

TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP3275

Measuring Instruments

Logic IC Testers / Memory Testers

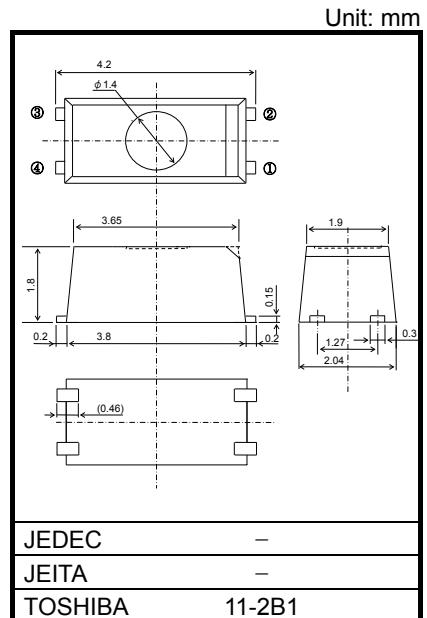
Board Testers / Scanners

The TOSHIBA TLP3275 is an ultra-small photorelay suitable for surface-mount assembly. The TLP3275 consists of a GaAs infrared emitting diode optically coupled to a photo-MOSFET and is housed in a 4-pin package.

The TLP3275 features a low CR product and extremely low on-state resistance, and thus delivers high on-state current.

Additionally the TLP3275 offers low insertion loss of high-frequency signal and thus prevents the degradation of rapidly rising signal.

The TLP3275 also features low off-state current and low output pin capacitance, making it suitable for high-frequency measuring instrument applications.

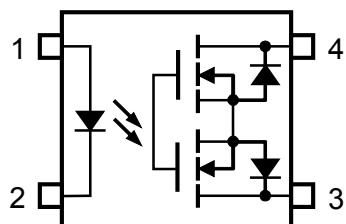


Weight: 0.03 g (typ.)

Features

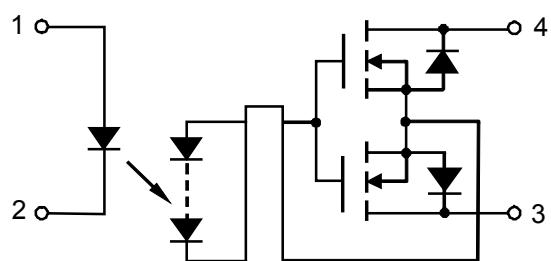
- 4-pin SSOP (SSOP4): 1.8-mm high, 1.27-mm pitch
- 1-Form-A
- Peak Off-State Voltage: 50 V (min)
- Trigger LED Current: 3 mA (max)
- On-State Current: 300 mA (max)
- On-State Resistance: 1.5 Ω (max), 1.0 Ω (typ.)
- Output Capacitance: 12 pF (typ.)
- Isolation Voltage: 1500 Vrms (min)
- ERT (Equivalent Rise Time): 60ps (typ.) (Note.4)
- UL approved: UL1577, File No.E67349

Pin Configuration (Top View)



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

Schematic

Start of commercial production
2008-01

Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I _F	50	mA
	Forward Current Derating (Ta ≥ 25°C)	ΔI _F /°C	-0.5	mA/°C
	Reverse Voltage	V _R	5	V
	Diode Power Dissipation	P _D	50	mW
	Diode Power Dissipation Derating (Ta ≥ 25°C)	ΔP _D /°C	-0.5	mW/°C
	Junction Temperature	T _j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V _{OFF}	50	V
	On-State Current	I _{ON}	300	mA
	On-State Current Derating (Ta ≥ 25°C)	ΔI _{ON} /°C	-3.0	mA/°C
	Output Power Dissipation	P _O	135	mW
	Output Power Dissipation Derating (Ta ≥ 25°C)	ΔP _O /°C	-1.35	mW/°C
	Junction Temperature	T _j	125	°C
Storage Temperature Range		T _{stg}	-40 to 125	°C
Operating Temperature Range		T _{opr}	-20 to 85	°C
Lead Soldering Temperature (10 s)		T _{sol}	260	°C
Isolation Voltage (AC, 1 minute, R.H. ≤ 60%) (Note 1)		B _{VS}	1500	V _{rms}

