TOSHIBA Photocoupler PHOTORELAY

TLP3123

Measurement Instruments Power Line Control FA (Factory Automation)

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)

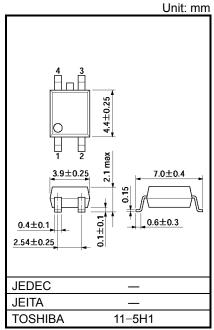
• UL-recognized : UL 1577, File No.E67349

• cUL-recognized : CSA Component Acceptance Service No.5A

File No.E67349

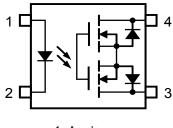
• VDE-approved : EN 60747-5-5 (Note 1)

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



Weight: 0.1 g (typ.)

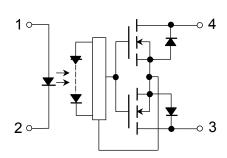
Pin configuration (top view)



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	
	Forward current	lF	30	mA	
	Forward current derating (Ta ≥ 25°C)	ΔI _F /°C	-0.3	mA/°C	
	Reverse voltage	V _R	5	V	
LED	Diode power dissipation	P _D	50	mW	
	Diode power dissipation derating (Ta ≥25°C)	ΔP _D /°C	-0.5	mW/°C	
	Junction temperature	Tj	125	°C	
	Off-state output terminal voltage	Voff	40	V	
	On-state current	Ion	1	Α	
ō	On-state current derating (Ta ≥ 50°C)	Δl _{ON} /°C	-13.3	mA/°C	
Detector	Pulse on-state current (t = 100 ms)	IONP	2	Α	
ď	Outpot power dissipation	PO	130	mW	
	Output power dissipation derating (Ta ≥ 50°C)	ΔP _o /°C	-1.74	mW / °C	
	Junction temperature	Tj	125	°C	
Stora	ge temperature range	T _{stg}	-55 to 125	°C	
Oper	ating temperature range	Topr	-40 to 85	°C	
Lead	soldering temperature (10 s)	T _{sol}	260	°C	
Isolat	tion 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

Characteristic	Symbol	Min	Тур.	Max	Unit
Supply voltage	V_{DD}	_	_	32	V
Forward current	lF	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	Тур.	Max	Unit
	Forward voltage	VF	I _F = 10 mA	1.18	1.33	1.48	V
LED	Reverse current	I _R	V _R = 5 V	_	_	10	μΑ
	Capacitance between terminals	CT	V _F = 0 V, f = 1 MHz	_	70	_	pF
Detector	Off-state current	loff	V _{OFF} = 30 V	ı	_	1	nA
Dete	Capacitance between terminals	Coff	V = 0 V, f = 1 MHz		300	-	pF



Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I _{FT}	I _{ON} = 100 mA	_	1	3	mA
Return LED current	IFC	I _{OFF} = 100 μA	0.1	0.8	_	mA
On-state resistance	Ron	I _{ON} = 1 A, I _F = 5 mA	_	0.1	0.13	Ω

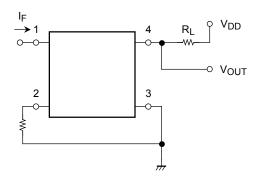
Isolation Characteristics (Ta = 25°C)

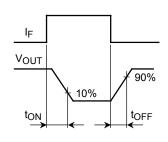
Characteristic	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	Cs	V _S = 0 V, f = 1 MHz	_	0.8	_	pF
Isolation resistance	Rs	V _S = 500 V, R.H. ≤ 60 %	5 × 10 ¹⁰	10 ¹⁴		Ω
Isolation voltage	BVs	AC, 60 s	1500	_	_	Vrms

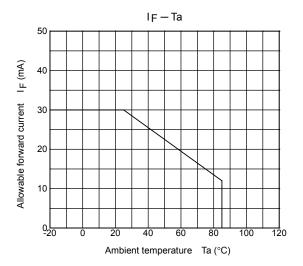
Switching Characteristics (Ta = 25°C)

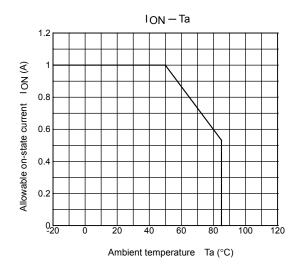
Characteristic	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	ton	$R_L = 200 \Omega$ (Note 2)	_	1.2	3	mo
Turn-off time	toff	$V_{DD} = 20 \text{ V, IF} = 5\text{mA}$	_	0.2	0.5	ms

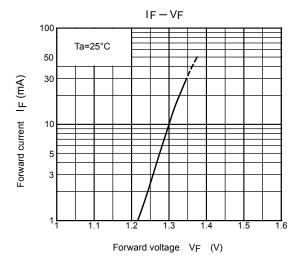
Note 2: switching time test circuit

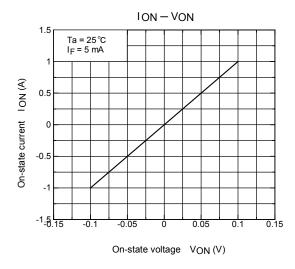


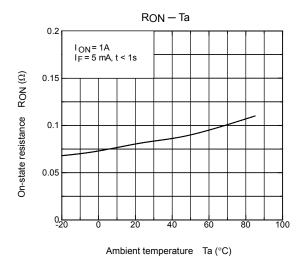


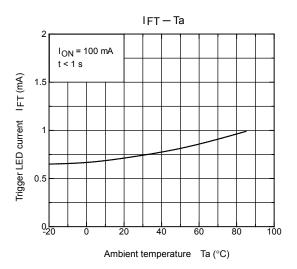




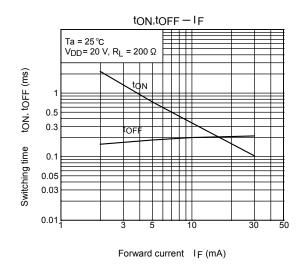


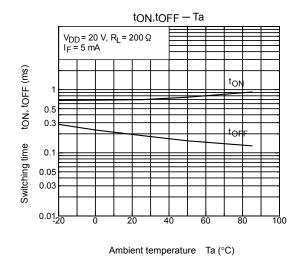


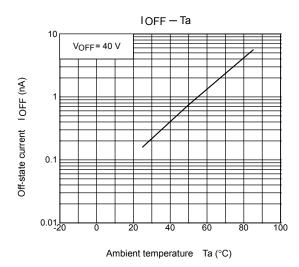




NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.







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