

TOSHIBA Photocoupler Photorelay

# TLP4597G

PBX

Telecommunication

Modem · FAX Cards, Modems In PC

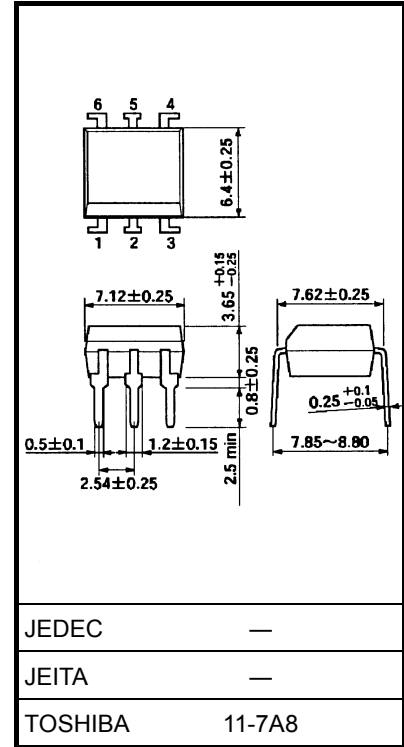
Measurement Instrumentation

Unit: mm

The TOSHIBA TLP4597G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a six lead plastic DIP package (DIP6).

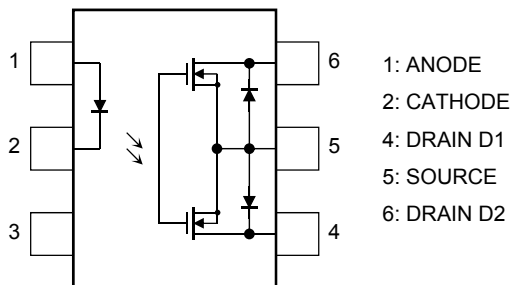
The TLP4597G is a bi-directional switch which can replace mechanical relays in many applications.

- 6 pin DIP (DIP6)
- 1-form-B
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 150 mA (max)
- On-state resistance: 25 Ω (max)
- Isolation voltage: 2500 Vrms (min)
- UL recognized: UL1577, File No. E67349

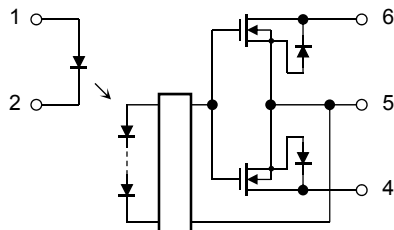


Weight: 0.4 g (typ.)

## Pin Configuration (top view)



## Schematic



Start of commercial production  
 2000/09

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics		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
	Peak forward current (100 μs pulse, 100 pps)	$I_{FP}$	1	A
	Reverse voltage	$V_R$	5	V
	Junction temperature	$T_j$	125	°C
Detector	Off-state output terminal voltage	$V_{OFF}$	350	V
	On-state current	A connection	150	mA
		B connection	150	
		C connection	300	
	On-state current derating (Ta ≥ 25°C)	A connection	-1.5	mA/°C
		B connection	-1.5	
		C connection	-3.0	
Junction temperature	$T_j$	125	°C	
Operating temperature range		$T_{opr}$	-40 to 85	°C
Storage temperature range		$T_{stg}$	-55 to 125	°C
Lead soldering temperature (10 s)		$T_{sol}$	260	°C
Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note 1)		$BV_S$	2500	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).