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}	—	—	40	V
Forward Current	I _F	10	—	30	mA
On-State Current	I _{ON}	—	—	300	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
LED	Forward Voltage	V _F	I _F = 10 mA	1.0	1.15	1.3	V
	Reverse Current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V _F = 0 V, f = 1 MHz	—	15	—	pF
DETECTOR	Off-State Current	I _{OFF}	V _{OFF} = 30 V, Ta = 50°C	—	—	1000	pA
	Capacitance	C _{OFF}	V = 0 V, f = 100 MHz, t < 1 s	—	12	—	pF

Coupled Electrical Characteristics ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	I_{FT}	$I_{ON} = 100 \text{ mA}$	—	1.5	3	mA
Return LED Current	I_{FC}	$I_{OFF} = 10 \mu\text{A}$	0.2	0.75	—	mA
On-State Resistance	R_{ON}	$I_{ON} = 300 \text{ mA}, I_F = 5 \text{ mA}, t < 1 \text{ s}$	—	1.0	1.5	Ω

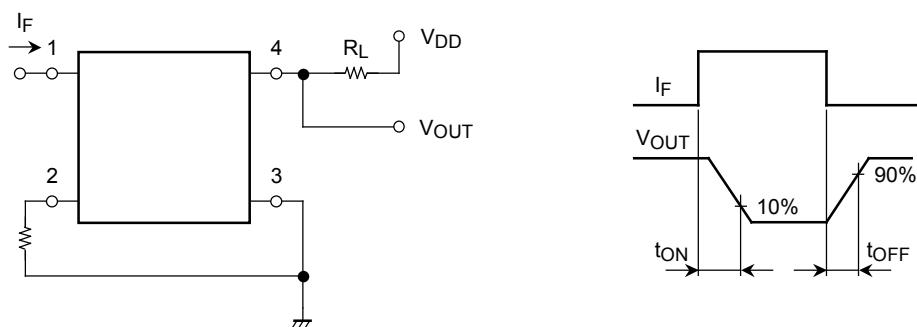
Isolation Characteristics ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.3	—	pF
Isolation Resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	B_VS	AC, 1 minute	1500	—	—	V_{rms}
		AC, 1 second (in oil)	—	3000	—	
		DC, 1 minute (in oil)	—	3000	—	V_{dc}

Switching Characteristics ($T_a = 25^\circ\text{C}$)

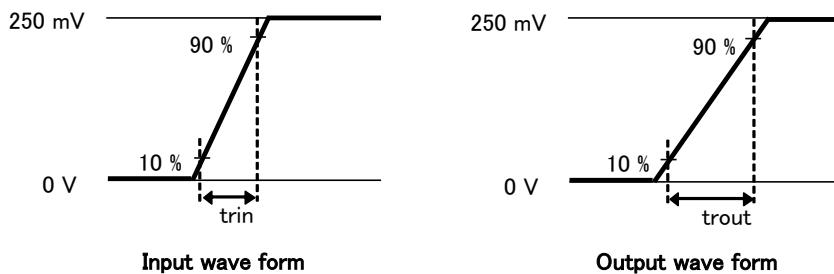
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-on Time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 10 \text{ V}, I_F = 5 \text{ mA}$	—	—	400	μs
Turn-off Time	t_{OFF}		—	—	400	μs
ERT		$I_F=5\text{mA}, V_{DD}=0.25\text{V}$ $\text{Trin}=25 \text{ ps}$	—	60	90	ps

