

# TLP3203

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

The TOSHIBA TLP3203 is an ultra-small photorelay suitable for surface-mount assembly. The TLP3203 consists of a GaAs infrared-emitting diode optically coupled to a photo-MOSFET and is housed in a 4-pin package.

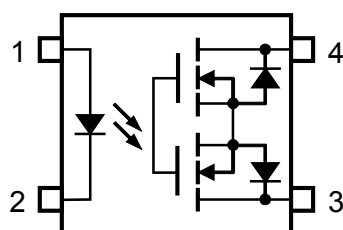
The TLP3203 features low CR product and extremely low On-state resistance, allowing high On-state current.

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

## Features

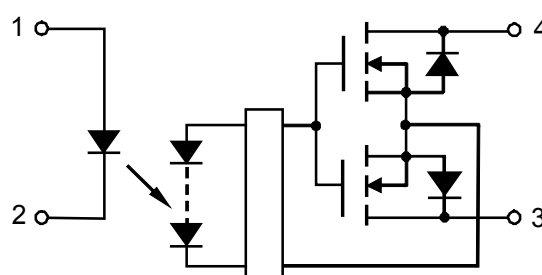
- 4-pin SSOP
- 1-Form-A
- Peak Off-State Voltage: 20 V (min)
- Trigger LED Current: 3 mA (max)
- On-State Current: 0.9 A (max)
- On-State Resistance: 0.22  $\Omega$  (max), 0.18  $\Omega$  (typ.)
- Output Capacitance: 40 pF (typ.)
- Isolation Voltage: 1500 Vrms (min)
- UL approved: UL1577, File No.E67349

## Pin Configuration (Top View)

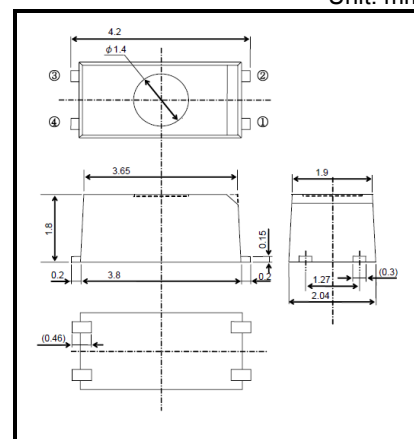


1 : ANODE  
2 : CATHODE  
3 : DRAIN  
4 : DRAIN

## Schematic



Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11-2B1

Weight: 0.03 g (typ.)

Start of commercial production  
2007-09

## 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>	20	V
	On-State Current	I <sub>ON</sub>	900	mA
	On-State Current Derating (Ta ≥ 50°C)	ΔI <sub>ON</sub> /°C	-12.0	mA/°C
	Output Power Dissipation	P <sub>O</sub>	240	mW
	Output Power Dissipation Derating (Ta ≥ 50°C)	ΔP <sub>O</sub> /°C	-3.2	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)		BV <sub>S</sub>	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
Forward Current	I <sub>F</sub>	—	—	20	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	1.00	1.15	1.30	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> = 20 V	—	—	1	nA
	Capacitance	C <sub>OFF</sub>	V = 0 V, f = 100 MHz, t < 1 s	—	40	—	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	—	—	3	mA
Return LED Current	I <sub>FC</sub>	I <sub>OFF</sub> = 10 μA	0.1	—	—	mA
On-State Resistance	R <sub>ON</sub>	I <sub>ON</sub> = 900 mA, I <sub>F</sub> = 5 mA, t < 1 s	—	0.18	0.22	Ω

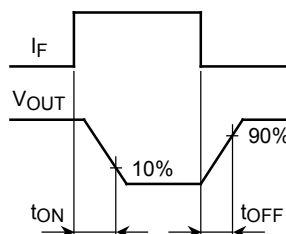
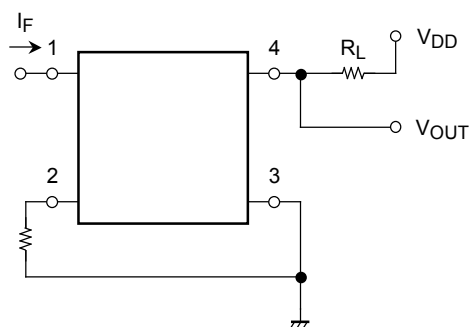
## Isolation Characteristics (Ta = 25°C)

