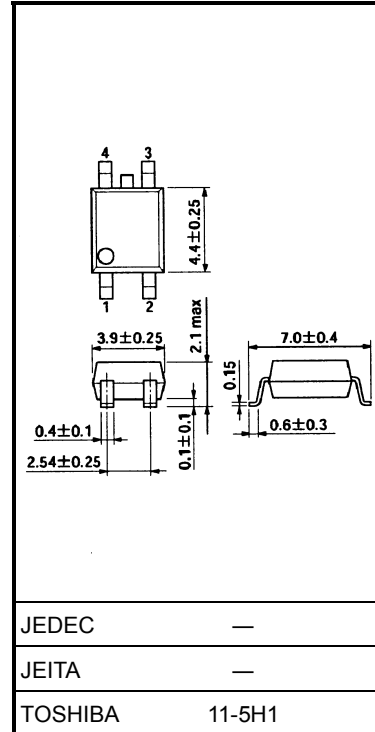
- 4-pin SOP (2.54SOP4): Height = 2.1 mm, pitch = 2.54 mm
- Normally closed (1-form-B) device
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 90 mA (max)
- On-state resistance: 50 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL Recognized: UL1577, File No. E67349

Pin Configuration (top view)



- 1: Anode
- 2: Cathode
- 3: Drain
- 4: Drain

Unit: mm



Weight: 0.1 g (typ.)

Maximum Ratings (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	
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A	
	Reverse voltage	V_R	5	V	
	Junction temperature	T_j	125	°C	
Detector	Off-state output terminal voltage	V_{OFF}	350	V	
	On-state current	One channel operation	I_{ON}	90	mA
		Two channel operations (1a1b simultaneous operation)			
	On-state current derating (Ta ≥ 25°C)	One channel operation	$\Delta I_{ON}/^\circ\text{C}$	-0.9	mA/°C
		Two channel operations (1a1b simultaneous operation)			
	Junction temperature		T_j	125	°C
Storage temperature range		T_{stg}	-55 to 125	°C	
Operating temperature range		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: Pins 1 and 2 are shorted together, and pins 3 and 4 are shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	280	V
Forward current	I_F	5	—	25	mA
On-state current	I_{ON}	—	—	90	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}	$V_{OFF} = 350 \text{ V}, I_F = 5 \text{ mA}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0, f = 1 \text{ MHz}, I_F = 5 \text{ mA}$	—	30	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FC}	$I_{OFF} = 10 \text{ μA}$	—	1	3	mA
Return LED current	I_{FT}	$I_{ON} = 90 \text{ mA}$	0.1	—	—	mA
On-state resistance	R_{ON}	$I_{ON} = 90 \text{ mA}$	—	27	50	Ω

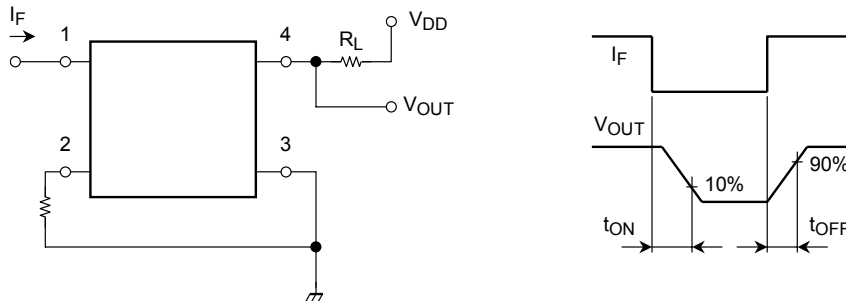
Isolation Characteristics (Ta = 25°C)

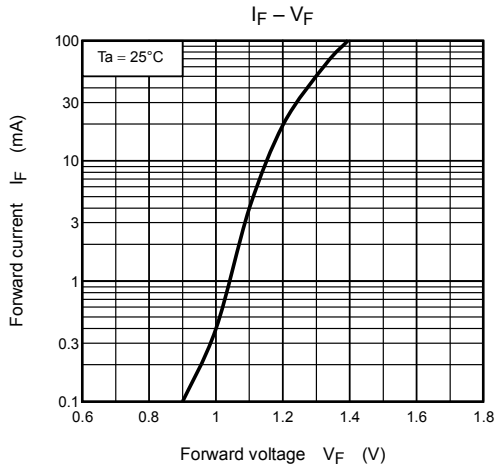
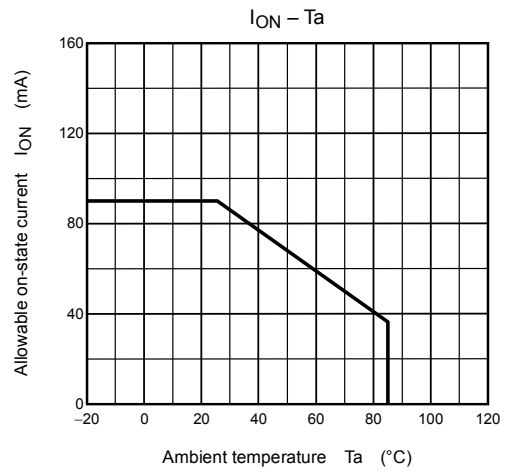
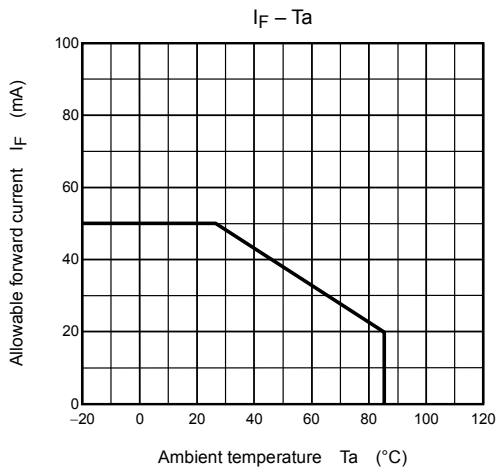
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V, R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	1500	—	—	Vrms
		AC, 1 s, in oil	—	3000	—	
		DC, 1 min, in oil	—	3000	—	Vdc

