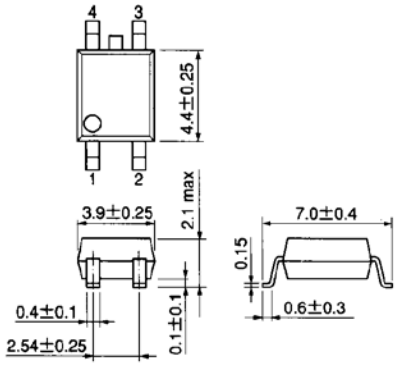
TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP3115

MEASUREMENT INSTRUMENTS
LOGIC IC TESTERS / MEMORY TESTERS
BOARD TESTERS / SCANNERS

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11−5H1

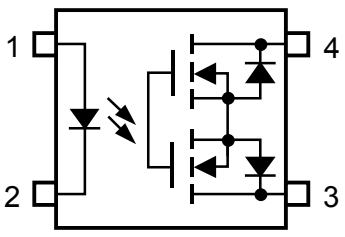
Weight: 0.1 g (typ.)

The TOSHIBA TLP3115 Mini-flat photorelay is a small-outline photorelay, suitable for surface-mount assembly. The TLP3115 consists of a GaAs infrared-emitting diode optically coupled to a photo-MOS FET and housed in a 4-pin package.
The TLP3115 features low CR product and especially low On-state resistance, allowing high ON-state current.
Its characteristics also include low OFF-state current and low output pin capacitance, enabling it to be used in high-frequency measuring instruments.

Features

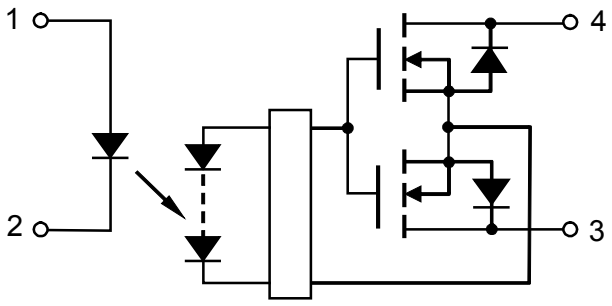
- 4 pin SOP (2.54SOP4) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak Off-State Voltage : 40 V (min)
- Trigger LED Current : 4 mA (max)
- On-State Current : 300 mA (max)
- On-State Resistance : 1.5 Ω (max), 1.0 Ω (typ.)
- Output Capacitance : 14 pF (max), 10 pF (typ.)
- Isolation Voltage : 1500 Vrms (min)
- UL approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service No. 5A, File No.E67349

Pin Configuration (top view)



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

Schematic



Start of commercial production
2000-11

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}	40	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)		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	I_F	10	—	30	mA
On-State Current	I_{ON}	—	—	300	mA
Operating Temperature	T_{opr}	25	—	60	°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 between terminals	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 between terminals	C_{OFF}	V = 0 V, f = 100 MHz, t < 1 s	—	10	14	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} = 300 mA, I_F = 5 mA, t < 1 s	—	1.0	1.5	Ω

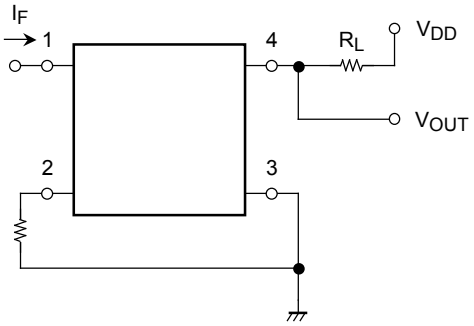
Isolation Characteristics (Ta = 25°C)

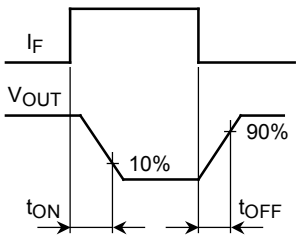
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S = 500 V, R.H. ≤ 60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	1500	—	—	Vrms
		AC, 1 second (in oil)	—	3000	—	
		DC, 1 minute (in oil)	—	3000	—	Vdc

Switching Characteristics (Ta = 25°C)

