TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP3216

Measuring Instruments
Logic IC Testers / Memory Testers
Board Testers / Scanners

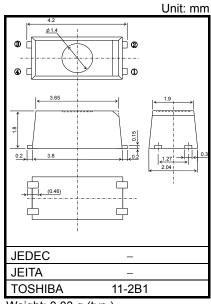
The TOSHIBA TLP3216 is an ultra-small photorelay suitable for surface-mount assembly. The TLP3216 consists of a GaAs infrared-emitting diode optically coupled to a photo-MOSFET and is housed in a 4-pin package.

Its features include low Off-state current and low output pin capacitance, enabling it to be used for high-frequency measuring instrument applications.

Features

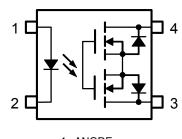
4-pin SSOP (SSOP4): 1.8-mm high, 1.27-mm pitch

- 1-Form-A
- Peak Off-State Voltage: 40 V (min)
- Trigger LED Current: 4 mA (max)
- On-State Current: 120 mA (max)
- On-State Resistance: 15Ω (max), 10Ω (typ.)
- Output Capacitance: 2.0 pF (max), 1.0 pF (typ.)
- Isolation Voltage: 1500 Vrms (min)



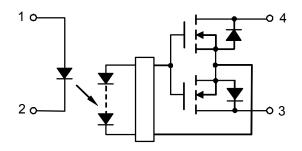
Weight: 0.03 g (typ.)

Pin Configuration (Top view)



- 1 : ANODE 2 : CATHODE
- 3 : DRAIN
- 4 : DRAIN

Schematic



Absolute Maximum Ratings (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	RATING	UNIT
	Forward Current	lF	50	mA
ED	Forward Current Derating (Ta ≥ 25°C)	ΔI _F /°C	-0.5	mA/°C
"	Reverse Voltage	V_{R}	5	V
	Junction Temperature	Tj	125	°C
~	Off-State Output Terminal Voltage	V _{OFF}	40	V
CTO	On-State Current	I _{ON}	120	mA
DETECTOR	On-State Current Derating (Ta ≥ 25°C)	Δl _{ON} /°C	-1.2	mA/°C
	Junction Temperature	Tj	125	°C
Storage Temperature Range		T _{stg}	-40 to 125	°C
Oper	ating Temperature Range	T _{opr}	-20 to 85	°C
Lead	Soldering Temperature (10 s)	T _{sol}	260	°C
Isolat	ion Voltage (AC, 1 minute, R.H. \leq 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: Pins 1 and, 2 shorted together, and pins 3 and 4 shorted together.

Caution

This device is sensitive to electrostatic discharge. When using this device, please ensure that all tools and equipment are earthed.

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V_{DD}	_	_	32	V
Forward Current	lF	_	_	30	mA
On-State Current	I _{ON}	_	_	120	mA
Operating Temperature	T _{opr}	-20	_	65	°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
	Forward Voltage	V _F	I _F = 10 mA	1.0	1.15	1.3	V
LED	Reverse Current	I _R	V _R = 5 V	_	_	10	μА
	Capacitance	C _T	V = 0, f = 1 MHz		15		pF
DETECTOR	Off-State Current	loff	V _{OFF} = 30 V, Ta = 50°C	l	l	1000	pA
	Capacitance	C _{OFF}	V = 0, f = 100 MHz, t < 1 s	l	1.0	2.0	pF

Coupled Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	I _{FT}	I _{ON} = 100 mA	_	_	4	mA
Return LED Current	I _{FC}	I _{OFF} = 10 μA	0.2	0.75	_	mA
On-State Resistance	R _{ON}	I _{ON} = 120 mA, I _F = 5 mA, t < 1 s	_	10	15	Ω

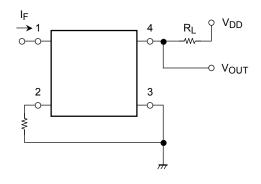
Isolation Characteristics (Ta = 25°C)

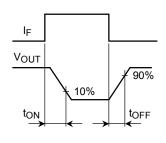
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	CS	V _S = 0 V, f = 1 MHz	_	0.3	_	pF
Isolation Resistance	R _S	V _S = 500 V, R.H. ≤ 60%	5 × 10 ¹⁰	10 ¹⁴	_	Ω
		AC, 1 minute	1500	_	_	Vrms
Isolation Voltage	BV_S	AC, 1 second (in oil)	_	3000	_	VIIIIS
		DC, 1 minute (in oil)	_	3000	_	Vdc

