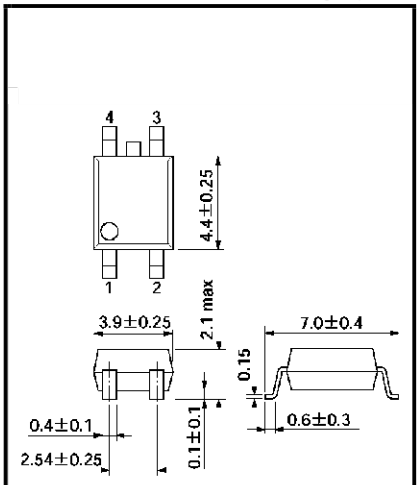
TOSHIBA Photocoupler PHOTORELAY

TLP3123

Measurement Instruments
Power Line Control
FA (Factory Automation)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11−5H1

Weight: 0.1 g (typ.)

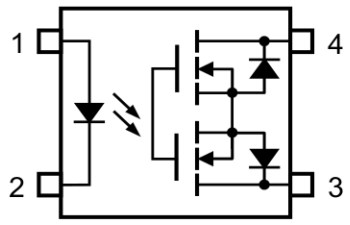
The TOSHIBA TLP3123 consists of an infrared emitting diode optically coupled to a photo-MOS FET in a plastic SOP package.
The TLP3123 is a bi-directional switch, which can replace mechanical relays in many applications. And its high on-state current maximum rating and low on-state resistance is suitable to control a power line.

Features

- 4 pin SOP (2.54SOP4) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak off-state voltage : 40 V (min)
- Trigger LED current : 3 mA (max)
- On-state current : 1 A (max)
- On-state resistance : 0.1 Ω (typ.)
- Capacitance between output terminals : 300 pF (typ.)
- Off-state current : 1 nA (max)
- 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)

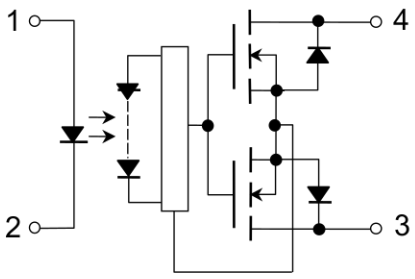
Note 1: When a VDE approved type is needed,
please designate the **Option(V4)**.

Pin configuration (top view)



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

Schematic



Start of commercial production
2012-06

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	30	mA
	Forward current derating (Ta ≥ 25°C)	ΔI_F/°C	-0.3	mA/°C
	Reverse voltage	V_R	5	V
	Diode power dissipation	P_D	50	mW
	Diode power dissipation derating (Ta ≥25°C)	ΔP_D /°C	-0.5	mW/°C
	Junction temperature	T_j	125	°C
Detector	Off-state output terminal voltage	V_{OFF}	40	V
	On-state current	I_{ON}	1	A
	On-state current derating (Ta ≥ 50°C)	ΔI_{ON}/°C	-13.3	mA/°C
	Pulse on-state current (t = 100 ms)	I_{ONP}	2	A
	Outpot power dissipation	PO	130	mW
	Output power dissipation derating (Ta ≥ 50°C)	ΔP_O / °C	-1.74	mW / °C
	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, 60 s, 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}	—	—	32	V
Forward current	I_F	5	10	20	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	1.18	1.33	1.48	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance between terminals	C_T	V_F = 0 V, f = 1 MHz	—	70	—	pF
Detector	Off-state current	I_{OFF}	V_{OFF} = 30 V	—	—	1	nA
	Capacitance between terminals	C_{OFF}	V = 0 V, f = 1 MHz	—	300	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	I_{ON} = 100 mA	—	1	3	mA
Return LED current	I_{FC}	I_{OFF} = 100 μA	0.1	0.8	—	mA
On-state resistance	R_{ON}	I_{ON} = 1 A, I_F = 5 mA	—	0.1	0.13	Ω

