

TOSHIBA Photocoupler Photorelay

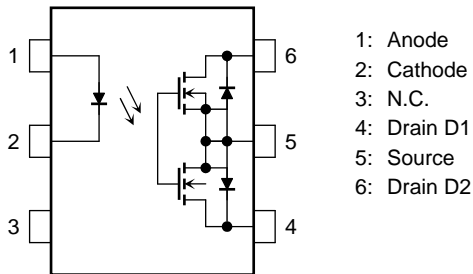
# TLP3120

High-Speed Memory Tester  
 High-Speed Logic Tester  
 High-Frequency Measurement Equipment

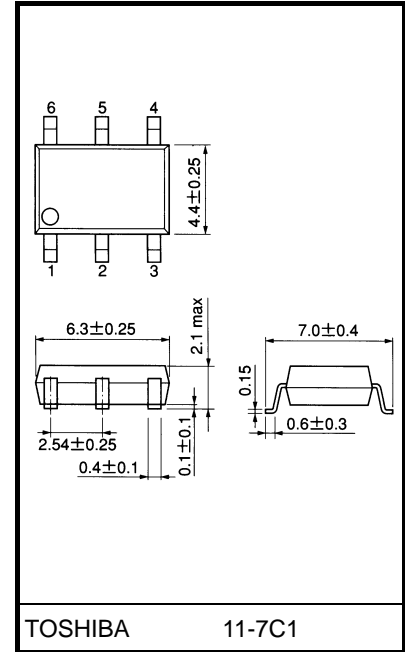
The Toshiba TLP3120 consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

- 6-pin SOP (2.54SOP6): 2.1 mm high, 2.54 mm pitch
- Normally opened (form A) device
- Peak OFF-state voltage: 80 V (min)
- Trigger LED current: 5 mA (max)
- ON-state current: 1.25 A (max)
- ON-state resistance: 0.15 Ω (max)
- Capacitance: 1000 pF (max)
- Isolation voltage: 1500 V<sub>rms</sub> (min)

### Pin Configuration (top view)



Unit: mm



Weight: 0.13 g (typ.)

## Absolute 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
	Reverse voltage	$V_R$	5	V
	Junction temperature	$T_j$	125	°C
Detector	OFF-state output terminal voltage	$V_{OFF}$	80	V
	ON-state current	$I_{ON}$	1.25	A
	ON-state current derating (Ta ≥ 25°C)	$\Delta I_{ON}/^\circ\text{C}$	-12.5	mA/°C
	Junction temperature	$T_j$	125	°C
Storage temperature range		$T_{stg}$	-40~125	°C
Operating temperature range		$T_{opr}$	-20~85	°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: 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 is considered as a two-terminal device. LED side pins are shorted together and detector side pins are shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	64	V
Forward current	$I_F$	5	—	30	mA
ON-state current	$I_{ON}$	—	—	1.25	A
Operating temperature	$T_{opr}$	25	—	60	°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.

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Led	Forward current	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	15	—	pF
Detector	OFF-state current	$I_{OFF}$	$V_{OFF} = 20 \text{ V}, T_a = 50^\circ\text{C}$	—	1200	1500	pA
	Capacitance	$C_{OFF}$	$V = 0, f = 100 \text{ MHz}$	—	460	1000	pF

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	$I_{FT}$	$I_{ON} = 1.25 \text{ A}$	—	2	5	mA
Return LED current	$I_{FC}$	$I_{OFF} = 10 \mu\text{A}$	0.2	—	—	mA
ON-state resistance	$R_{ON}$	$I_{ON} = 1.25 \text{ A}, I_F = 5 \text{ mA}$	—	0.11	0.15	$\Omega$

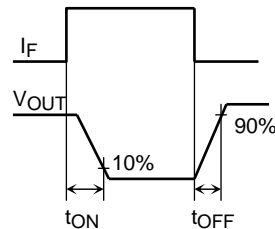
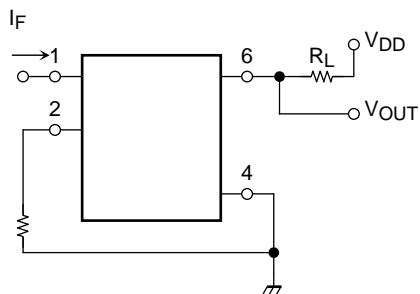
## Isolation Characteristics (Ta = 25°C)

