TOSHIBA Photocoupler Photorelay

# **TLP4197G**

#### **PBX**

Telecommunication

Modem·FAX Cards, Modems In PC

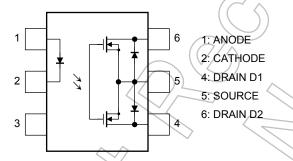
Measurement Instrumentation

The TOSHIBA TLP4197G consists of an infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

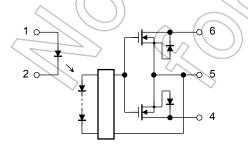
The TLP4197GA is suitable for replacement of mechanical relays in many applications which require space savings.

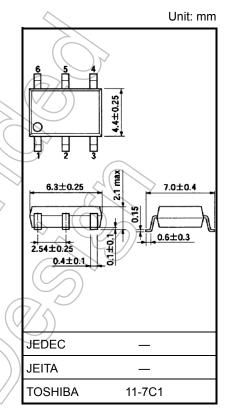
- 6 pin SOP (2.54SOP6): 2.1 mm high, 2.54 mm pitch
- 1-form-B
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- On-state resistance: 25 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349

## Pin Configuration (top view)



#### **Schematic**





Weight: 0.13 g (typ.)

Start of commercial production 2001-05

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

	Character	istics	Symbol	Rating	Unit	
	Forward current		lF	50	mA	
	Forward current derating (Ta ≥ 25°C)		ΔIF/°C	-0.5	mA/°C	
	Peak forward current (100 µs pulse, 100 pps)		IFP	1	Α	
LED	Reverse voltage		$V_{R}$	5	V	
	Diode power dis	sipation	$P_D$	50	mW	
	Diode power dissipation derating (Ta ≥ 25°C)		ΔP <sub>D</sub> /°C	-0.5	mW/°C	(7/5)
	Junction temper	ature	Tj	125	°C	
	Off-state output	terminal voltage	Voff	350	V	
		A connection		120		
	On-state current	B connection	- 011	120	mA	
		C connection		240		
	On-state current	A connection	Δl <sub>ON</sub> /°C	-1.2	770	
	derating	B connection		-1.2	mA/°C	4.00
ţor	(Ta ≥ 25°C)	C connection		-2.4		401
Detector		A connection		360	$\rightarrow$	
	Output power dissipation	B connection	Po	201	> mW	
		C connection		403		
	Output power	A connection		-3.6		$(\vee/)$
	dissipation derating	B connection	ΔPo /°C <	-2.0	mW /°C	
	(Ta ≥ 25°C)	C connection		-4.0		
	Junction temperature		т) (	125	°C	//
Operating temperature range		Topr	-40 to 85	°C	<b>\</b>	
Storage temperature range		( T <sub>stg</sub>	-55 to 125	)°C		
Lead soldering temperature (10 s)		T <sub>sol</sub>	260	3,0		
Isolation voltage (AC, 60 s, R.H. ≤ 60 %) (Note 1)		BVs	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).

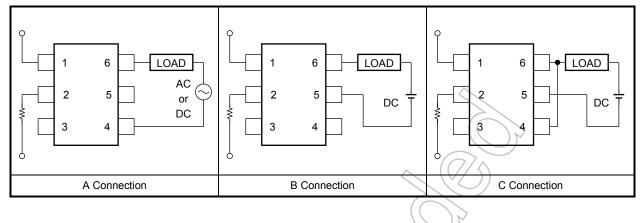
Note 1: Device considered a two-terminal device: LED side pins shorted together, and DETECTOR side pins and 6 shorted together.

#### **Recommended Operating Conditions**

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	$V_{DD}$	_	_	280	V
Forward current	lF	5	-	25	mA
On-state current	Ion	_	_	120	mA
Operating temperature	Topr	-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**





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

	Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
	Forward voltage	VF	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	IR	V <sub>R</sub> = 5 V	_	_	10	μΑ
	Capacitance	CT	V <sub>F</sub> = 0 V, f = 1 MHz	/-	30	_	pF
ctor	Off-state current	loff	V <sub>OFF</sub> = 350 V, I <sub>F</sub> = 5 mA		/	1	μA
Detector	Capacitance	Coff	V = 0 V, f = 1 MHz, IF = 5 mA		65	_	pF

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

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current		IFC	IOFF = 10 μA	_	(1	3	mA
Return LED current		lFT	ION = 120 mA	0.1	1	_	mA
	A connection		ION = 120 mA	+(	))15	25	
On-state resistance	B connection	Ron	ION = 120 mA	7	(8)/	14	Ω
	C connection		I <sub>ON</sub> = 240 mA	7	> 4	_	

