

TOSHIBA PHOTOCOUPLER PHOTO RELAY

# TLP3115

## MEASUREMENT INSTRUMENTS

## LOGIC IC TESTERS / MEMORY TESTERS

## BOARD TESTERS / SCANNERS

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.

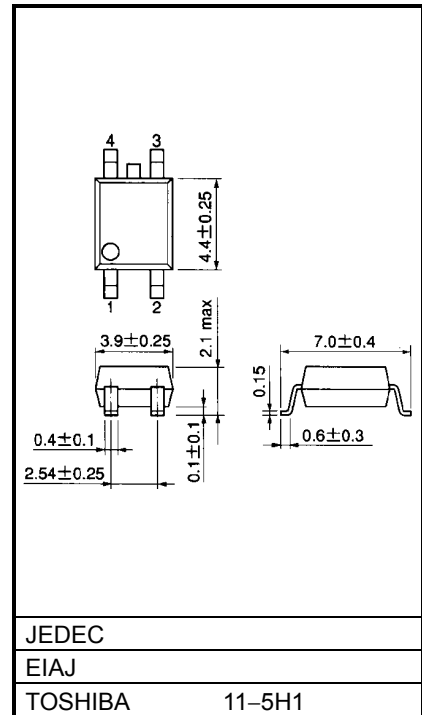
The TLP3115 features low CR multiplication and especially low On-state resistance, allowing high ON-state current.

Its characteristics also include low OFF-state current and low output pin capacitance, enabling it to be used in high-frequency measuring instruments.

## FEATURES

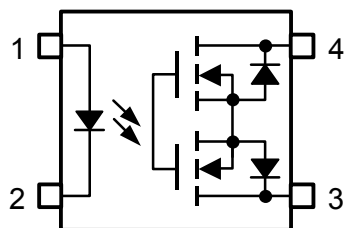
- 4 pin SOP (2.54SOP4) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak Off-State Voltage : 40 V (MIN.)
- Trigger LED Current : 4 mA (MAX.)
- On-State Current : 300 mA (MAX.)
- On-State Resistance : 1.5  $\Omega$  (MAX.), 1.0  $\Omega$  (TYP.)
- Output Capacitance : 14 pF (MAX.), 10 pF (TYP.)
- Isolation Voltage : 1500 Vrms (MIN.)

Unit: mm



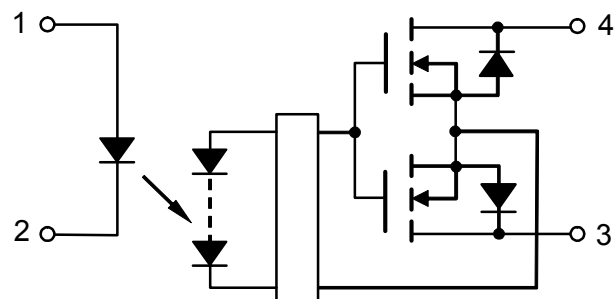
Weight: 0.1 g

## PIN CONFIGURATION (TOP VIEW)



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

## SCHEMATIC



**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	$I_F$	50	mA
	Forward Current Derating (Ta ≥ 25°C)	$\Delta I_F/^\circ\text{C}$	-0.5	mA/°C
	Reverse Voltage	$V_R$	5	V
	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)	$\Delta I_{ON}/^\circ\text{C}$	-3.0	mA/°C
	Junction Temperature	$T_j$	125	°C
Storage Temperature Range		$T_{stg}$	-40~125	°C
Operating Temperature Range		$T_{opr}$	-20~85	°C
Lead Soldering Temperature (10 s)		$T_{sol}$	260	°C
Isolation Voltage (AC, 1 minute, R.H. ≤ 60%) (NOTE1)		$BV_S$	1500	Vrms

(NOTE1) : 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

**INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	μA
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	15	—	pF
DETECTOR	Off-State Current	$I_{OFF}$	$V_{OFF} = 30 \text{ V}, T_a = 50^\circ\text{C}$	—	—	1000	pA
	Capacitance	$C_{OFF}$	$V = 0, f = 100 \text{ MHz}, t < 1 \text{ s}$	—	10	14	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	$I_{FT}$	$I_{ON} = 100\text{ mA}$	—	—	4	mA
Return LED Current	$I_{FC}$	$I_{OFF} = 10\text{ }\mu\text{A}$	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	$\Omega$

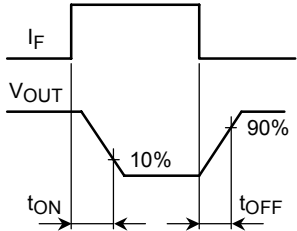
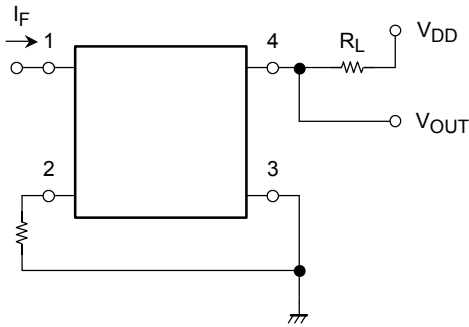
ISOLATION CHARACTERISTICS (Ta = 25°C)

