

## TLP3216

### Measuring Instruments

Logic IC Testers / Memory Testers

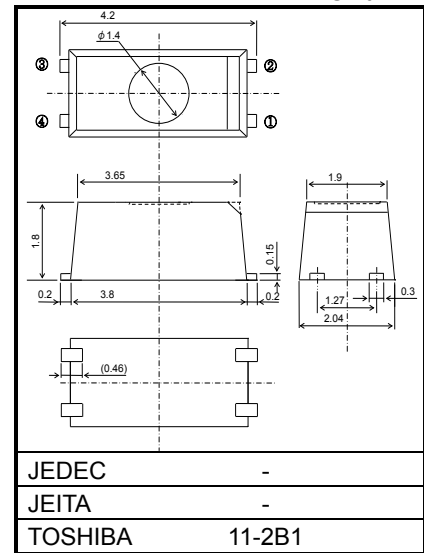
Board Testers / Scanners

The TOSHIBA TLP3216 is an ultra-small photorelay suitable for surface-mount assembly. The TLP3216 consists of an 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

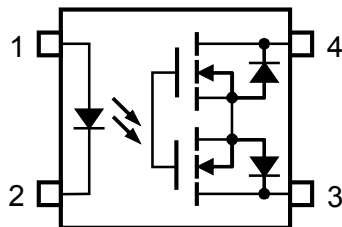
- 4-pin SSOP (SSOP4): 1.8 mm high, 1.27 mm pitch
- 1-Form-A
- Peak Off-State Voltage: 40 V (min)
- Trigger LED Current: 4 mA (max)
- On-State Current: 120 mA (max)
- On-State Resistance: 15  $\Omega$  (max), 10  $\Omega$  (typ.)
- Output Capacitance: 2.0 pF (max), 1.0 pF (typ.)
- Isolation Voltage: 1500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349

Unit: mm



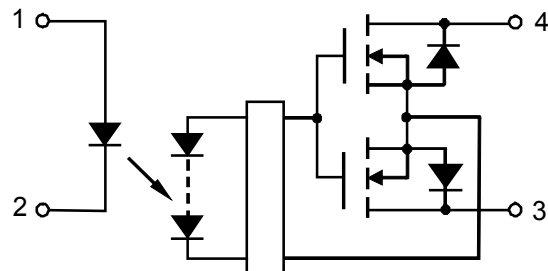
Weight: 0.03 g (typ.)

### Pin Configuration (Top view)



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

### Schematic



Start of commercial production  
2002-09

## Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	50	mA
	Forward Current Derating (Ta ≥ 25°C)	ΔI <sub>F</sub> /°C	-0.5	mA/°C
	Reverse Voltage	V <sub>R</sub>	5	V
	Diode Power Dissipation	P <sub>D</sub>	50	mW
	Diode Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>D</sub> /°C	-0.5	mW/°C
	Junction Temperature	T <sub>j</sub>	125	°C
DETECTOR	Off-State Output Terminal Voltage	V <sub>OFF</sub>	40	V
	On-State Current	I <sub>ON</sub>	120	mA
	On-State Current Derating (Ta ≥ 25°C)	ΔI <sub>ON</sub> /°C	-1.2	mA/°C
	Output Power Dissipation	P <sub>O</sub>	216	mW
	Output Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>O</sub> /°C	-2.16	mW/°C
	Junction Temperature	T <sub>j</sub>	125	°C
Storage Temperature Range		T <sub>stg</sub>	-40 to 125	°C
Operating Temperature Range		T <sub>opr</sub>	-20 to 85	°C
Lead Soldering Temperature (10 s)		T <sub>sol</sub>	260	°C
Isolation Voltage (AC, 60 s, R.H. ≤ 60 %) (Note 1)		BVS	1500	V <sub>rms</sub>

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 <sub>DD</sub>	—	—	32	V
Forward Current	I <sub>F</sub>	—	—	30	mA
On-State Current	I <sub>ON</sub>	—	—	120	mA
Operating Temperature	T <sub>opr</sub>	-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.

## Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT	
LED	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V	—	—	10	μA
	Capacitance	C <sub>T</sub>	V = 0 V, f = 1 MHz	—	15	—	pF
DETECTOR	Off-State Current	I <sub>OFF</sub>	V <sub>OFF</sub> = 30 V, Ta = 50 °C	—	—	1000	pA
	Capacitance	C <sub>OFF</sub>	V = 0 V, f = 100 MHz, t < 1 s	—	1.0	2.0	pF