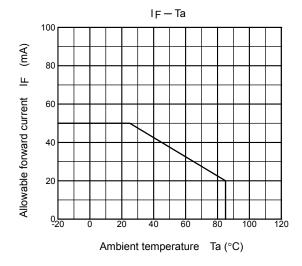
Switching Characteristics (Ta = 25°C)

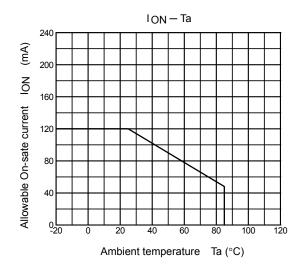
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-on Time	t _{ON}	$R_L = 200 \Omega$ (Note 4)	_	50	500	6
Turn-off Time	t _{OFF}	$V_{DD} = 10 \text{ V}, I_F = 5 \text{ mA}$	_	120	500	μS

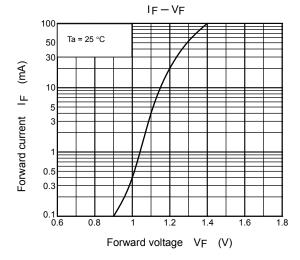
Note 4: Switching time test circuit

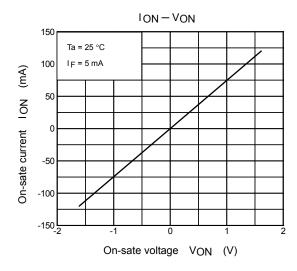


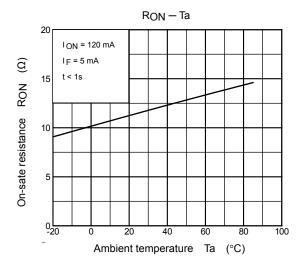


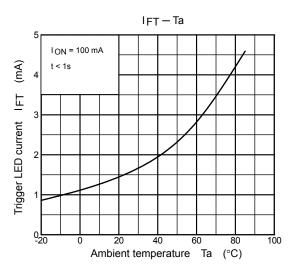


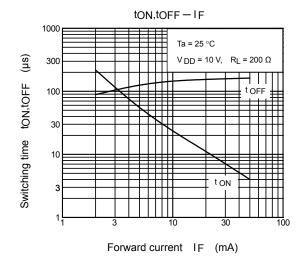


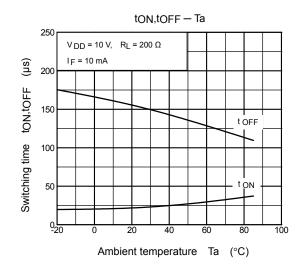


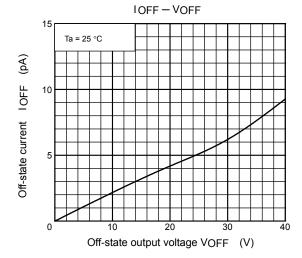


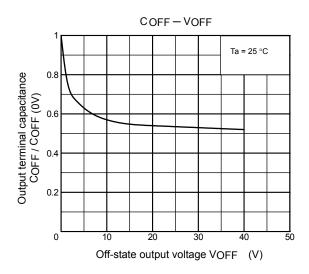




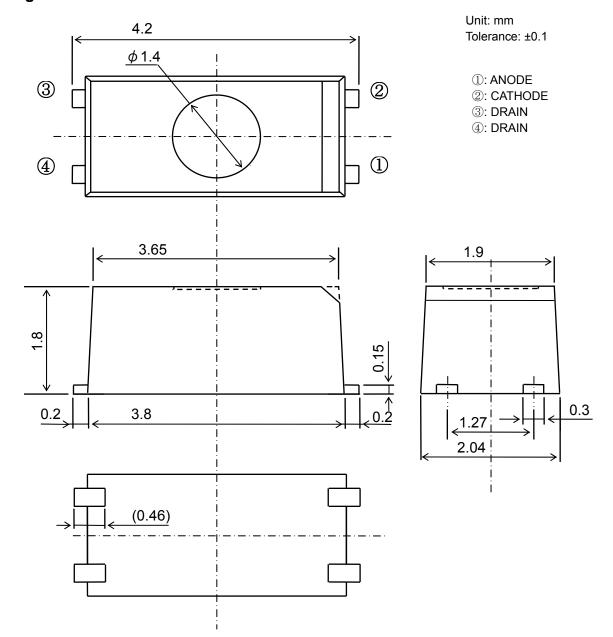








Package Dimensions



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