

# TLP3212

Battery Control

Measuring Instruments

Logic IC Testers / Memory Testers

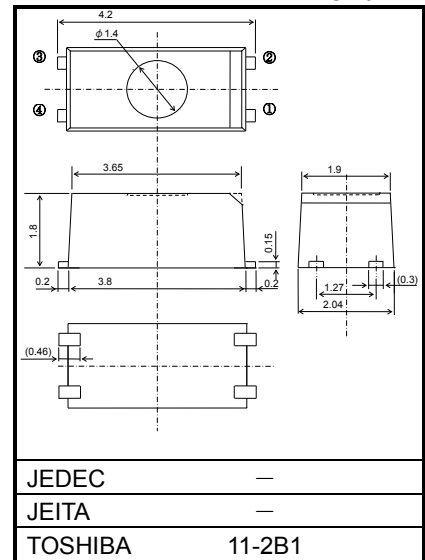
The TOSHIBA TLP3212 is an ultra-small photorelay suitable for surface-mount assembly. The TLP3212 consists of a GaAs infrared-emitting diode optically coupled to a photo-MOSFET and is housed in a 4-pin package.

Its features include low Off-state current and low output pin capacitance.

## Features

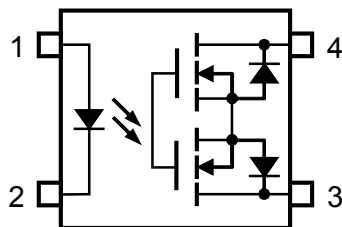
- 4-pin SSOP (SSOP4): 1.8 mm high, 1.27 mm pitch
- 1-Form-A
- Peak Off-State Voltage: 60 V (min)
- Trigger LED Current: 5 mA (max)
- On-State Current: 400 mA (max)
- On-State Resistance: 1.5Ω(max), 1.0 Ω (typ.)
- Isolation Voltage: 1500 Vrms (min)
- UL approved: UL1577, File No.E67349

Unit: mm



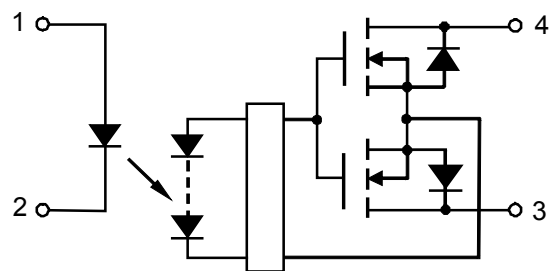
Weight: 0.03 g (typ.)

## Pin Configuration (Top View)



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

## Schematic



Start of commercial production  
2005-07

## 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>	60	V
	On-State Current	I <sub>ON</sub>	400	mA
	On-State Current Derating (Ta ≥ 25°C)	ΔI <sub>ON</sub> /°C	-4.0	mA/°C
	Output Power Dissipation	P <sub>O</sub>	240	mW
	Output Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>O</sub> /°C	-2.4	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: This device is sensitive to electrostatic discharge. When using this device, please ensure that all tools and equipment are earthed.

Note1: Device considered a two-terminal device. Pins 1 and 2 shorted together, and pins 3 and 4 shorted together.

## Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V <sub>DD</sub>	—	—	48	V
Forward Current	I <sub>F</sub>	—	—	20	mA
On-State Current	I <sub>ON</sub>	—	—	400	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 devices. Each item also has its own independent guideline document. In developing designs using these products, please confirm the specified characteristics shown in these documents.

## Individual 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> = 60 V	—	—	1	μA
	Capacitance	C <sub>OFF</sub>	V = 0 V, f = 1 MHz, t < 1 s	—	20	—	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,	—	2	5	mA
Close LED Current	I <sub>FC</sub>	I <sub>OFF</sub> = 10 μA	0.2	—	—	mA
On-State Resistance	R <sub>ON</sub>	I <sub>ON</sub> = 400 mA, I <sub>F</sub> = 5 mA	—	1.0	1.5	Ω

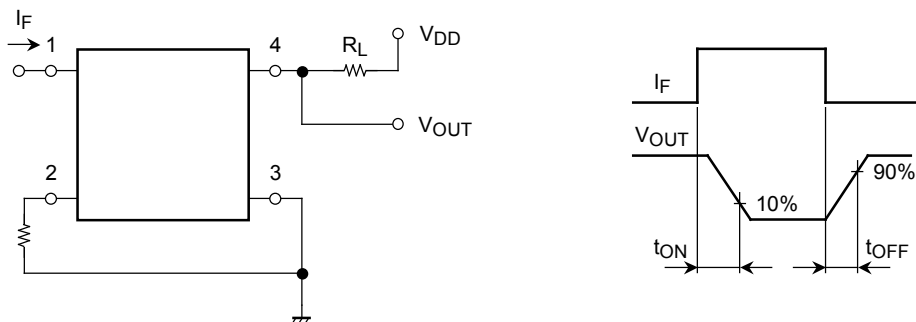
## Isolation Characteristics (Ta = 25°C)