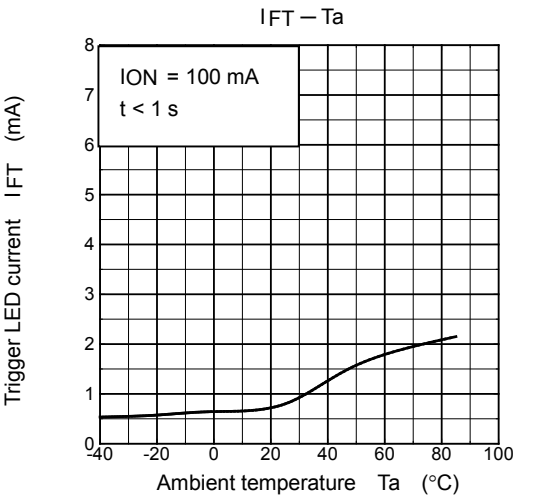
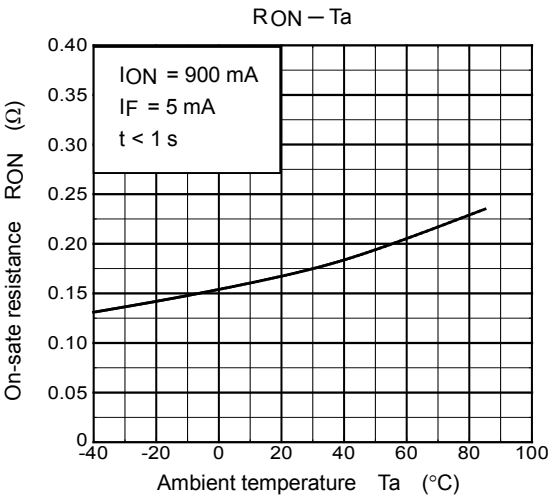
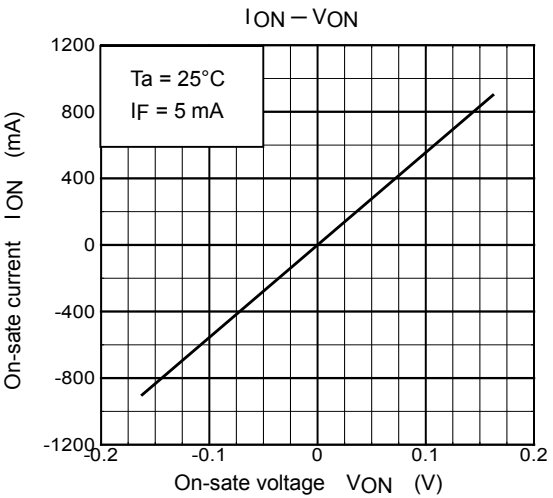
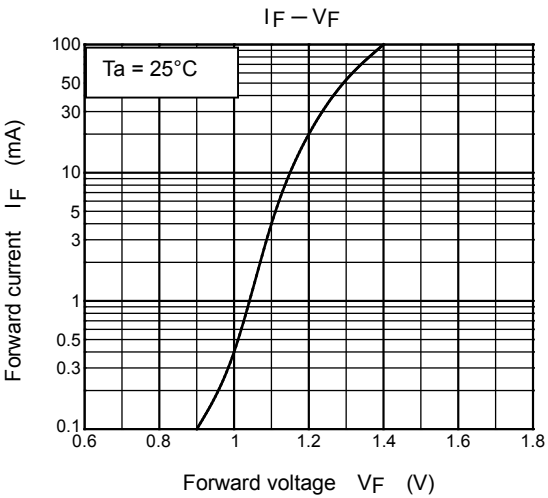
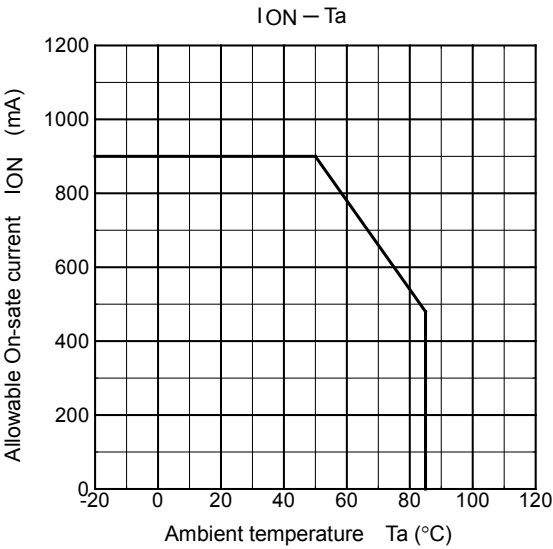
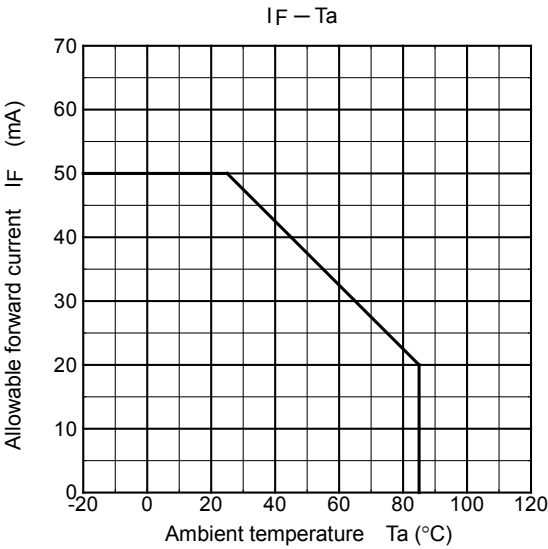
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.3	—	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60%	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 60 s	1500	—	—	V <sub>rms</sub>
		AC, 1 s (in oil)	—	3000	—	
		DC, 60 s (in oil)	—	3000	—	V <sub>dc</sub>

