

TLP170J

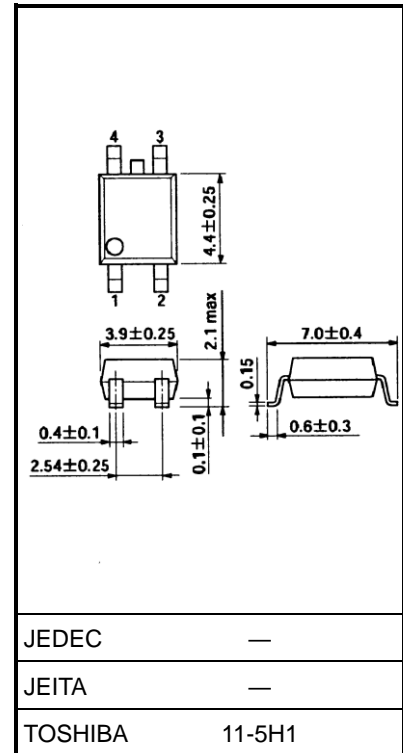
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The Toshiba TLP170J consists of an infrared emitting diode optically coupled to a photo-MOSFET in a 4-pin SOP package.
This photorelay requires 1 mA of LED current to turn it on. It is suitable for applications that need electrical power savings.

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, Pitch = 2.54 mm
- 1-Form-A
- Peak OFF-state voltage: 600 V (min)
- Trigger LED current: 1 mA (max)
- ON-state current: 90 mA (max)
- ON-state resistance: 40 Ω (max, t < 1 s)
- ON-state resistance: 60 Ω (max, continuous)
- Isolation voltage: 1500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)

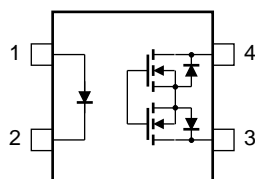
Note 1: When a VDE approved type is needed,
please designate the **Option(V4)**.

Unit: mm



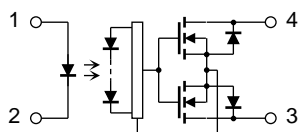
Weight: 0.1 g (typ.)

Pin Configuration (top view)



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

Internal Circuit



Start of commercial production
2009-06

Absolute Maximum Rating (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
	Pulse forward current (100 μs pulse, 100 pps)	IFP	1	A
	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	600	V
	ON-state current	ION	90	mA
	ON-state current derating (Ta ≥ 25°C)	ΔION/°C	-0.9	mA/°C
	Output power dissipation	PO	300	mW
	Output power dissipation derating (Ta ≥ 25°C)	ΔPO / °C	-3.0	mW / °C
	Junction temperature	Tj	125	°C
Storage temperature range		Tstg	-55 to 125	°C
Operating temperature range		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: Device considered a two-terminal device: LED side pins shorted together, and detector side pins shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	VDD	—	—	480	V
Forward current	IF	—	2	25	mA
ON-state current	ION	—	—	70	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	VF = 0 V, f = 1 MHz	—	30	—	pF
Detector	OFF-state current	IOFF	VOFF = 600 V	—	1	1000	nA
	Capacitance	COFF	V = 0 V, f = 1 MHz	—	75	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$I_{ON} = 90 \text{ mA}$	—	0.4	1	mA
Return LED current	I_{FC}	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	mA
ON-state resistance	R_{ON}	$I_{ON} = 90 \text{ mA}, I_F = 2 \text{ mA}, t < 1 \text{ s}$	—	—	40	Ω
		$I_{ON} = 90 \text{ mA}, I_F = 2 \text{ mA}, \text{continuous}$	—	45	60	

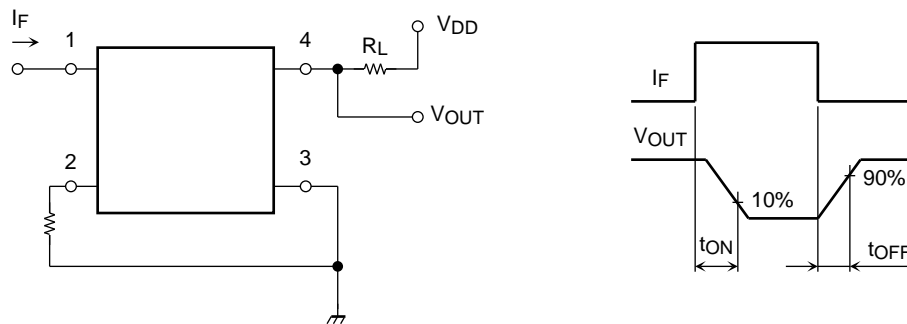
Isolation Characteristics (Ta = 25°C)