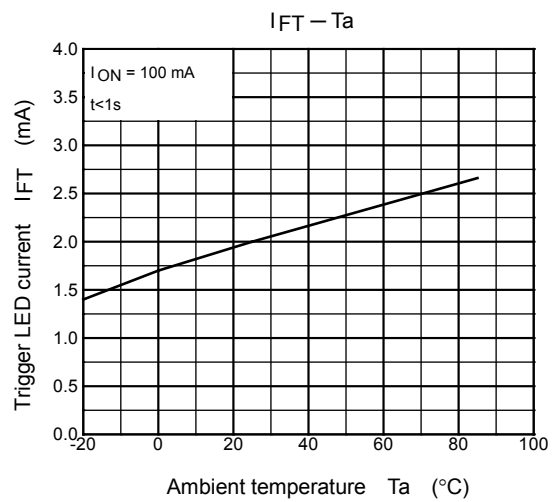
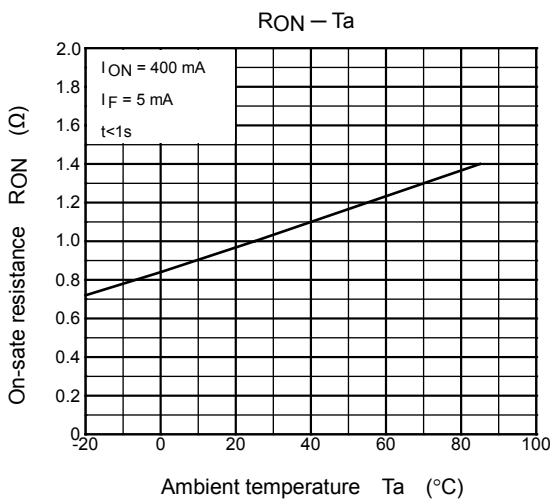
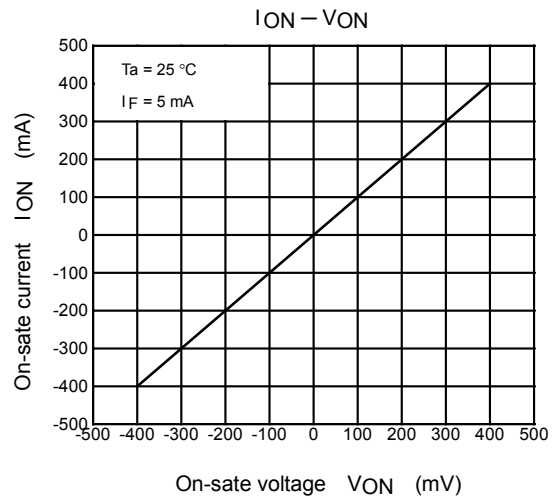
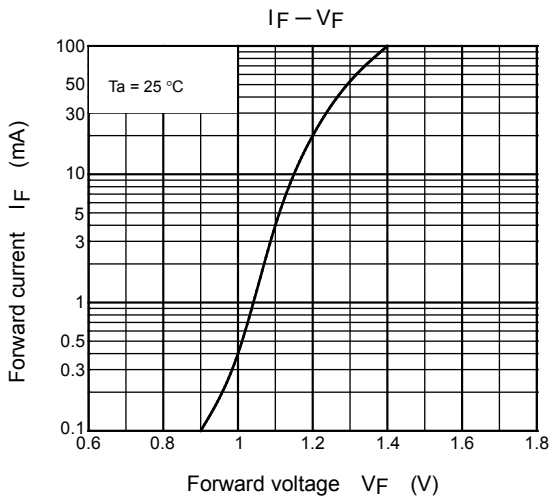
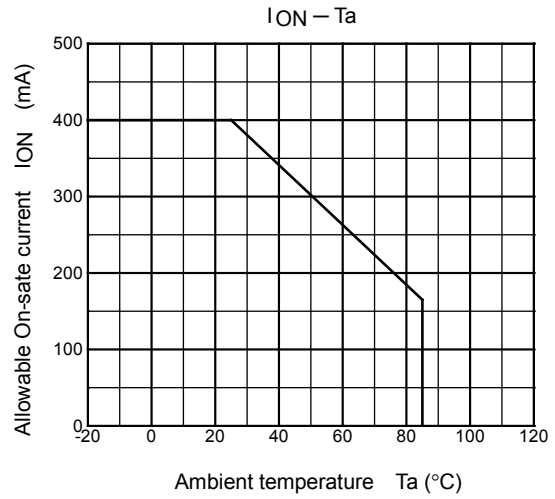
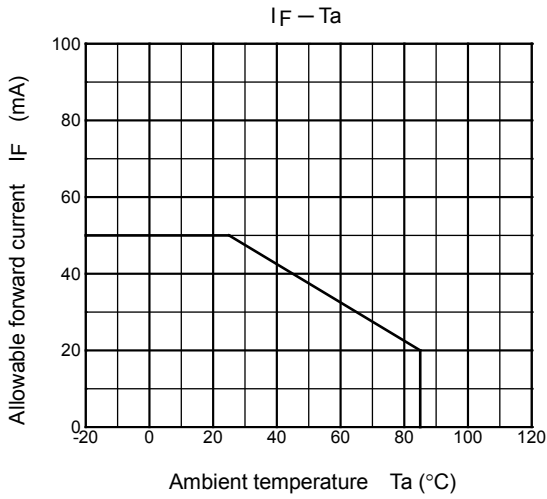
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0 V, f = 1 MHz	—	0.3	—	pF
Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≤ 60%	5 × 10 <sup>10</sup>	10 <sup>14</sup>	—	Ω
Isolation Voltage	BV <sub>S</sub>	AC, 60 s	1500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

