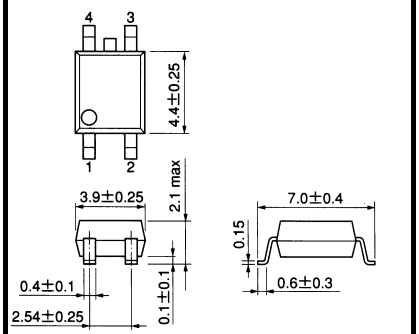
TOSHIBA Photocoupler PHOTORELAY

TLP3121

Measurement Instruments
Logic Testers / Memory Testers
Board Testers / Scanners

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11−5H1

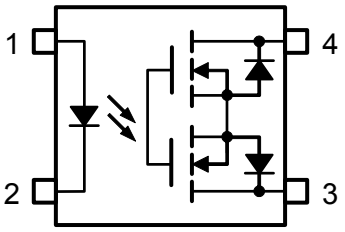
Weight: 0.1 g (Typ.)

The TOSHIBA TLP3121 Mini-flat photorelay is a small-outline photorelay, suitable for surface-mount assembly. The TLP3121 consists of a GaAs infrared-emitting diode optically coupled to a photo-MOS FET and housed in a 4-pin package.

Features

- 4 pin SOP (2.54SOP4) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak off-state voltage : 80 V (min)
- Trigger LED current : 4 mA (max)
- ON-State current : 350 mA (max)
- ON-state resistance : 1.2 Ω (max)
- OFF-state capacitance : 40 pF (max)
- Isolation voltage : 1500 Vrms (min)

Pin configuration (top view)



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

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating (Ta ≥ 25°C)	ΔI_F/°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}	350	mA
	ON-state current derating (Ta ≥ 50°C)	ΔI_{ON}/°C	−3.5	mA/°C
	Junction temperature	T_j	125	°C
Storage temperature range		T_{stg}	−40 to 125	°C
Operating temperature range		T_{opr}	−20 to 85	°C
Lead soldering temperature (10 s)		T_{sol}	260	°C
Isolation voltage (AC, 1 minute, 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 considered a two-terminal device : LED side pins shorted together, and detector side pins shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	64	V
Forward current	I_F	5	—	30	mA
On-state current	I_{ON}	—	—	350	mA
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)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	15	—	pF
Detector	Off-state current	I_{OFF}	V_{OFF} = 30 V, Ta = 50°C	—	200	1000	pA
	Capacitance	C_{OFF}	V = 0, f = 100 MHz	—	30	40	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	I_{ON} = 350 mA	—	1	4	mA
Return LED current	I_{FC}	I_{OFF} = 10 μA	0.2	—	—	mA
On-state resistance	R_{ON}	I_{ON} = 350 mA, I_F = 5 mA	—	1.0	1.2	Ω

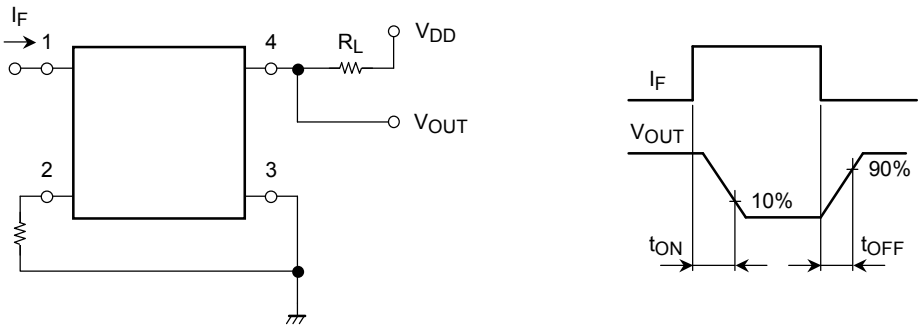
Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H. ≤ 60%	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	1500	—	—	Vrms
		AC, 1 second (in oil)	—	3000	—	
		DC, 1 minute (in oil)	—	3000	—	Vdc