Note 3: SWITCHING TIME TEST CIRCUIT



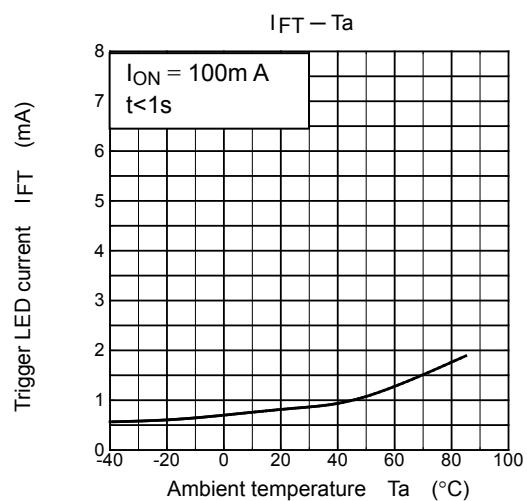
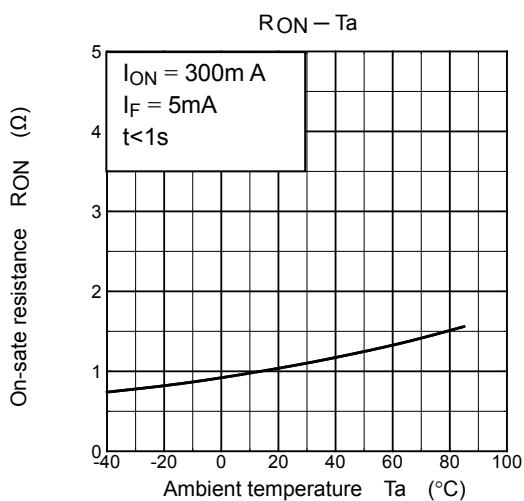
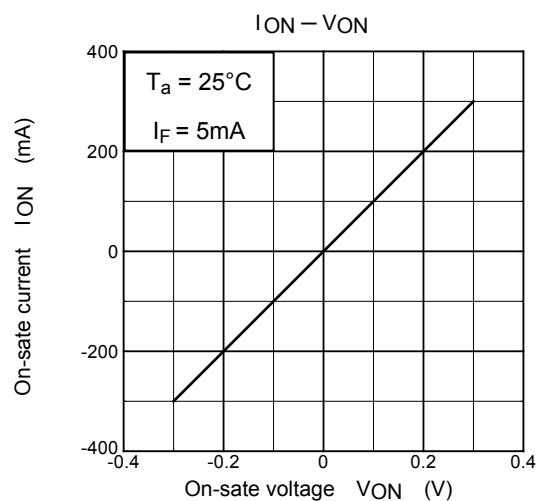
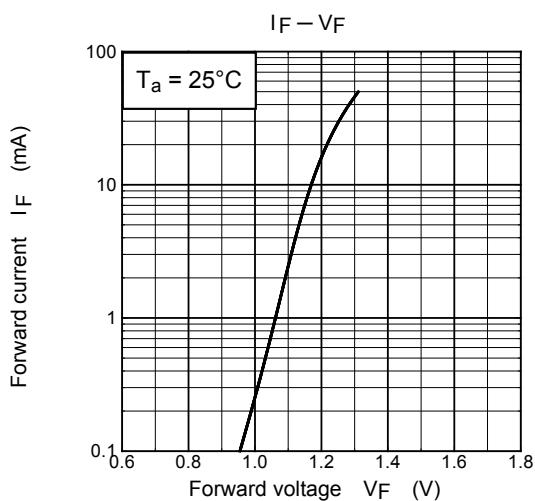
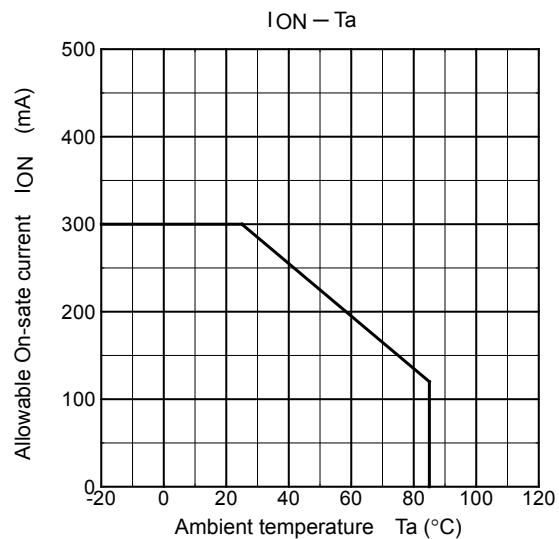
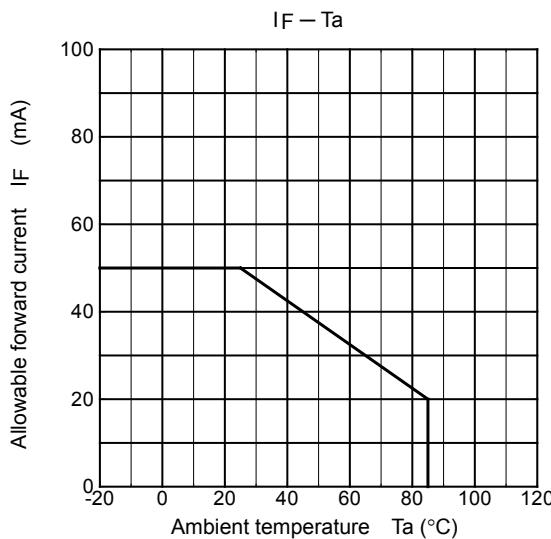
Note 4: ERT (Equivalent Rise Time)