## Coupled Electrical Characteristics (Ta = 25°C)

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

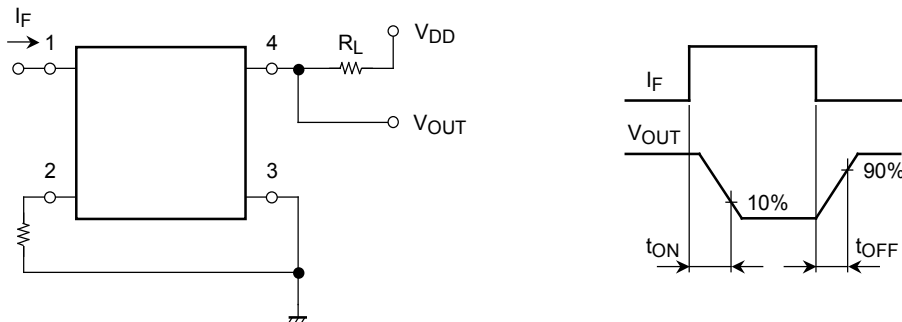
## Isolation Characteristics (Ta = 25°C)

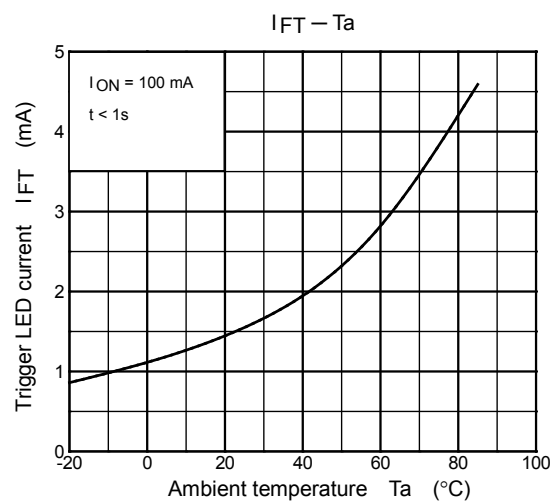
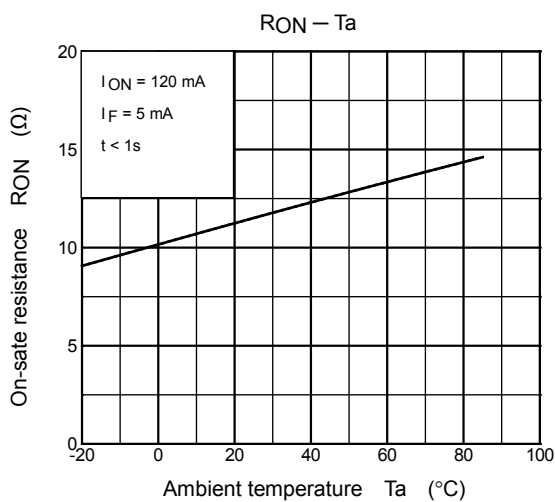
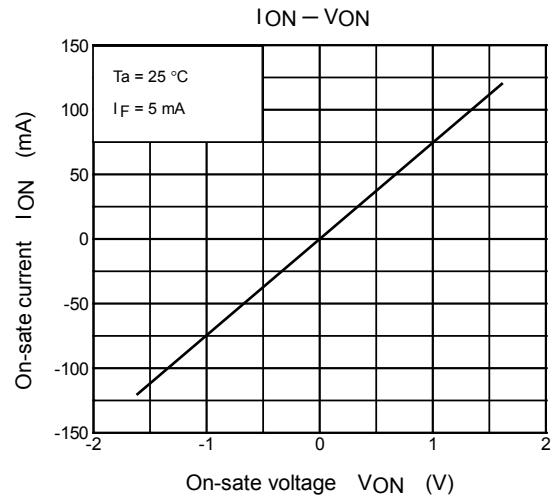
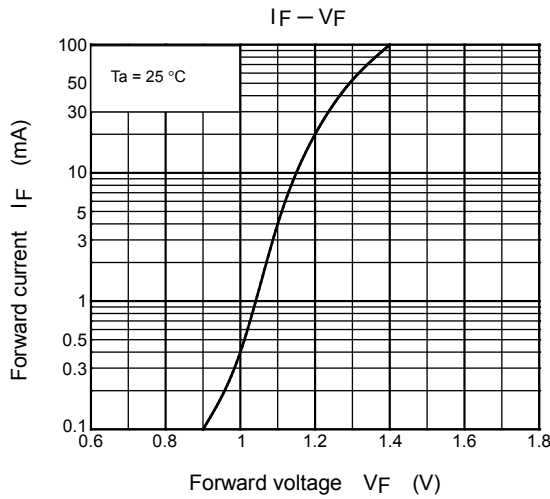
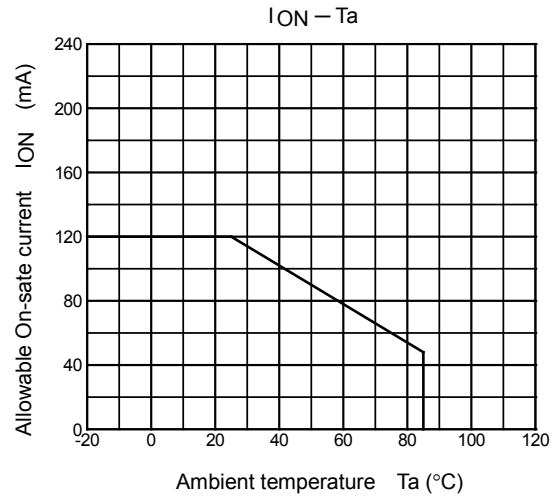
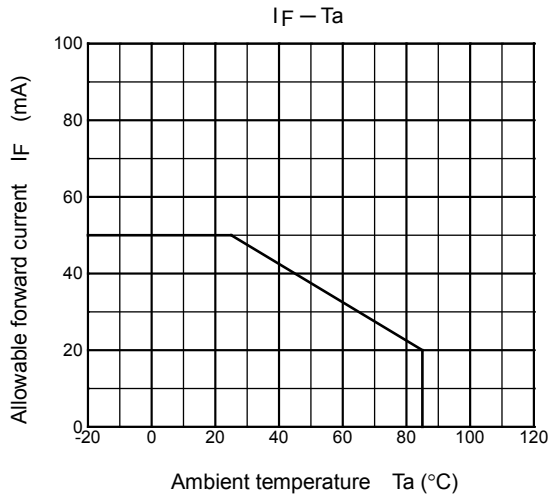
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.3	—	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60 %	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 60 s	1500	—	—	V <sub>rms</sub>