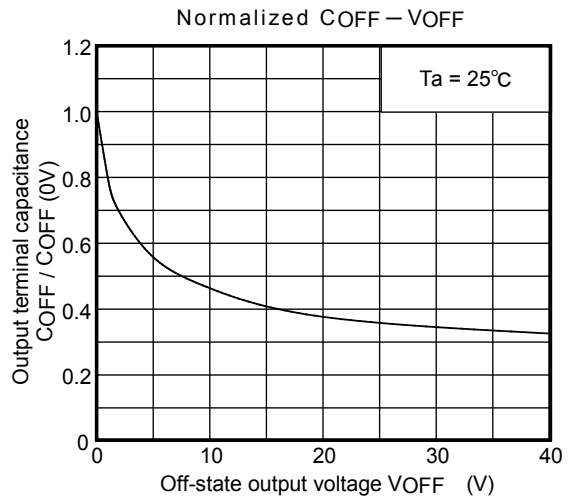
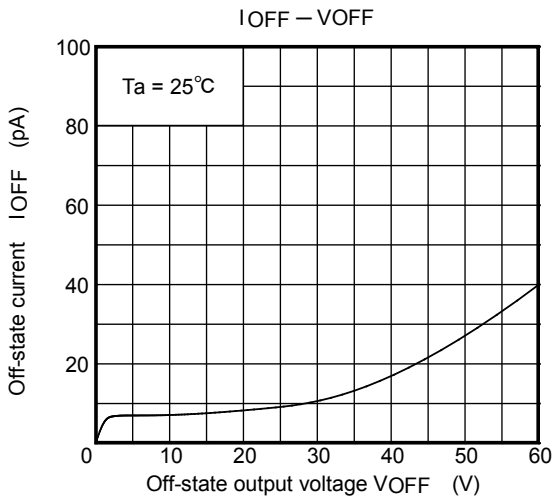
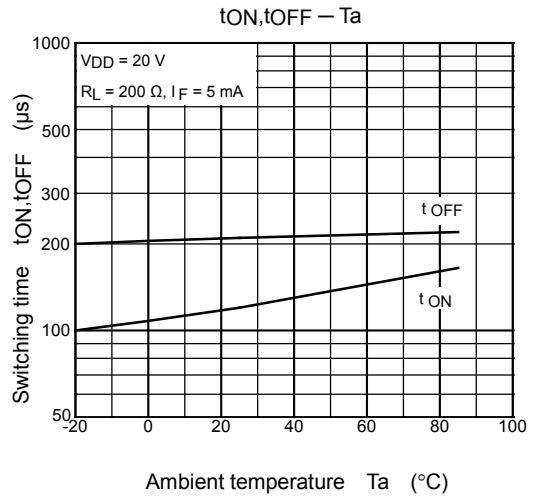
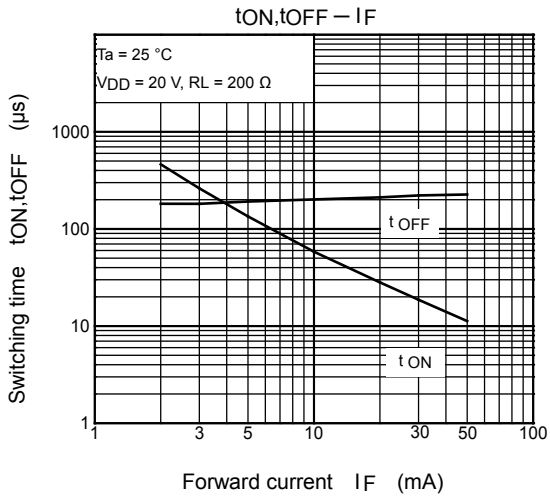
## Switching Characteristics (Ta = 25°C)