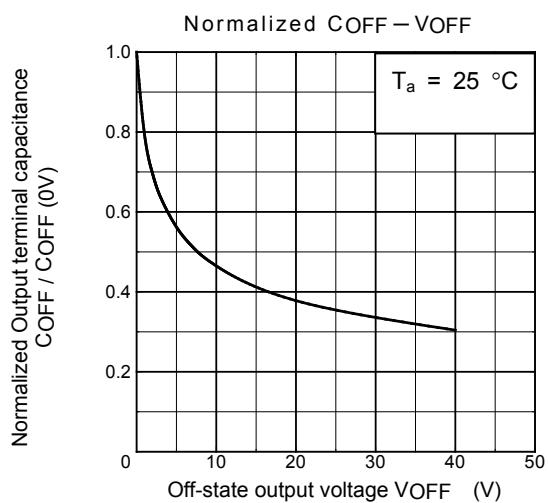
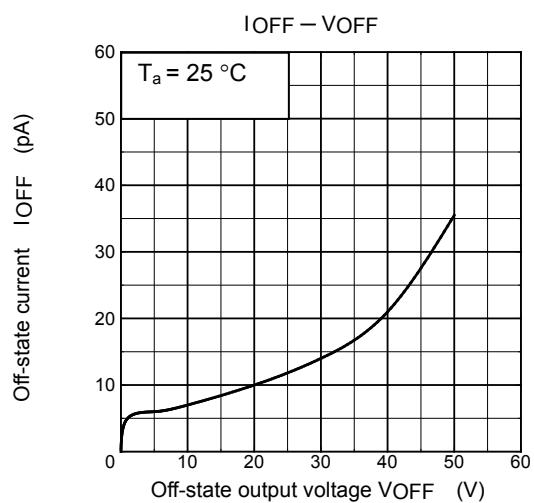
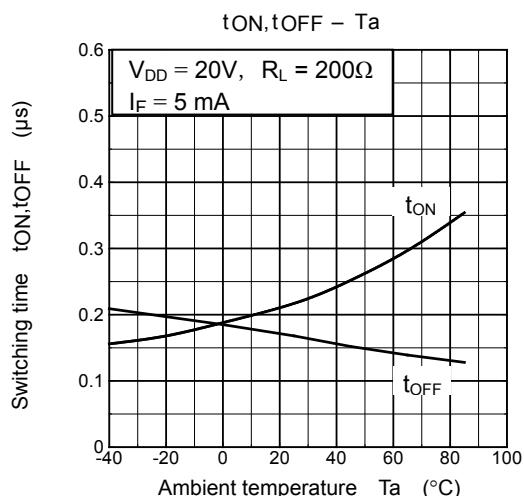
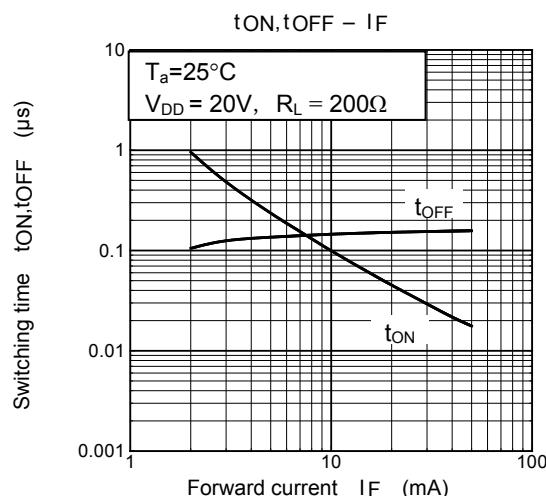
$$ERT = \sqrt{trout^2 - trin^2}$$