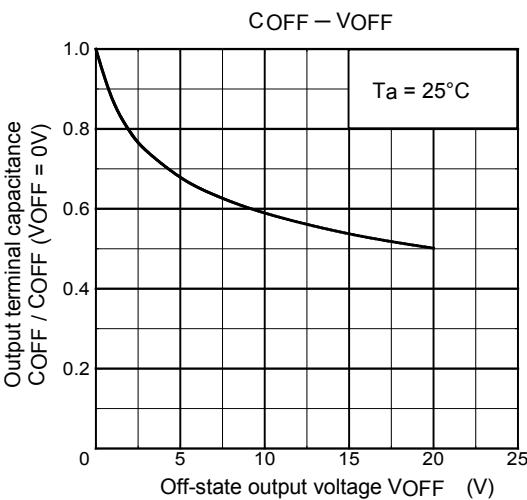
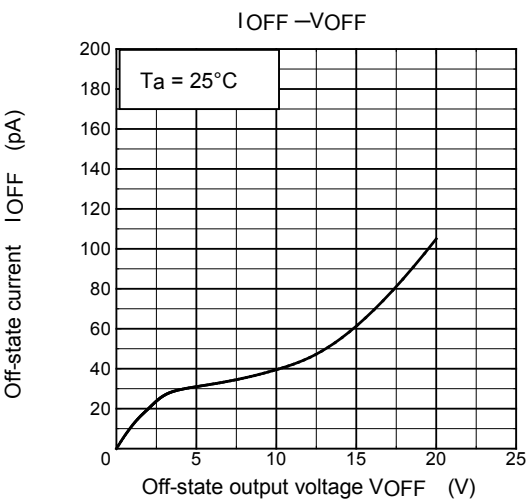
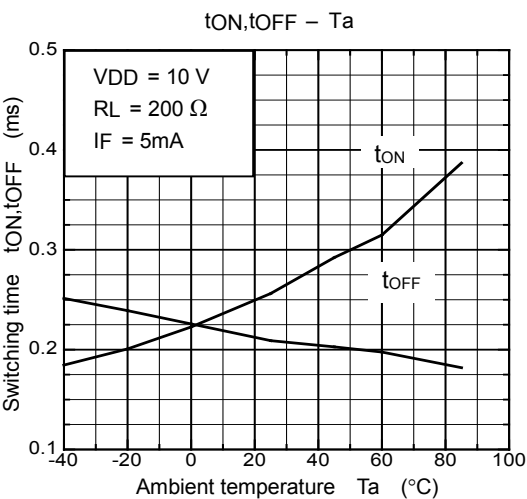
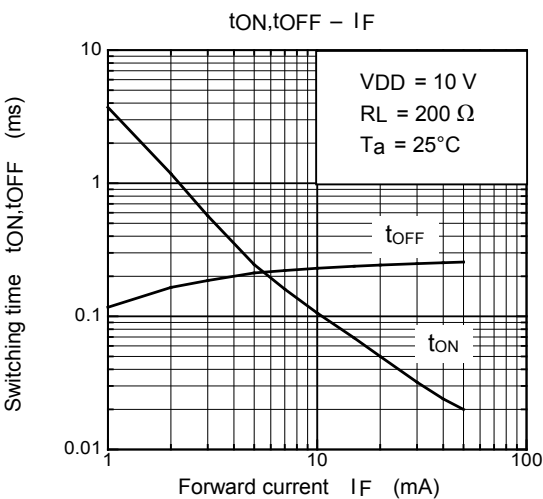
## Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-ON Time	t <sub>ON</sub>	R <sub>L</sub> = 200 Ω (Note 2) V <sub>DD</sub> = 10 V, I <sub>F</sub> = 5 mA	—	0.3	2	ms
Turn-OFF Time	t <sub>OFF</sub>		—	0.2	1	