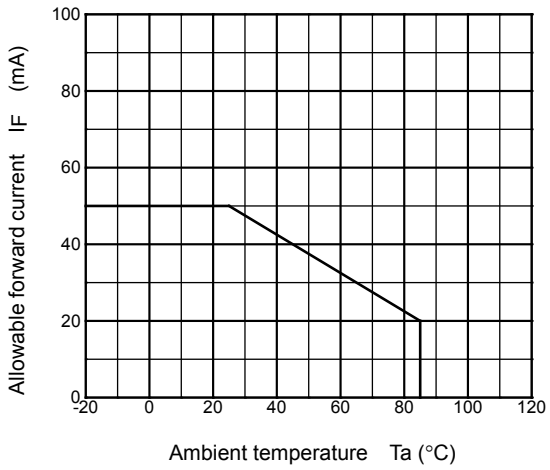
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-on Time	t_{ON}	R_L = 200 Ω (NOTE 2) V_{DD} = 10 V, I_F = 10 mA	—	—	500	μs
Turn-off Time	t_{OFF}		—	—	500	

NOTE 2 : SWITCHING TIME TEST CIRCUIT

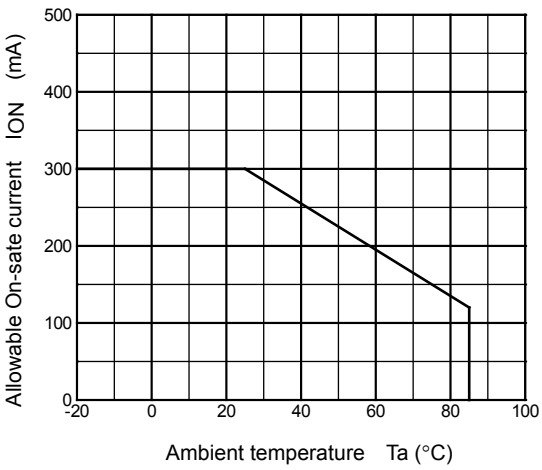




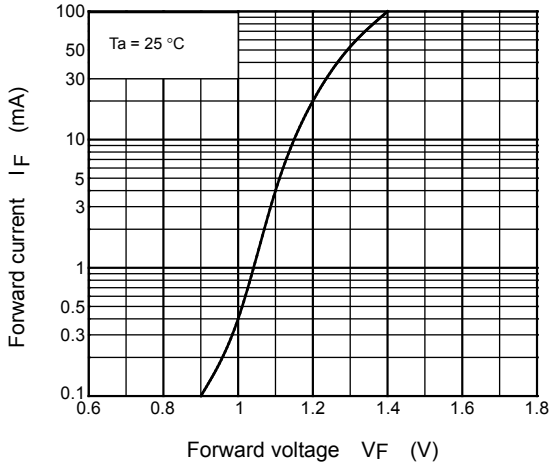
$I_F - Ta$



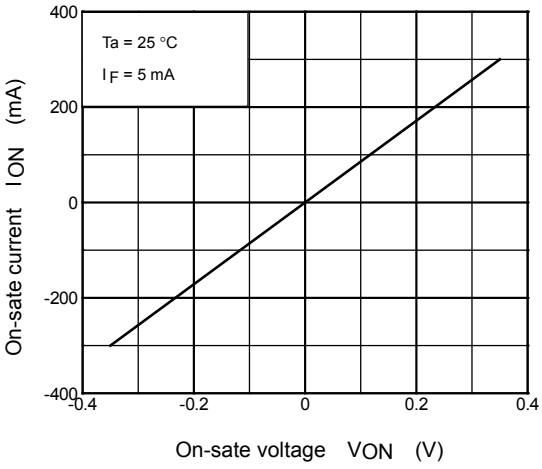
$I_{ON} - Ta$



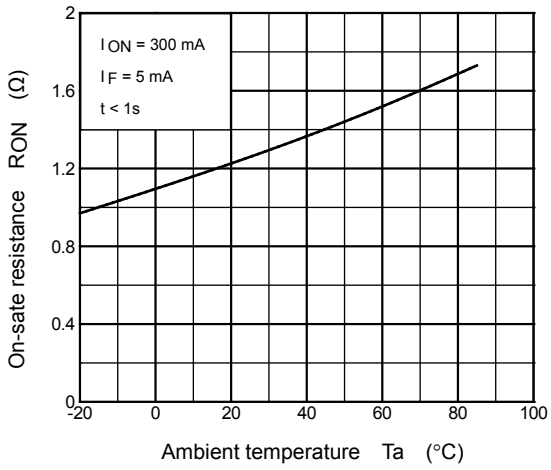