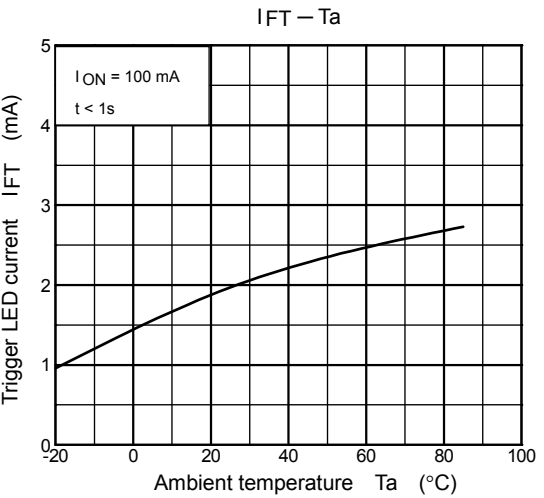
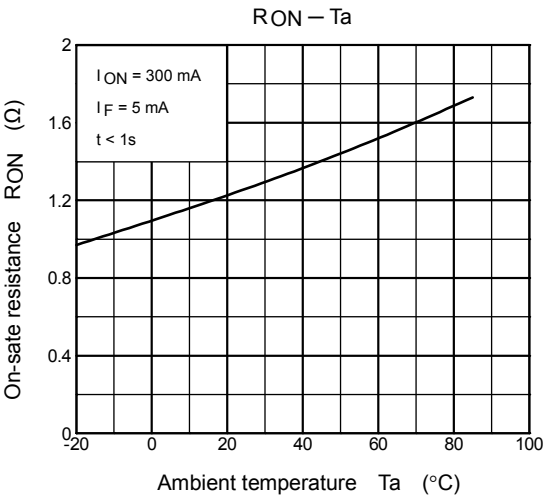
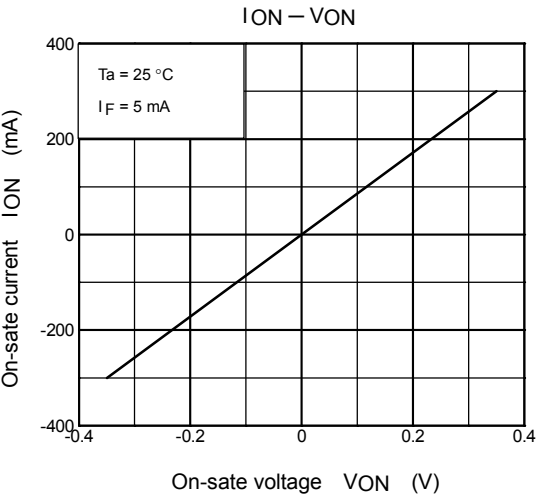
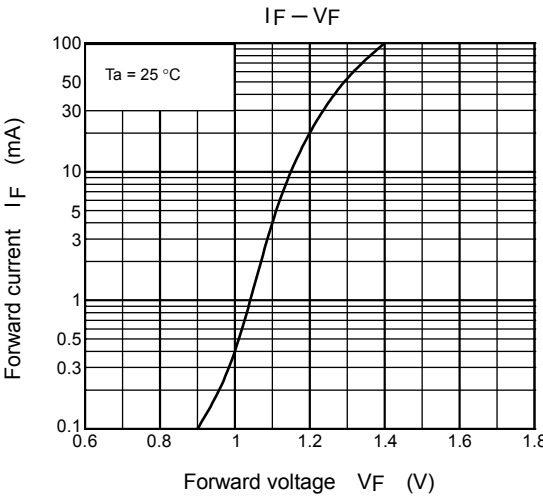
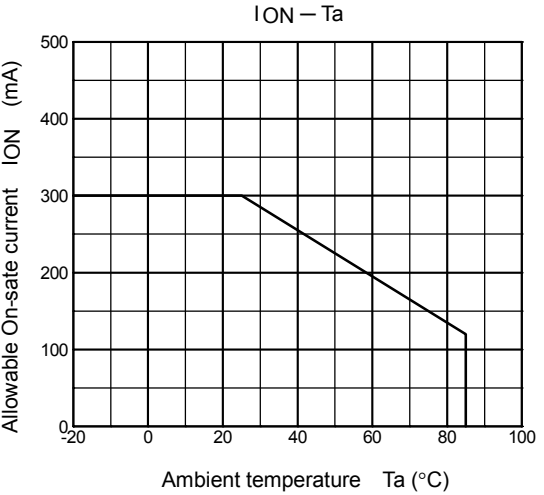
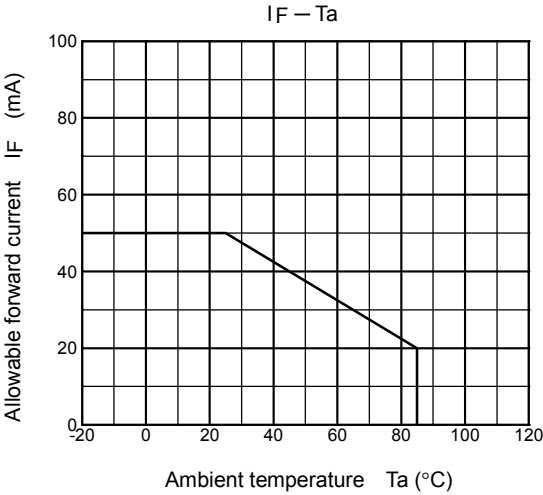
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	$C_S$	$V_S = 0\text{ V}$ , $f = 1\text{ MHz}$	—	0.8	—	pF
Isolation Resistance	$R_S$	$V_S = 500\text{ V}$ , R.H. $\leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	1500	—	—	Vrms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