Note 2: Switching time test circuit

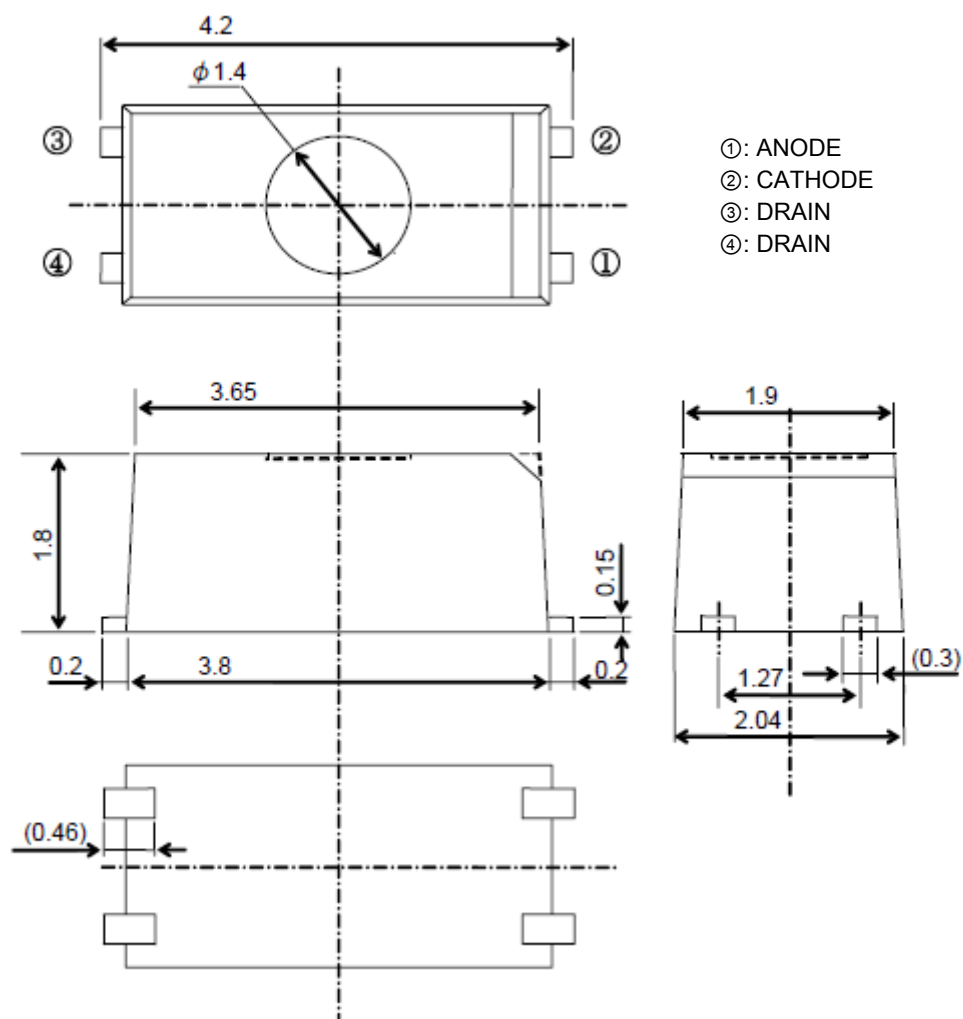






## Package Dimensions

Unit: mm  
Tolerance:  $\pm 0.1$



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