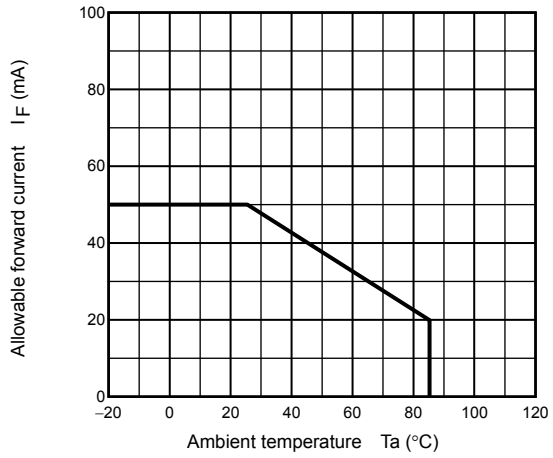
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	R_L = 200 Ω (Note 2) V_{DD} = 20 V, I_F = 5mA	—	300	500	μs
Turn-off time	t_{OFF}		—	300	500	

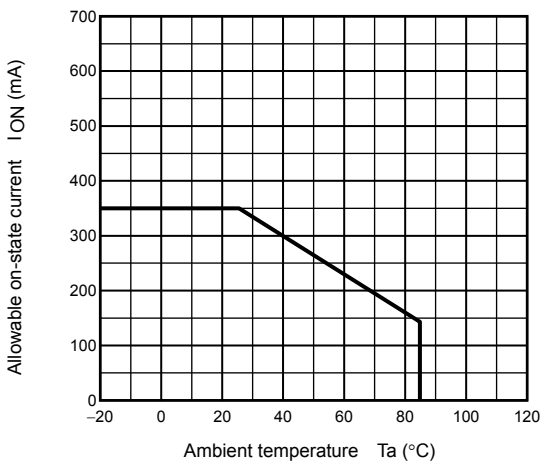
(Note 2) : switching time test circuit



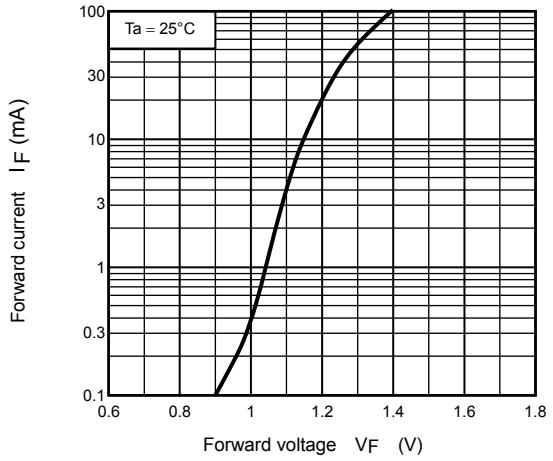
$I_F - Ta$



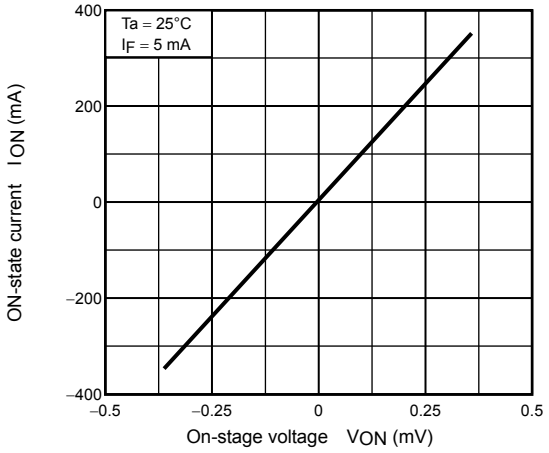
$I_{ON} - Ta$



