TOSHIBA Photocoupler Photorelay

# TLP4597G

PBX

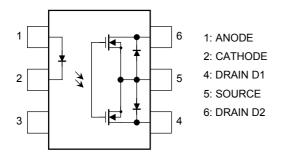
Telecommunication Modem · FAX Cards, Modems In PC Measurement Instrumentation

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).

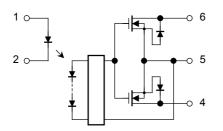
The TLP4597G is a bi-directional switch can replace mechanical relays in many applications.

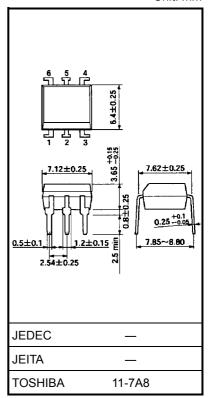
- 6 pin DIP (DIP6)
- 1-form-B
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 150 mA (max)
- On-state resistance:  $25 \Omega$  (max)
- Isolation voltage: 2500 Vrms (min)
- UL recognized: UL1577, File No. E67349

#### Pin Configuration (top view)



#### Schematic





Weight: 0.4 g (typ.)

Unit: mm

## Maximum Ratings (Ta = 25°C)

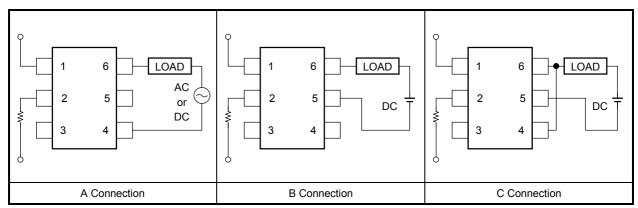
Characteristics			Symbol	Rating	Unit
LED	Forward current		١ <sub>F</sub>	50	mA
	Forward current d (Ta≧25°C)	erating	∆I <sub>F</sub> /°C	-0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)		I <sub>FP</sub>	1	A
	Reverse voltage		V <sub>R</sub>	5	V
	Junction temperat	ure	Tj	125	°C
	Off-state output te	rminal voltage	V <sub>OFF</sub>	350	V
	On-state current	A connection	I <sub>ON</sub>	150	
		B connection		150	mA
ctor		C connection		300	
Detector	On-state current derating (Ta ≧ 25°C)	A connection		-1.5	
		B connection	$\Delta I_{ON}/^{\circ}C$	-1.5	mA/°C
		C connection		-3.0	
	Junction temperat	ure	Tj	125	°C
Operating temperature range			T <sub>opr</sub>	-40 to 85	°C
Storage temperature range			T <sub>stg</sub>	-55 to 125	°C
Lead soldering temperature (10 s)			T <sub>sol</sub>	260	°C
Isola (AC,	tion voltage 1 min, R.H. ≦ 60%	) (Note 1)	BVS	2500	Vrms

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	Тур.	Max	Unit
Supply voltage	V <sub>DD</sub>		_	280	V
Forward current	١ <sub>F</sub>	5	_	25	mA
On-state current	I <sub>ON</sub>	_	_	150	mA
Operating temperature	T <sub>opr</sub>	-20	_	65	°C

#### **Circuit Connections**



**TOSHIBA** 

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

	Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
LED	Forward voltage	VF	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
	Reverse current	I <sub>R</sub>	$V_R = 5 V$			10	μA
	Capacitance	CT	V = 0, f = 1 MHz	_	30	_	pF
Detec- tor	Off-state current	I <sub>OFF</sub>	$V_{OFF} = 350 \text{ V}, \text{ I}_F = 5 \text{ mA}$		_	1	μA
	Capacitance	C <sub>OFF</sub>	$V=0,f=1MHz,I_F=5mA$		65	_	pF

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

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current		I <sub>FC</sub>	I <sub>OFF</sub> = 10 μA	_	1	3	mA
Return LED current		I <sub>FT</sub>	I <sub>ON</sub> = 150 mA	0.1	_	_	mA
	A connection		I <sub>ON</sub> = 150 mA	_	15	25	
On-state resistance	B connection		I <sub>ON</sub> = 150 mA	_	8	14	Ω
	C connection		I <sub>ON</sub> = 300 mA	_	4	_	