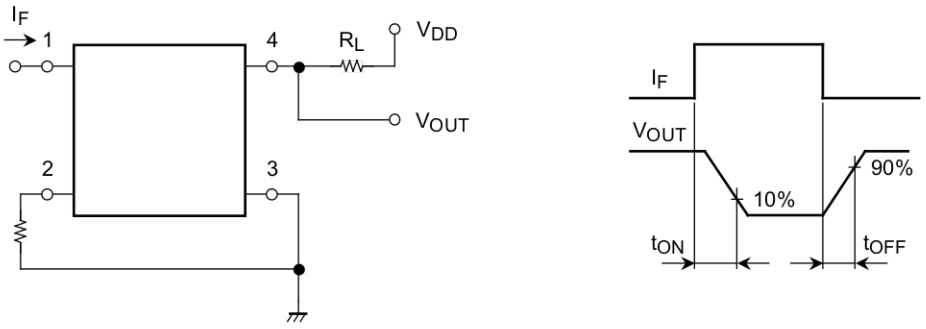
Isolation Characteristics (Ta = 25°C)

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, 60 s	1500	—	—	Vrms

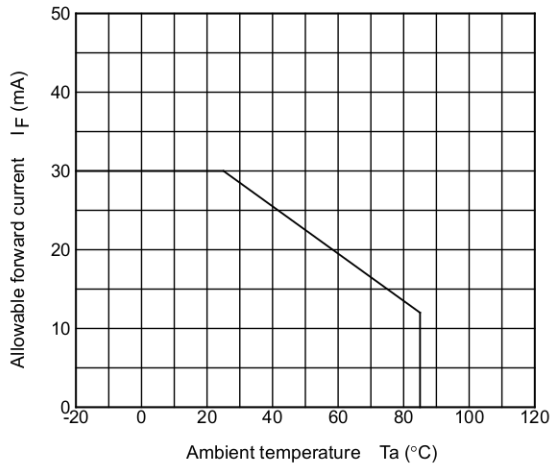
Switching Characteristics (Ta = 25°C)

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	—	1.2	3	ms
Turn-off time	t_{OFF}		—	0.2	0.5	