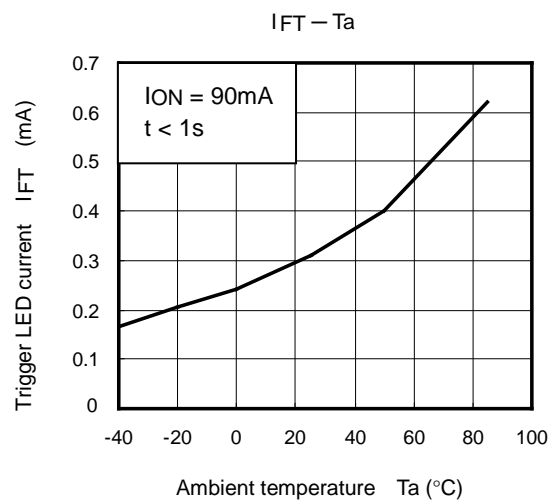
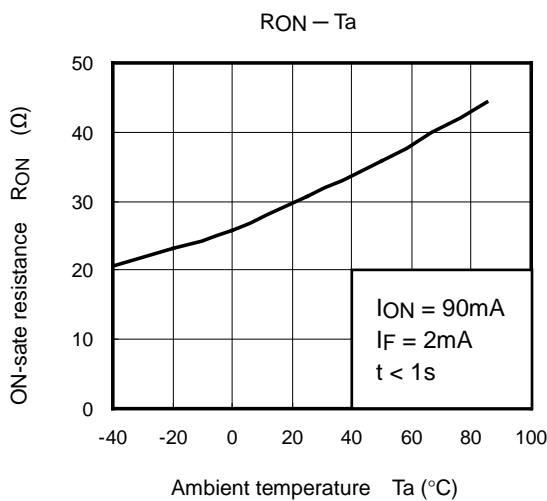
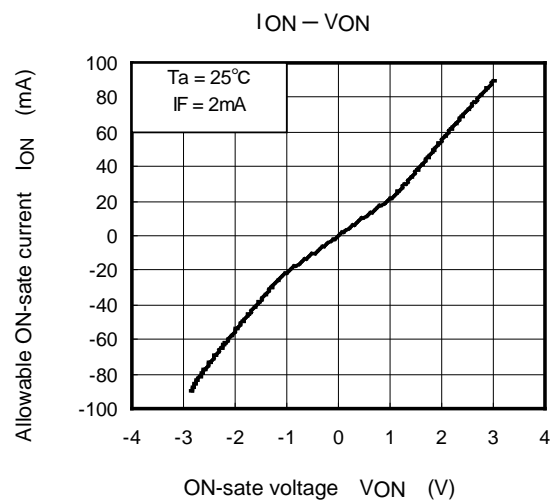
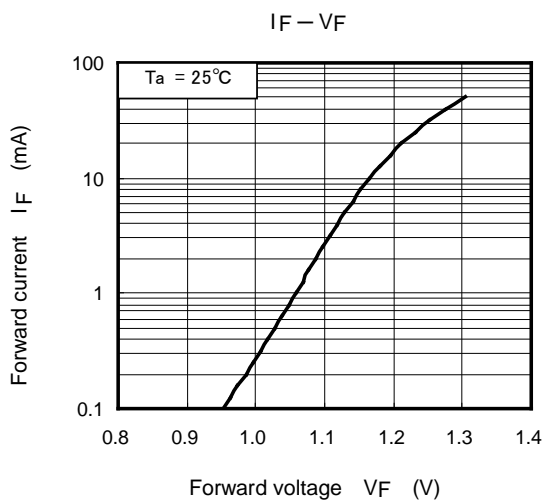
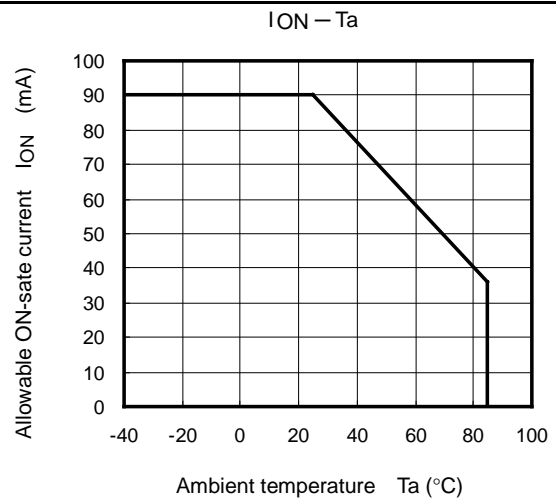
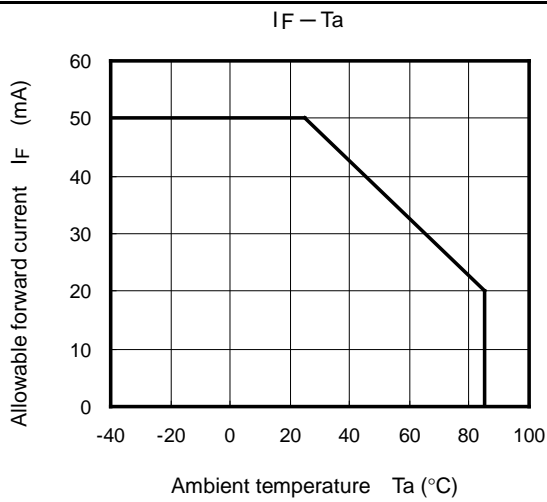
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60 \%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 60 s	1500	—	—	Vrms

