

TOSHIBA Photocoupler Photorelay

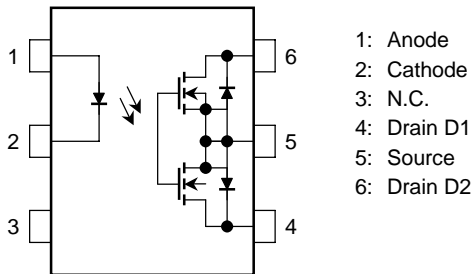
# TLP3120

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

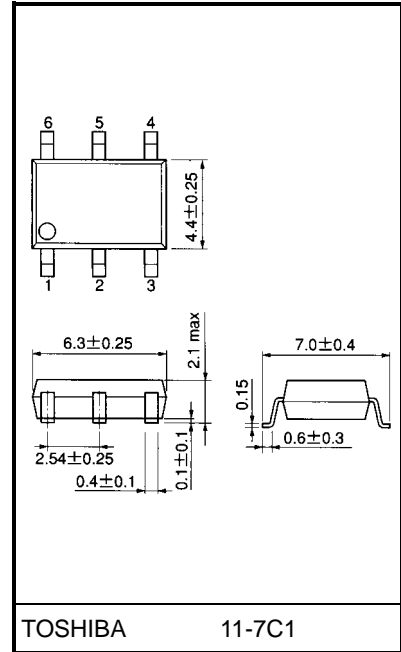
The Toshiba TLP3120 consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

- 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.)

## 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 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

## 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	$\Omega$

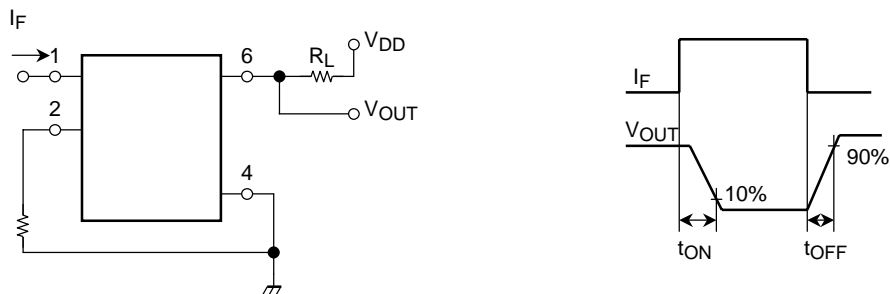
## Isolation Characteristics (Ta = 25°C)

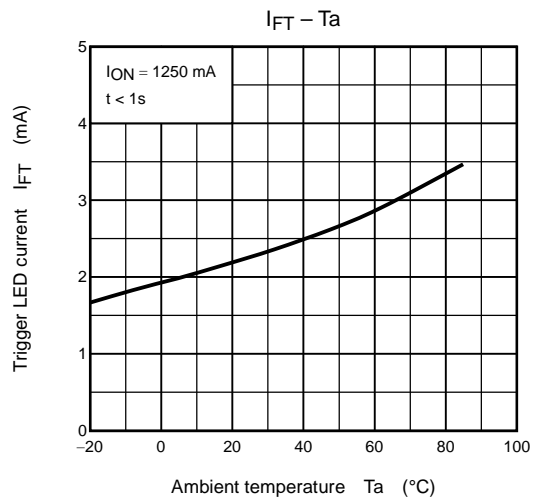
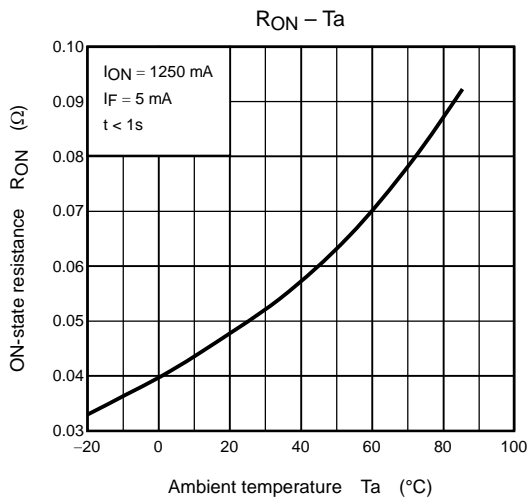
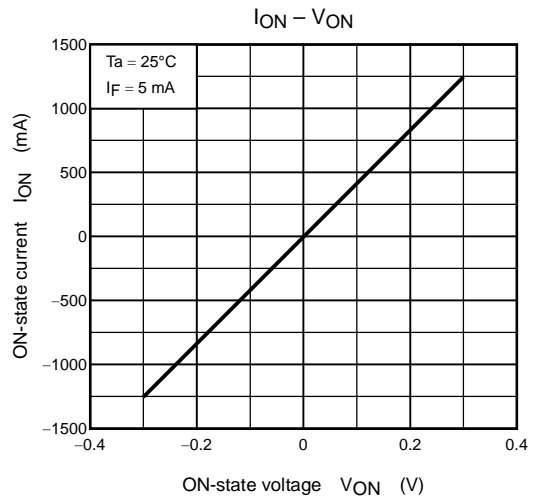
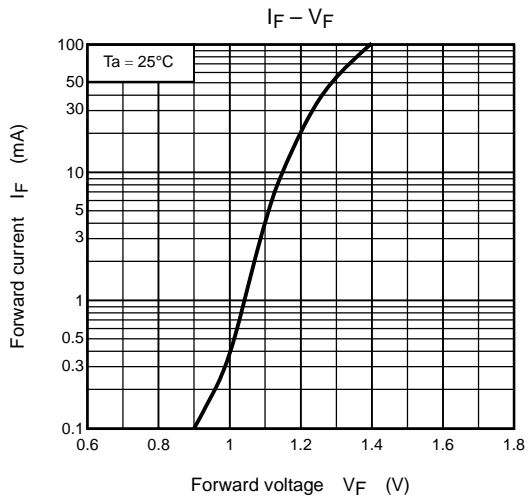
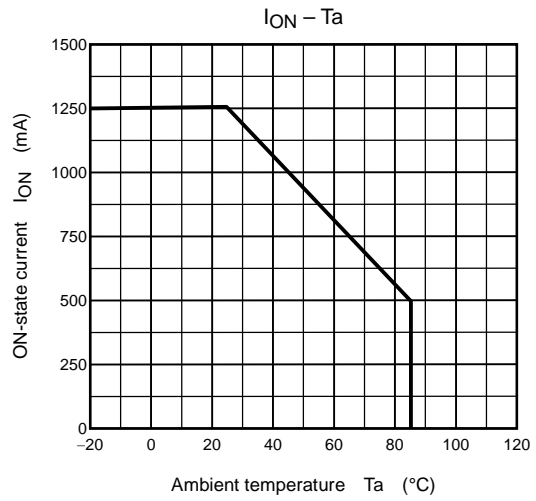
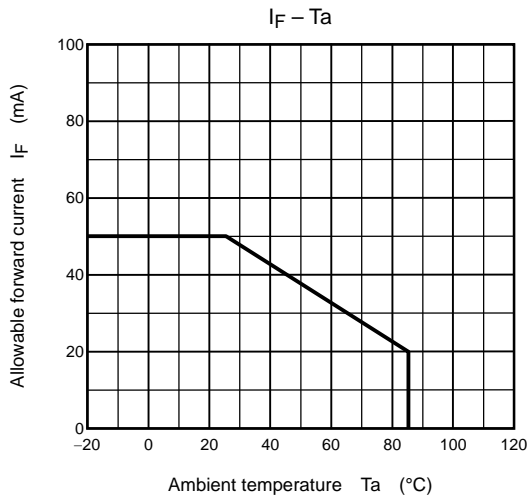
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 min	1500	—	—	Vrms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