## Switching Characteristics (Ta = 25°C)

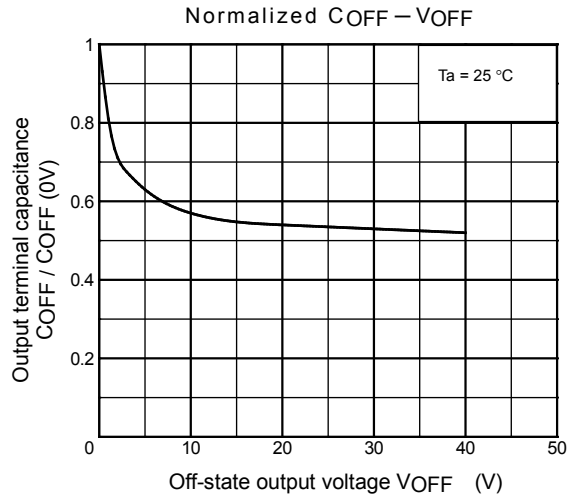
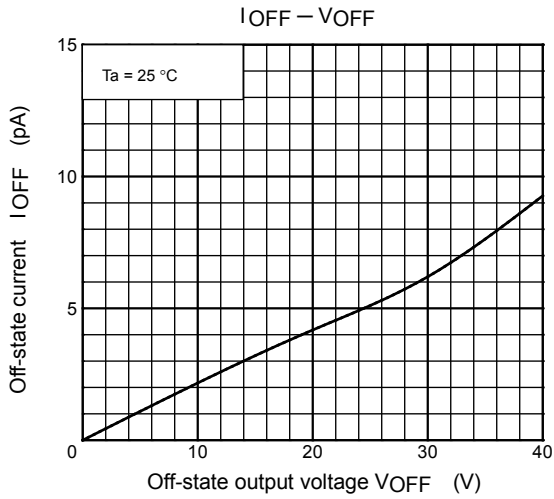
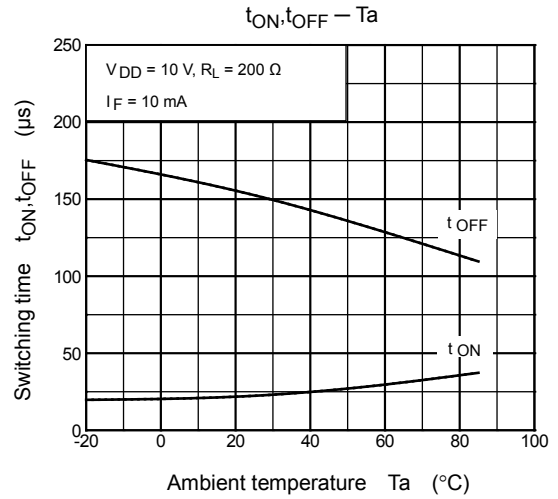
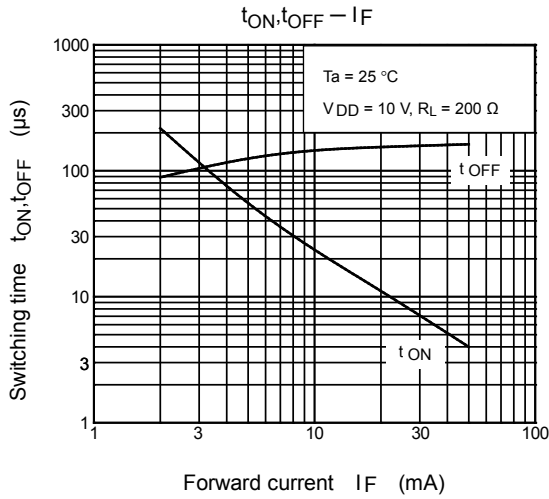
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-on Time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω (Note 2)	—	50	500	μs
Turn-off Time	t <sub>OFF</sub>	V <sub>DD</sub> = 10 V, I <sub>F</sub> = 5 mA	—	120	500	