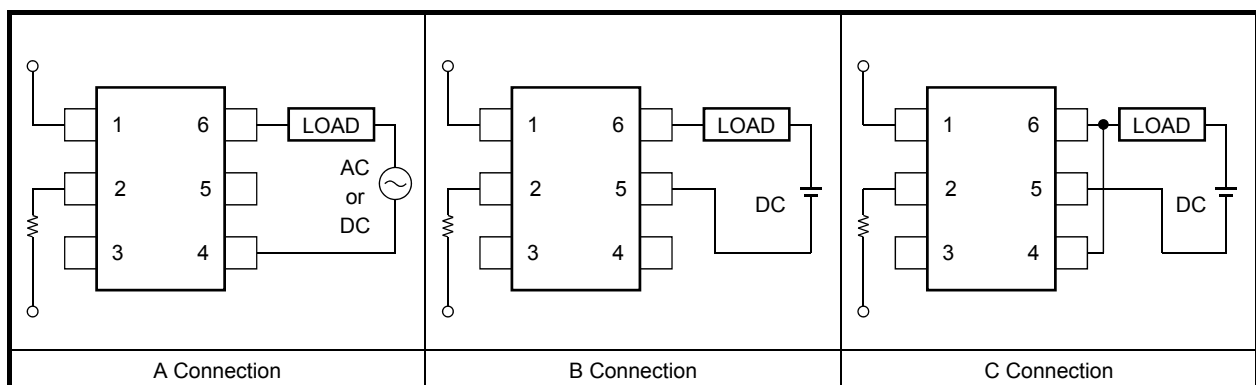
Note 1: Device considered a two-terminal device: LED side pins shorted together, and DETECTOR side pins shorted together.

## Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{DD}$	—	—	280	V
Forward current	$I_F$	5	—	25	mA
On-state current	$I_{ON}$	—	—	150	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.

## Circuit Connections



## Individual Electrical Characteristics (Ta = 25°C)

Characteristics		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	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	$I_{OFF}$	$V_{OFF} = 350 \text{ V}, I_F = 5 \text{ mA}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V = 0, f = 1 \text{ MHz}, I_F = 5 \text{ mA}$	—	65	—	pF

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		$I_{FC}$	$I_{OFF} = 10 \mu\text{A}$	—	1	3	mA
Return LED current		$I_{FT}$	$I_{ON} = 150 \text{ mA}$	0.1	—	—	mA
On-state resistance	A connection	$R_{ON}$	$I_{ON} = 150 \text{ mA}$	—	15	25	$\Omega$
	B connection		$I_{ON} = 150 \text{ mA}$	—	8	14	
	C connection		$I_{ON} = 300 \text{ mA}$	—	4	—	

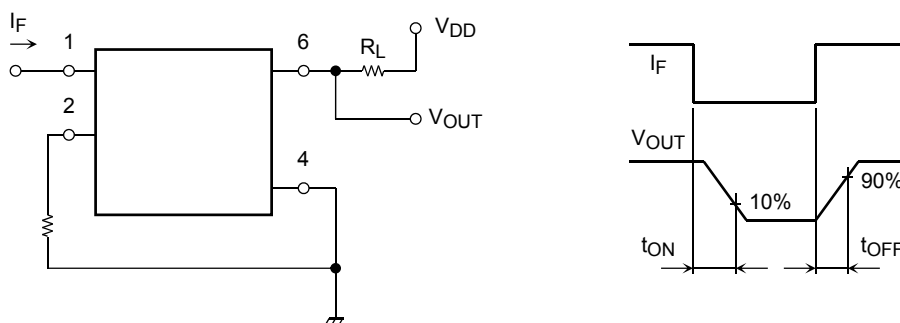
## Isolation Characteristics (Ta = 25°C)