$I_F - V_F$



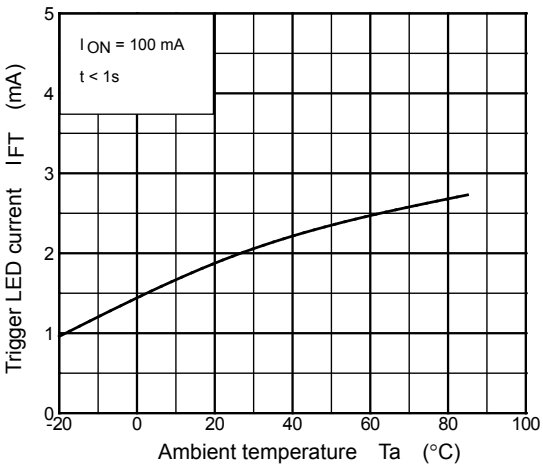
$I_{ON} - V_{ON}$



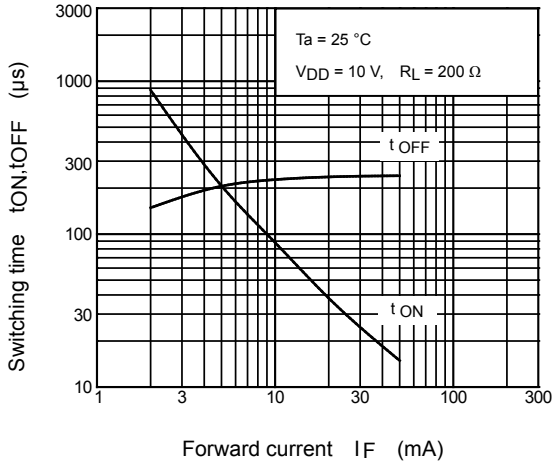
$R_{ON} - Ta$



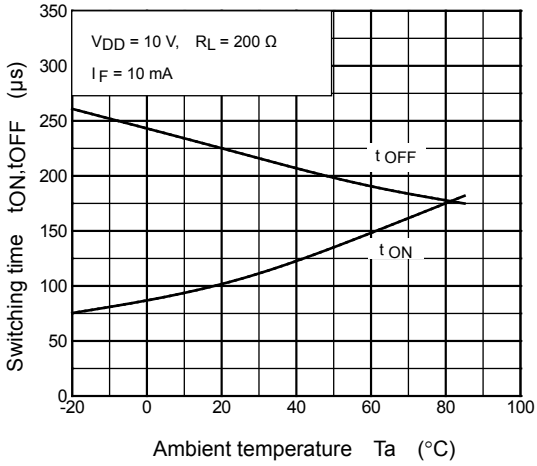
$I_{FT} - Ta$



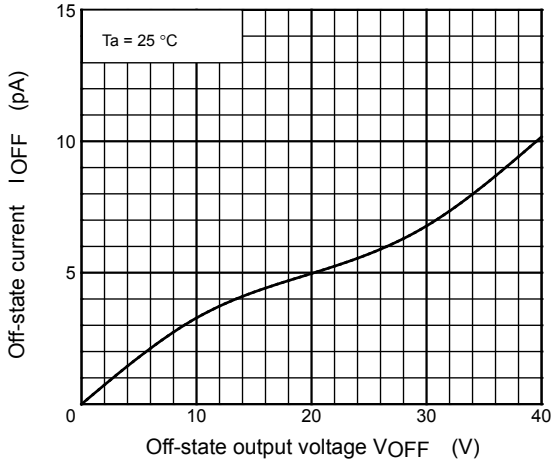
t_{ON}, t_{OFF} – I_F



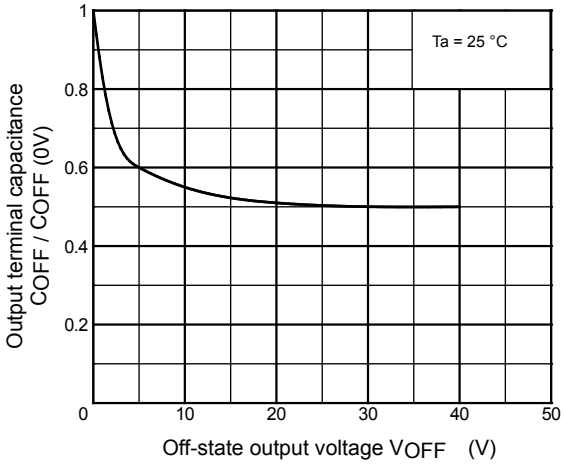
t_{ON}, t_{OFF} – Ta



$I_{OFF} - V_{OFF}$



Normalized $C_{OFF} - V_{OFF}$



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