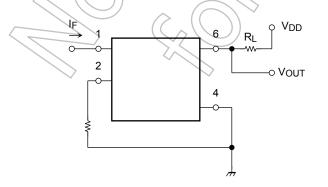
## Isolation Characteristics (Ta = 25°C)

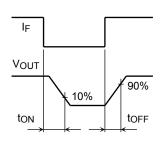
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	Cs	V <sub>S</sub> = 0 V, f = 1 MHz	_	8.0	_	pF
Isolation resistance	Rs	V <sub>S</sub> = 500 V, R.H. ≦ 60 %	5 × 10 <sup>10</sup>	10 <sup>14</sup>	_	Ω
Isolation voltage	BVS	AC, 60 s	1500	_	_	Vrms

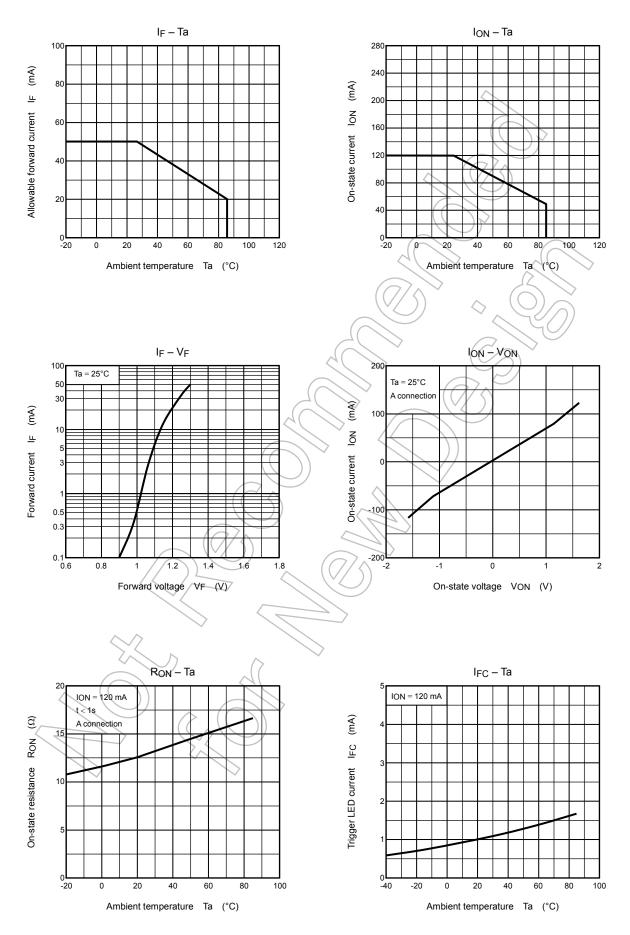
## Switching Characteristics (Ta = 25°C)

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

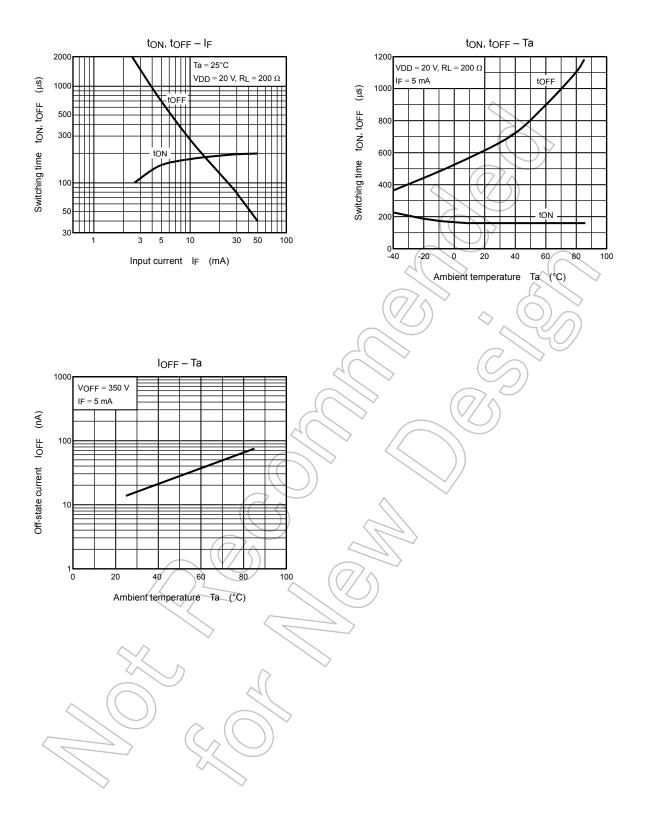
Note 2: Switching time test circuit







NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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