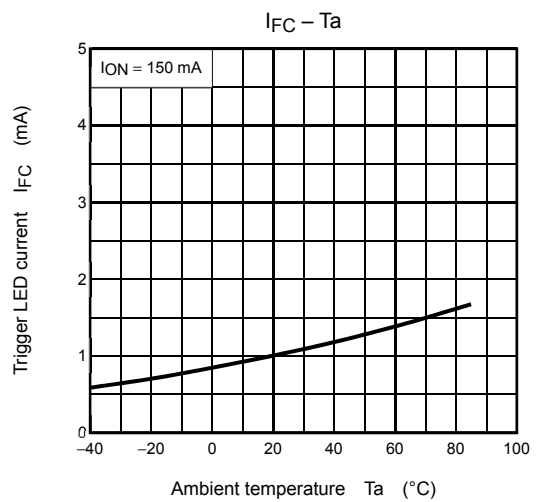
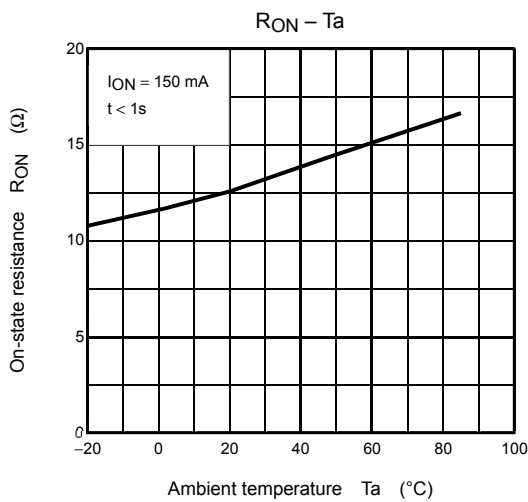
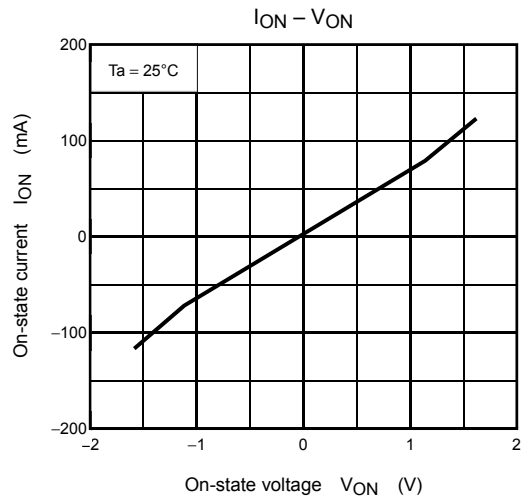
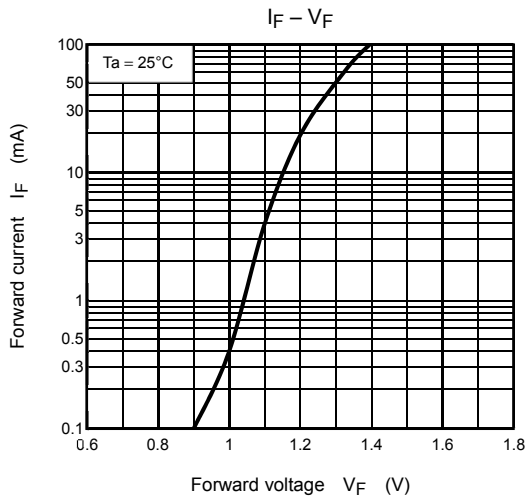
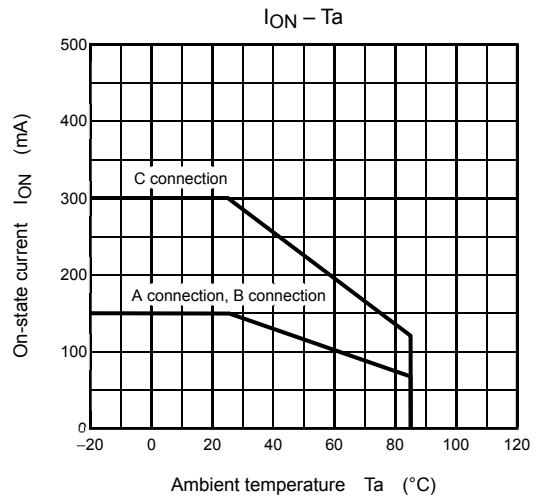
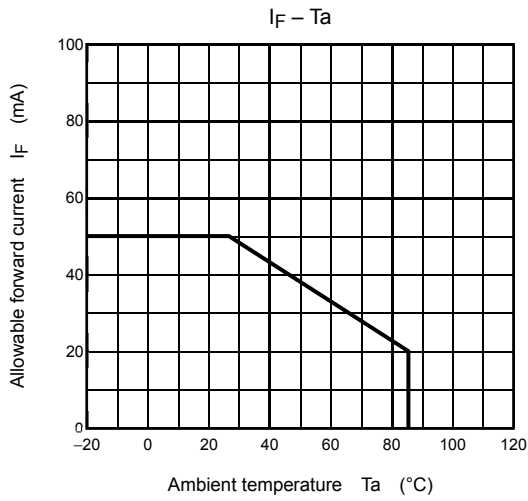
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output		$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance		$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage		$BV_S$	AC, 1 minute	2500	—	—	Vrms
			AC, 1 second, in oil	—	5000	—	
			DC, 1 minute, in oil	—	5000	—	Vdc