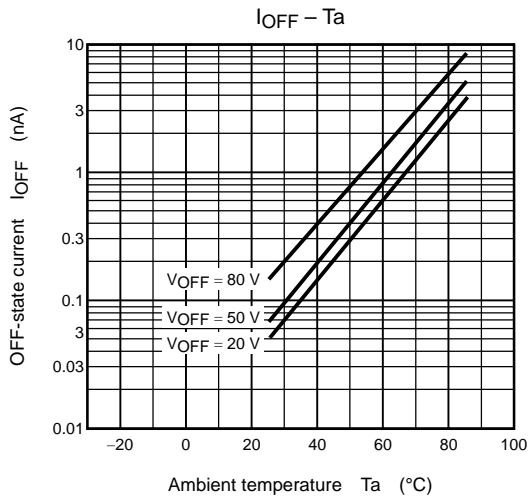
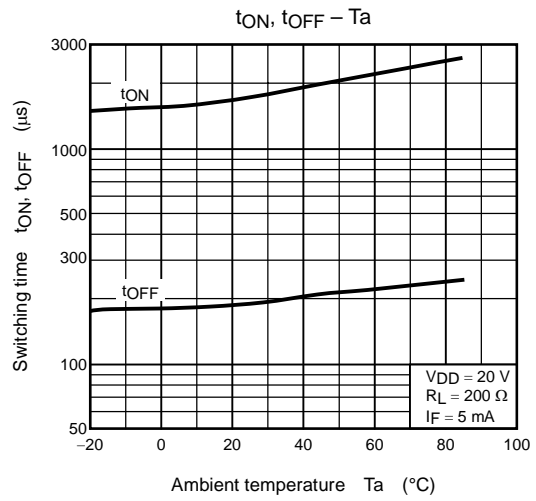
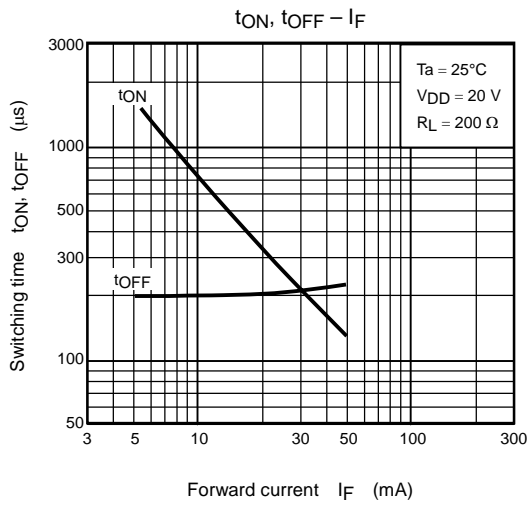
## Switching Characteristics (Ta = 25°C)

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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