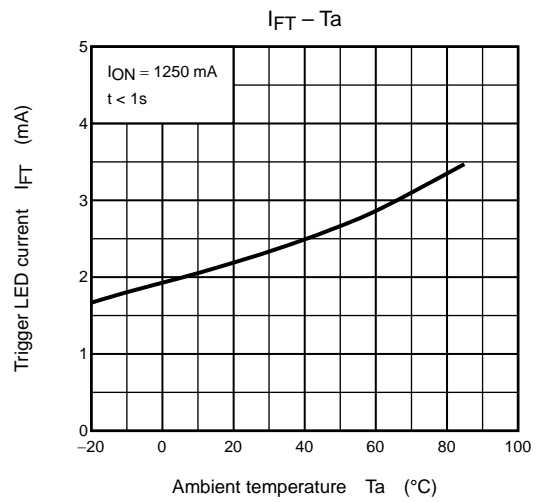
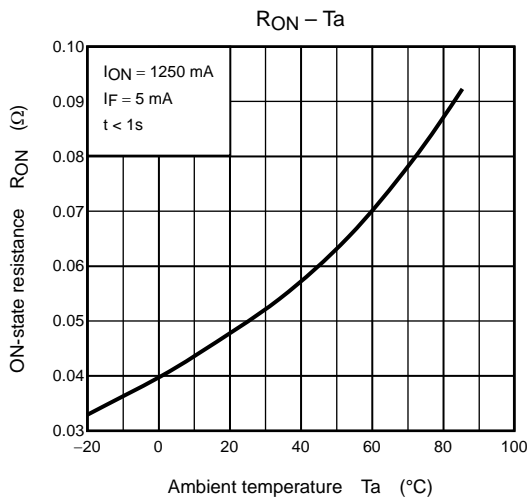
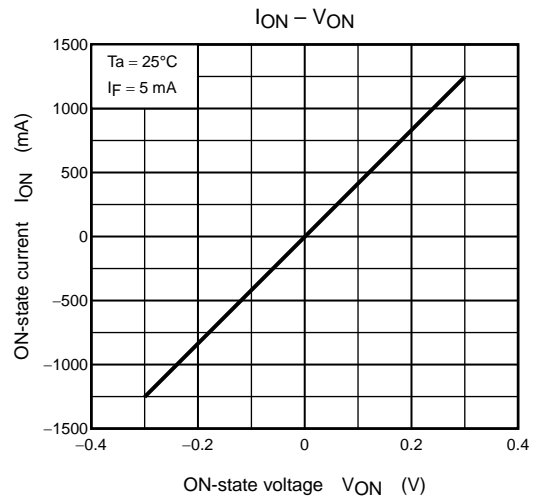
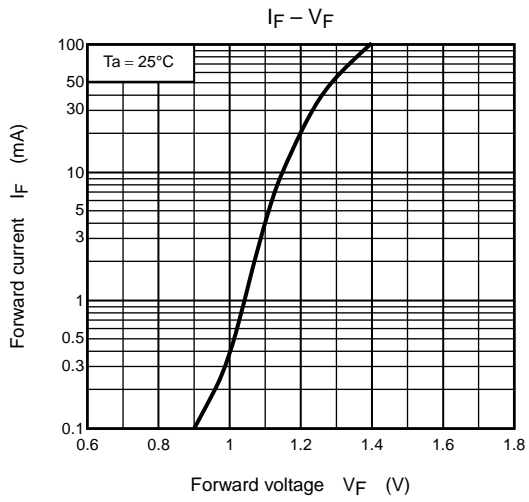
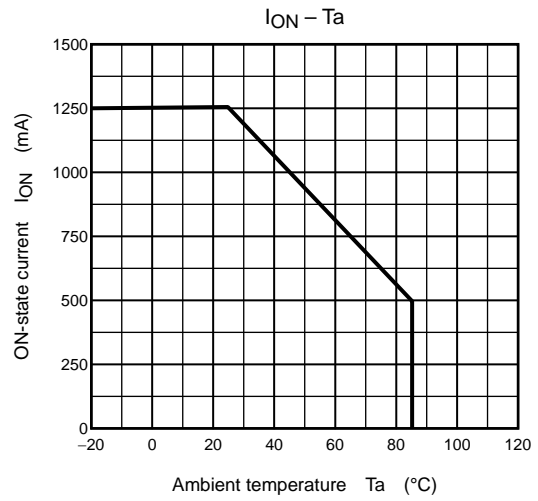
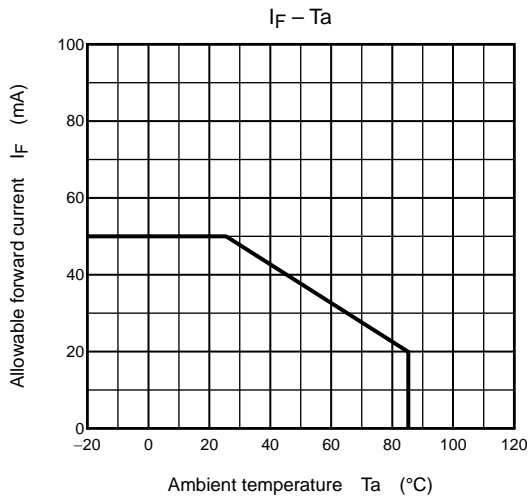
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 min	1500	—	—	Vrms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