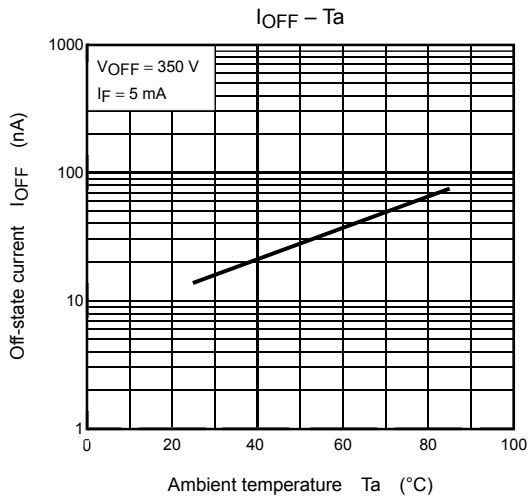
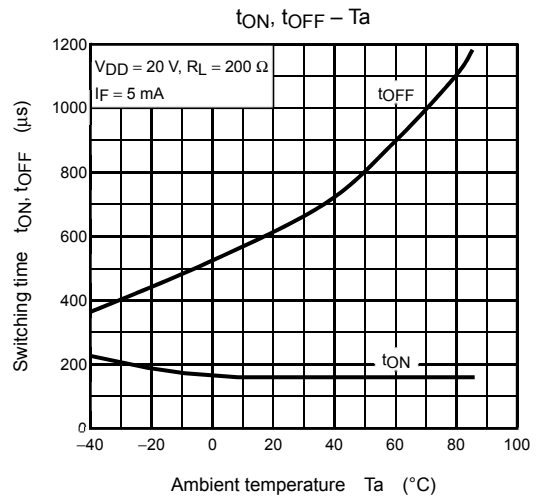
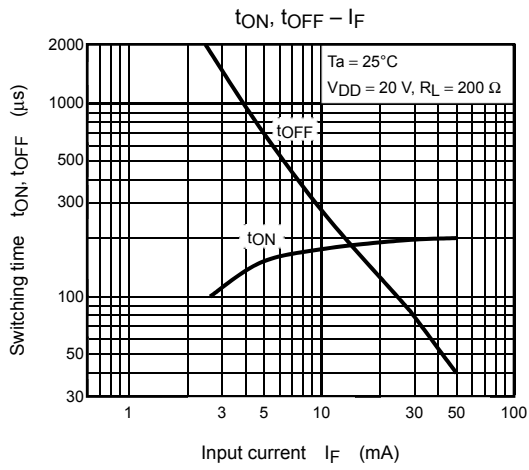
## Switching Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	$t_{ON}$	$R_L = 200 \Omega$	(Note 2)	—	—	1	ms
Turn-off time	$t_{OFF}$	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$		—	—	3	ms

Note 2: Switching time test circuit







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