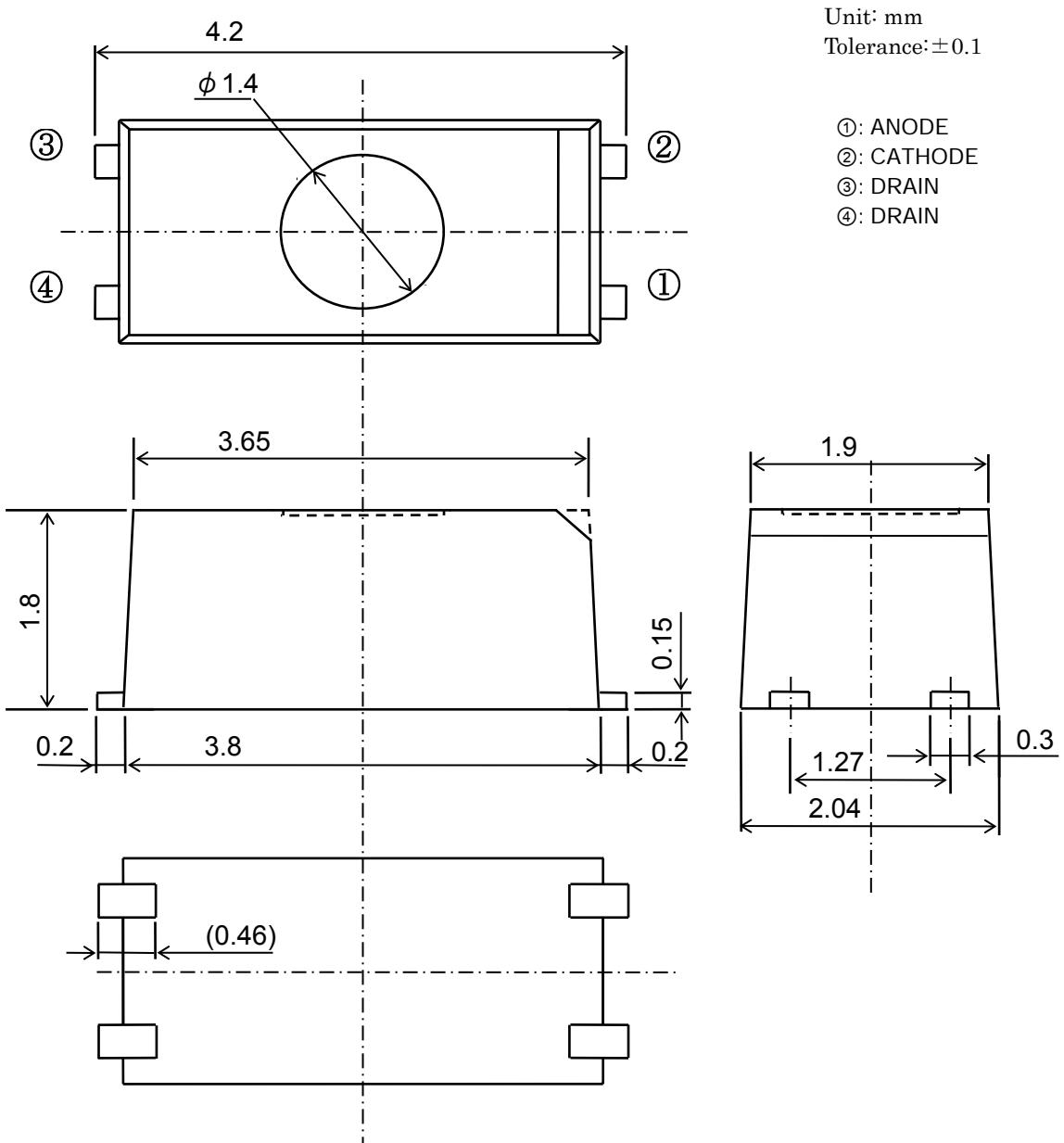
Input wave form

Output wave form





Package Dimensions



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