Note 2: Switching time test circuit



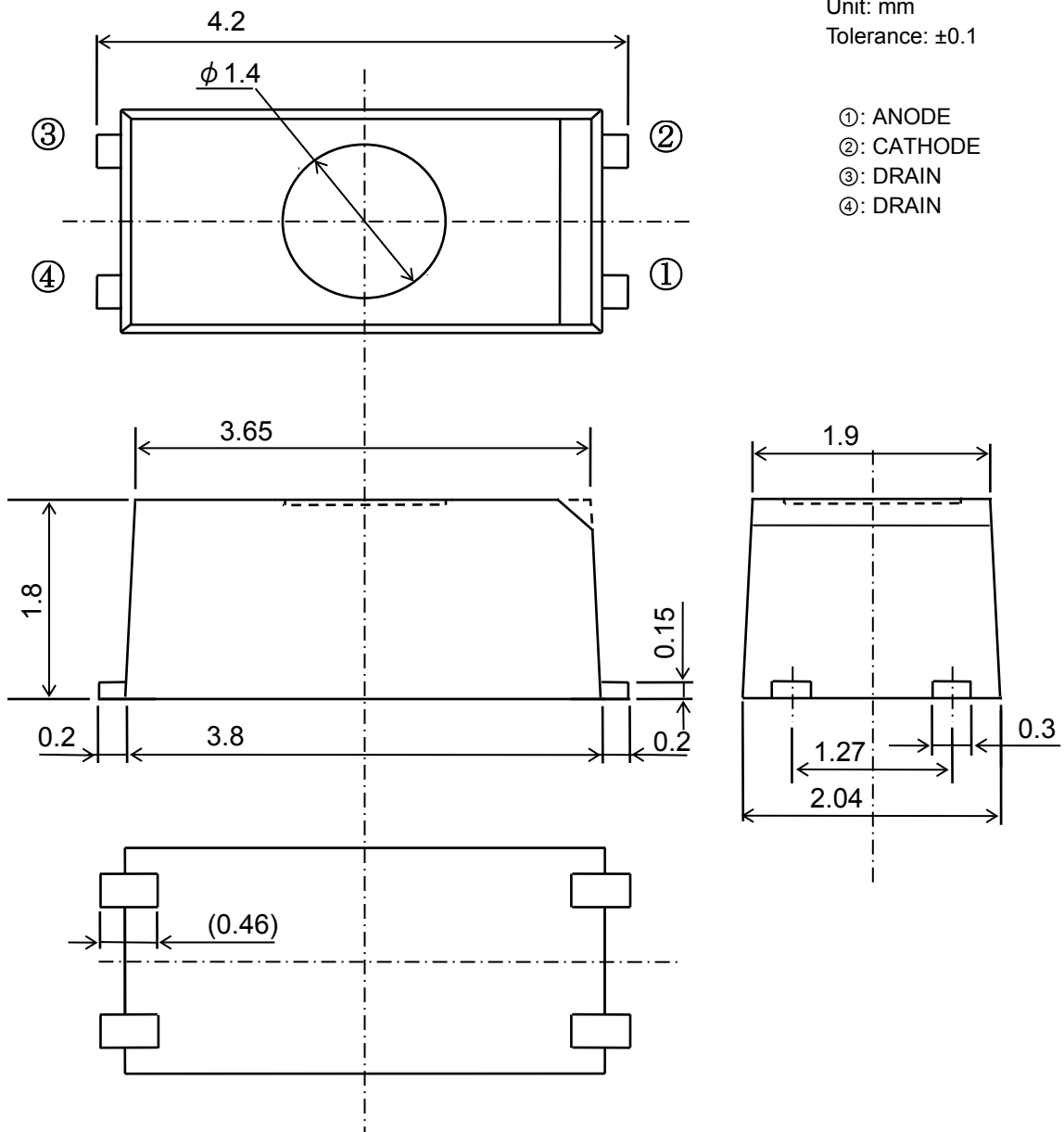


NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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## Package Dimensions



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