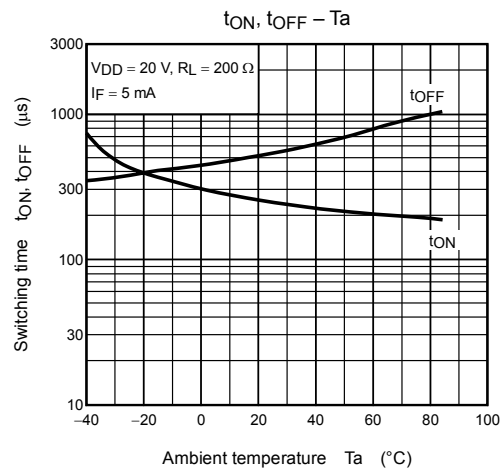
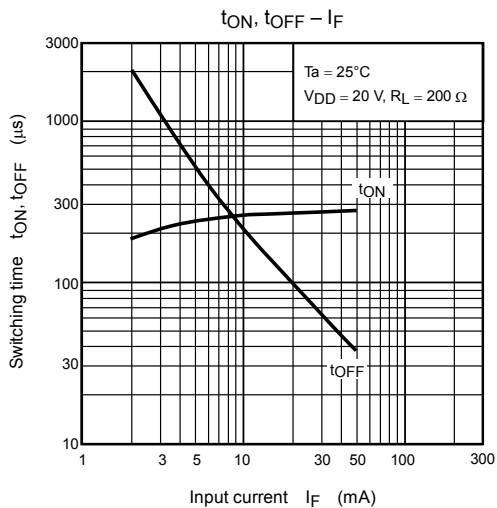
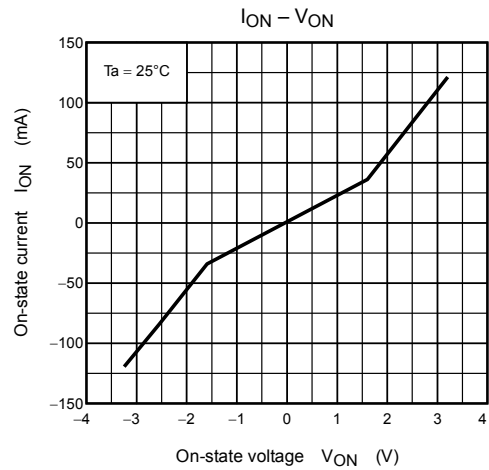
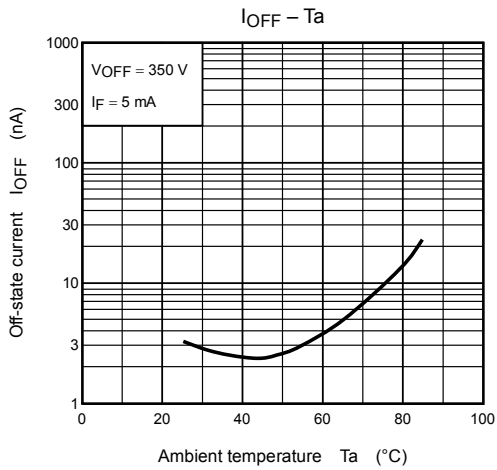
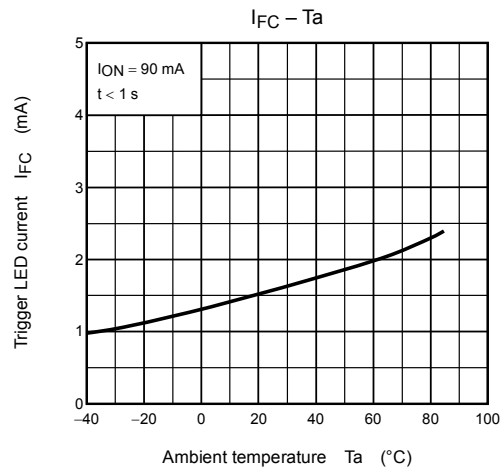
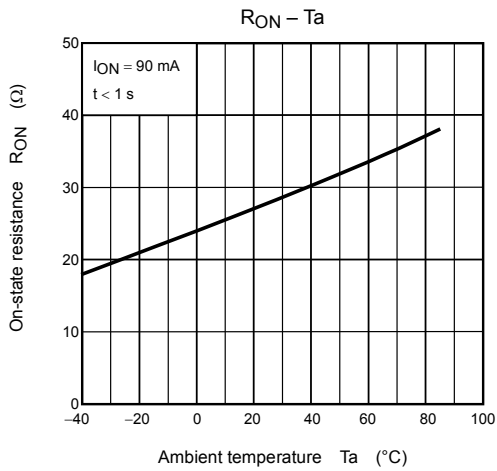
Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 20 \text{ V, } I_F = 5 \text{ mA}$ (Note 2)	—	0.25	0.5	ms
Turn-off time	t_{OFF}		—	0.5	1	ms

Note 2: Switching time test circuit







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