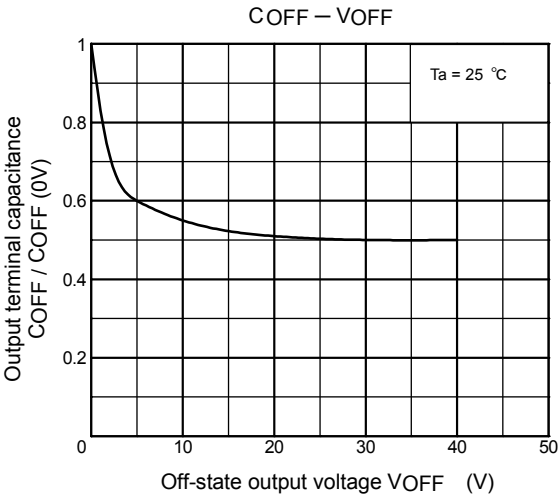
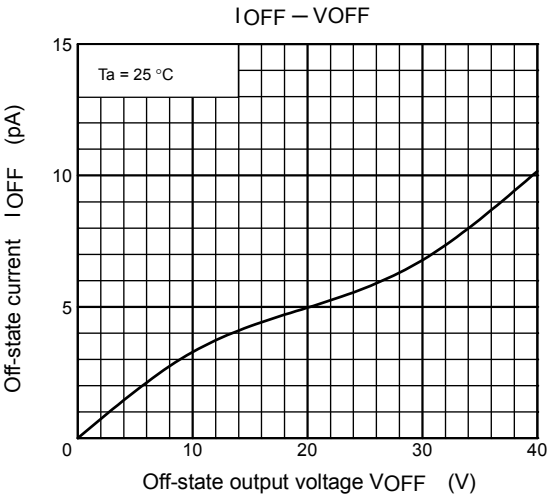
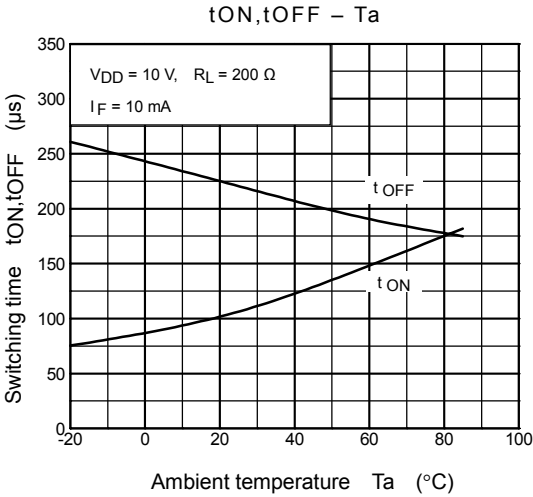
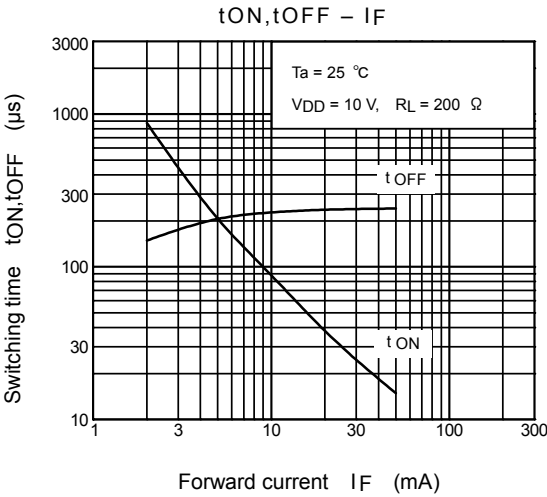
SWITCHING CHARACTERISTICS (Ta = 25°C)

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

(NOTE 2) : SWITCHING TIME TEST CIRCUIT







**RESTRICTIONS ON PRODUCT USE**

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