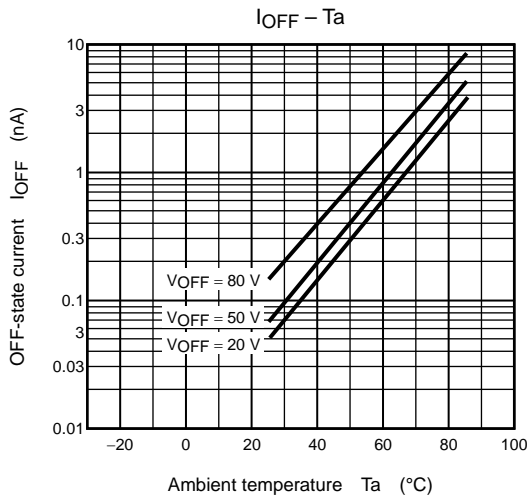
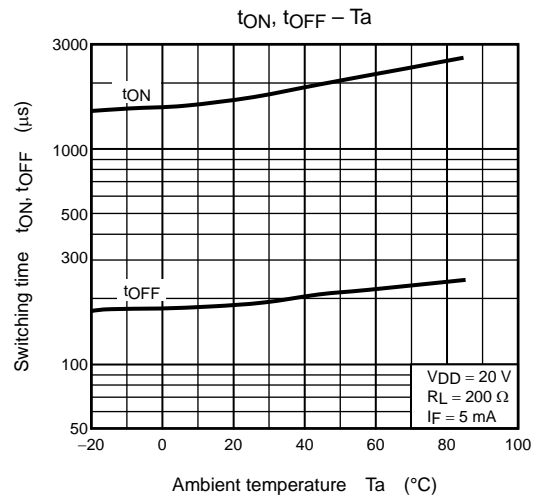
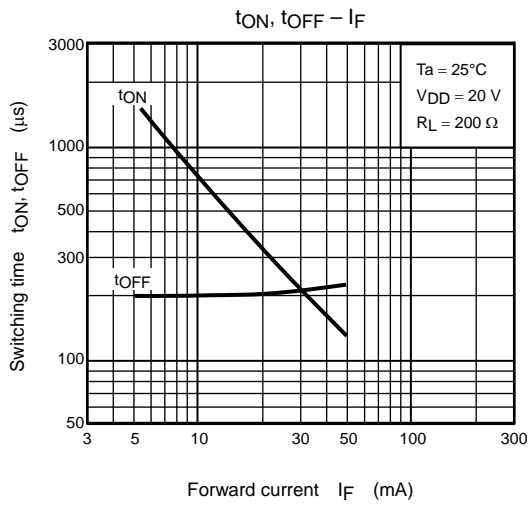
## Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-ON time	$t_{ON}$	$R_L = 200 \Omega$	—	2.0	3.0	ms
Turn-OFF time	$t_{OFF}$	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ (Note 2)	—	0.7	1.0	

Note 2: Switching time test circuit







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