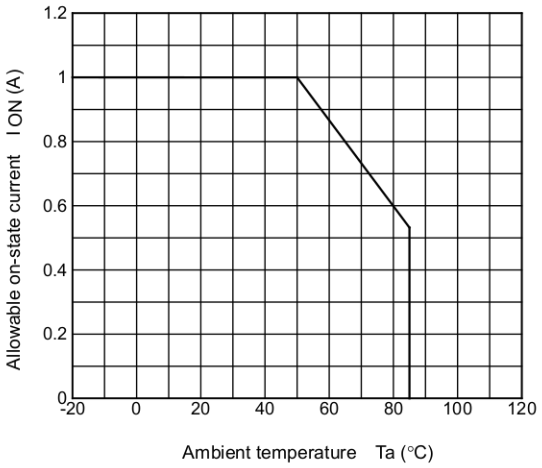
Note 2: switching time test circuit



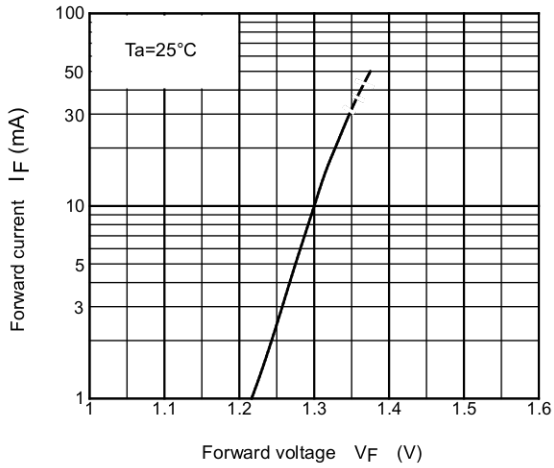
$I_F - Ta$



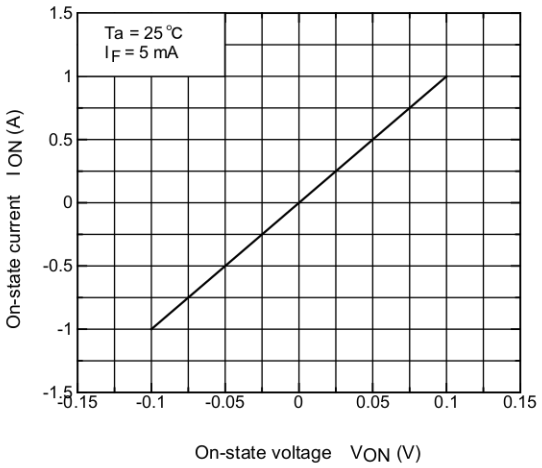
$I_{ON} - Ta$



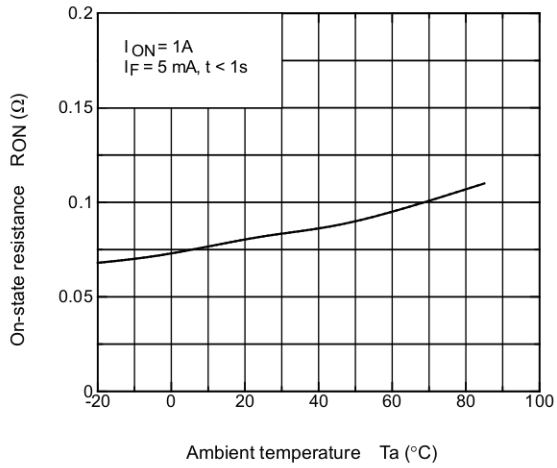
$I_F - V_F$



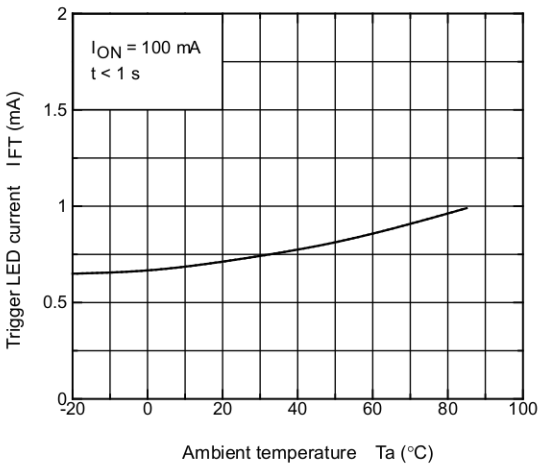
$I_{ON} - V_{ON}$



$R_{ON} - Ta$

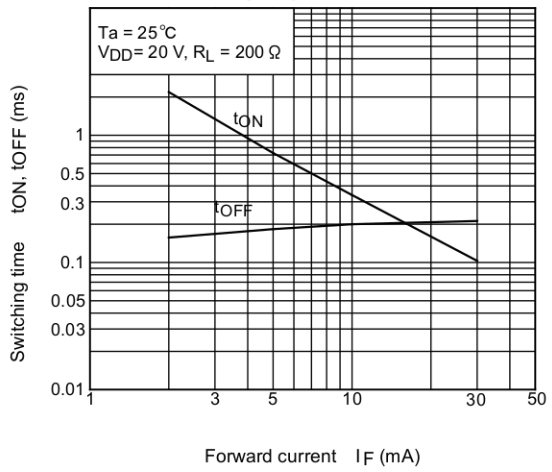


$I_{FT} - Ta$

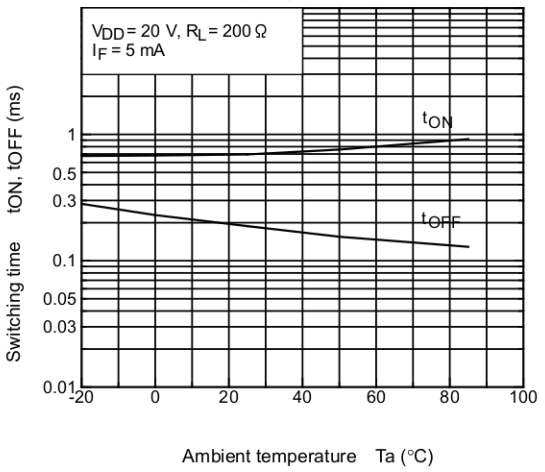


NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

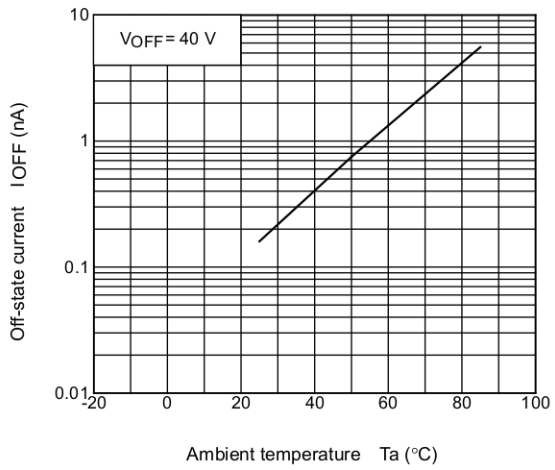
$t_{ON}, t_{OFF} - I_F$



$t_{ON}, t_{OFF} - Ta$



$I_{OFF} - Ta$



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