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> = 20 V, I <sub>F</sub> = 5 mA	—	300	1000	μs
Turn-off Time	t <sub>OFF</sub>		—	200	1000	

Note 2: Switching time test circuit

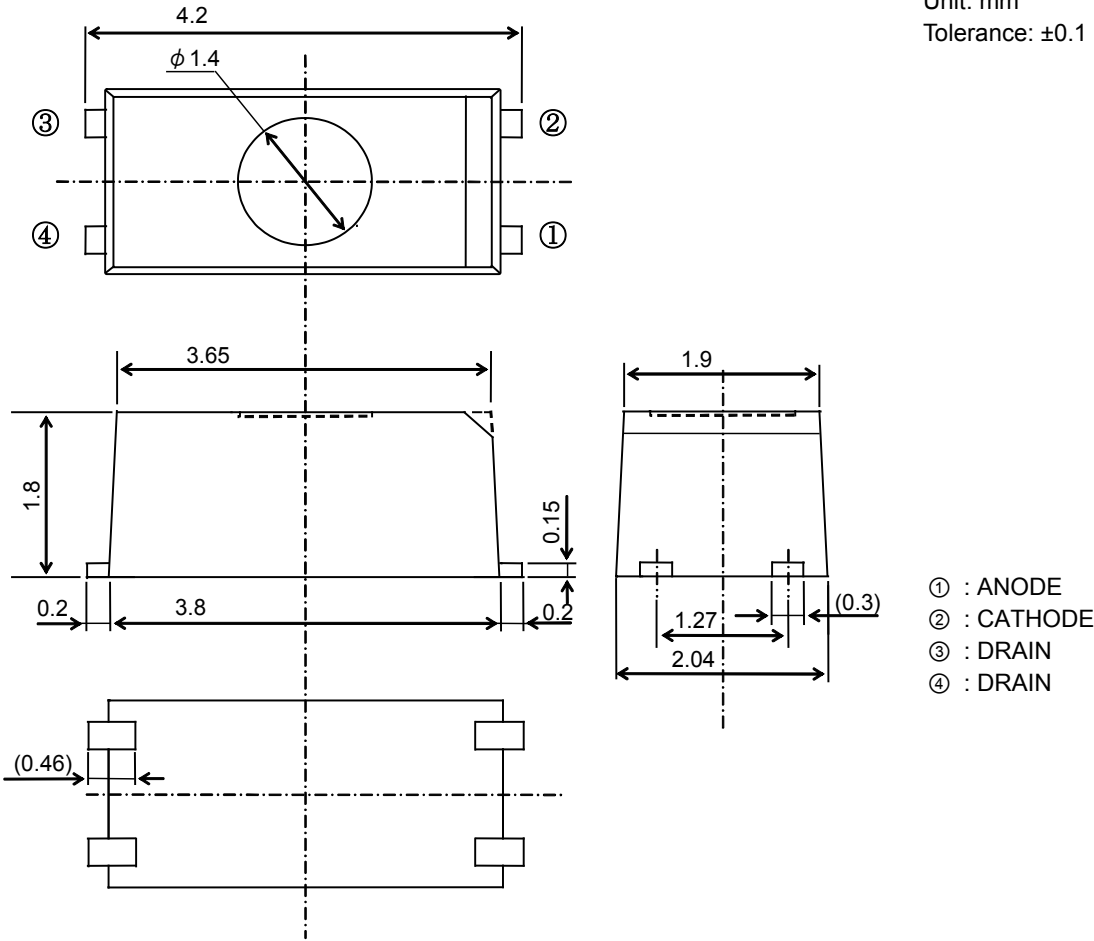






Package Dimensions

Unit: mm  
Tolerance: ±0.1



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