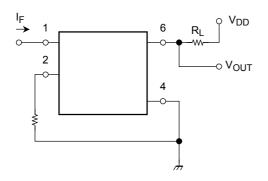
# Isolation Characteristics (Ta = 25°C)

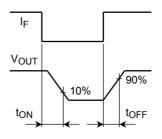
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	C <sub>S</sub>	$V_{S} = 0, f = 1 MHz$		0.8	_	pF
Isolation resistance	R <sub>S</sub>	$V_S = 500 \text{ V}, \text{ R.H.} \leq 60\%$	$5\times 10^{10}$	10 <sup>14</sup>		Ω
	BVS	AC, 1 min	2500	_	_	Vrms
Isolation voltage		AC, 1 s, in oil		5000	_	VIIIS
		DC, 1 min, in oil	_	5000	_	Vdc

## Switching Characteristics (Ta = 25°C)

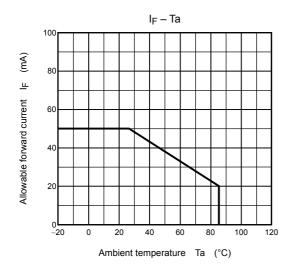
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	t <sub>ON</sub>	$R_L = 200 \ \Omega$ (Note 2	) —	_	1	ms
Turn-off time	t <sub>OFF</sub>	$V_{DD} = 20 \text{ V}, \text{ I}_{\text{F}} = 5 \text{ mA}$	—		3	ms

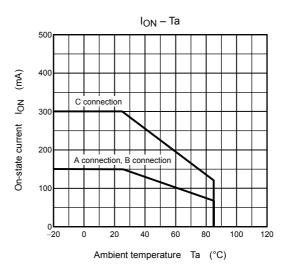
Note 2: Switching time test circuit

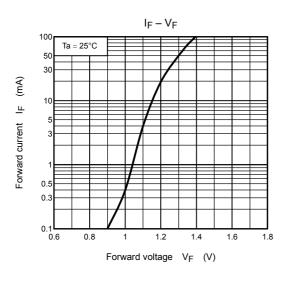


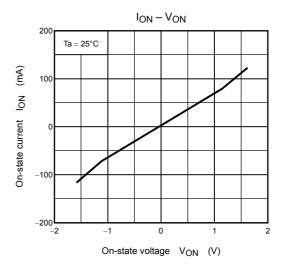


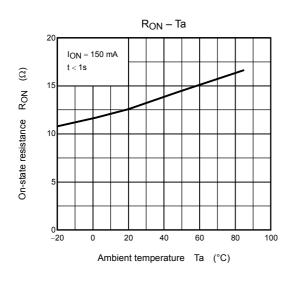
# **TOSHIBA**

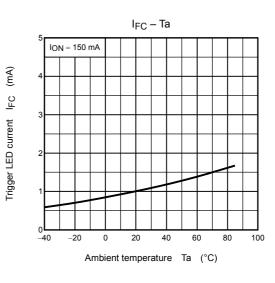




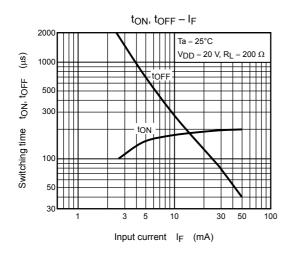


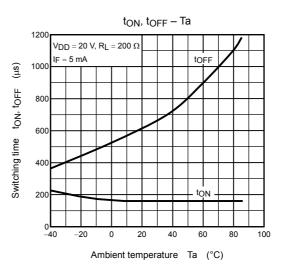


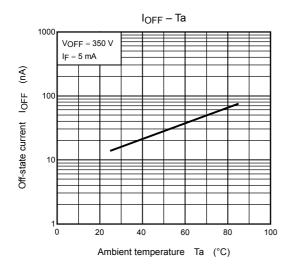




# **TOSHIBA**







#### **RESTRICTIONS ON PRODUCT USE**

000707EBC

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.