Switching Characteristics (Ta = 25°C)

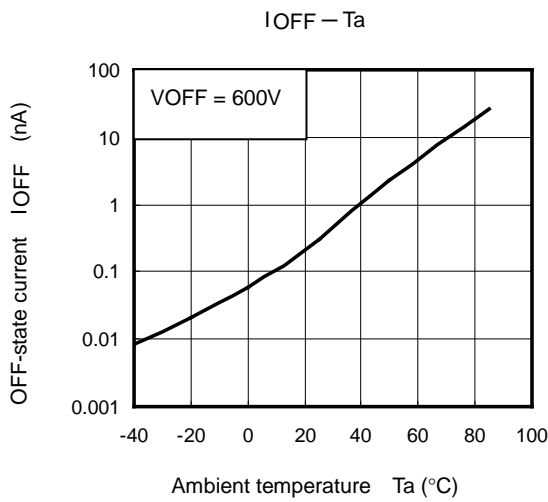
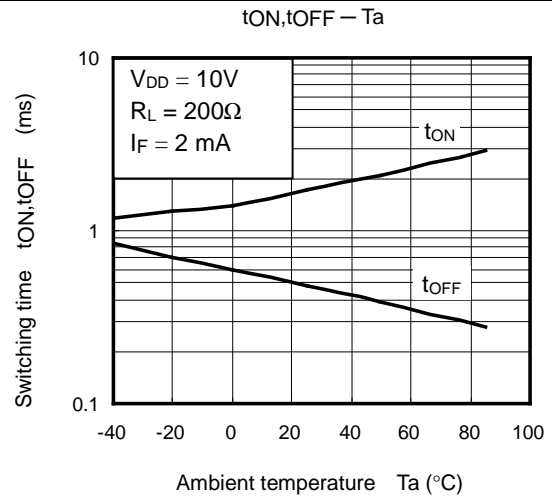
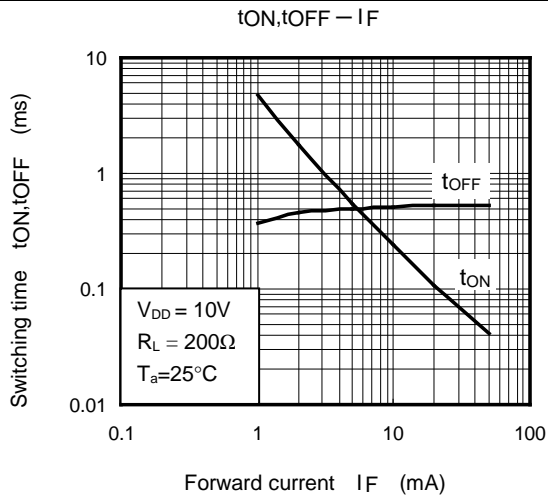
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 10 \text{ V}, I_F = 2 \text{ mA}$ (Note 2)	—	2.0	8.0	ms
Turn-on time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 10 \text{ V}, I_F = 5 \text{ mA}$ (Note 2)	—	—	5.0	
Turn-off time	t_{OFF}	$R_L = 200 \Omega$ $V_{DD} = 10 \text{ V}, I_F = 2 \text{ mA}$ (Note 2)	—	0.5	3.0	

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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