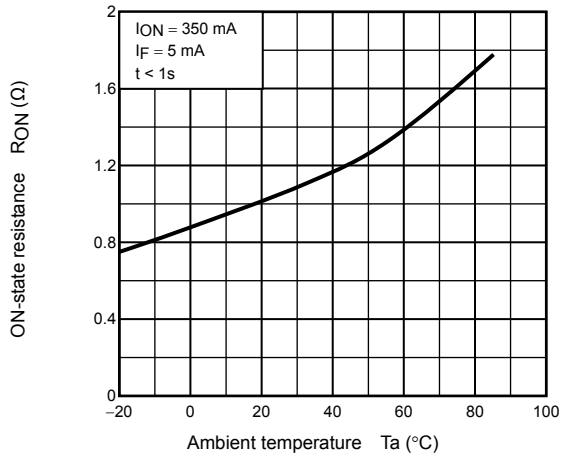
$I_F - V_F$



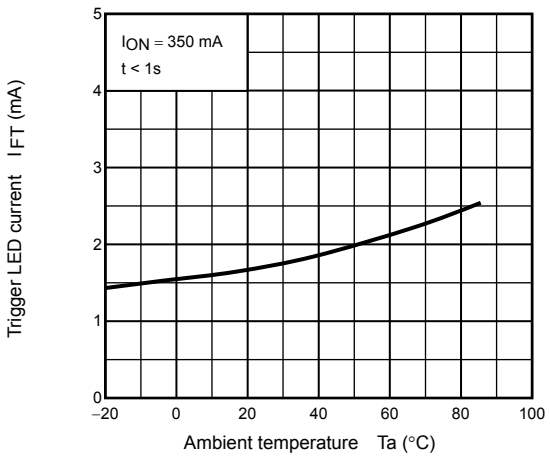
$I_{ON} - V_{ON}$



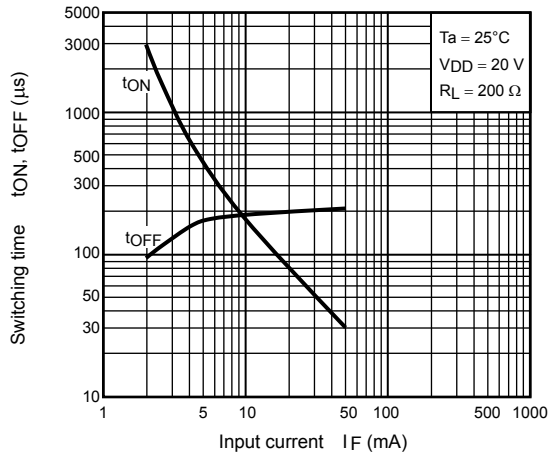
$R_{ON} - Ta$



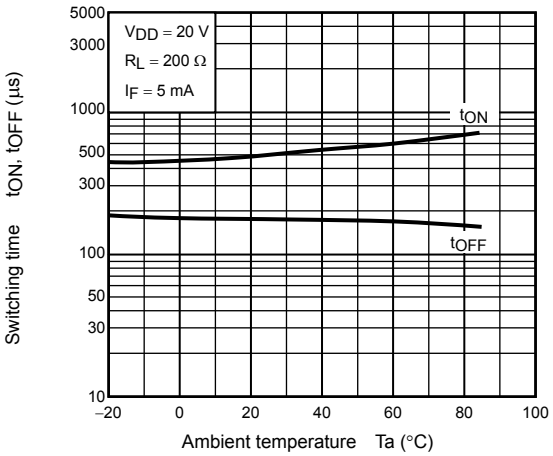
$I_{FT} - Ta$



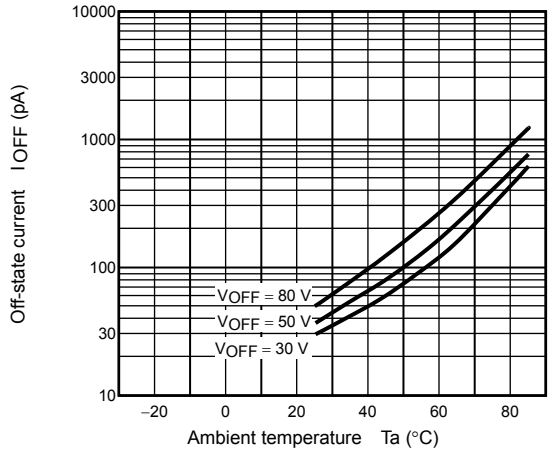
tON,tOFF – IF



tON,tOFF – Ta



IOFF – Ta



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