

TOSHIBA Photocoupler Photorelay

TLP4197G

PBX

Telecommunication

Modem · FAX Cards, Modems In PC

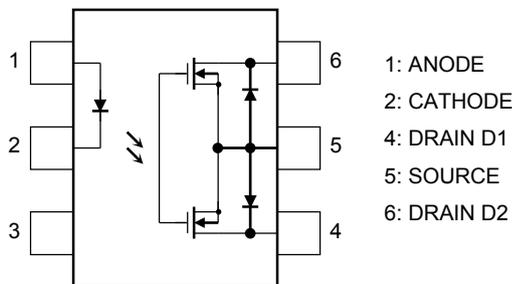
Measurement Instrumentation

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

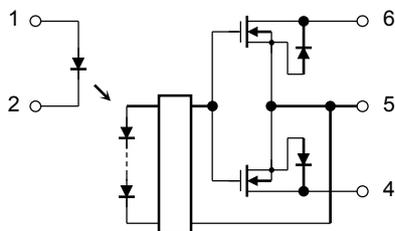
The TLP4197GA is suitable for replacement of mechanical relays in many applications which require space savings.

- 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 approved: UL1577, File No.E67349

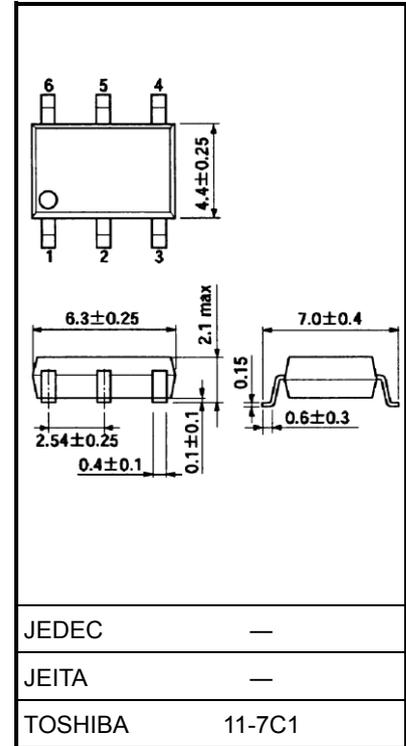
Pin Configuration (top view)



Schematic



Unit: mm



Weight: 0.13 g (typ.)

Start of commercial production
2001-05

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	
	Diode power dissipation	P_D	50	mW	
	Diode power dissipation derating (Ta ≥ 25°C)	$\Delta P_D / ^\circ\text{C}$	-0.5	mW/°C	
	Junction temperature	T_j	125	°C	
Detector	Off-state output terminal voltage	V_{OFF}	350	V	
	On-state current	A connection	I_{ON}	120	mA
		B connection		120	
		C connection		240	
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON} / ^\circ\text{C}$	-1.2	mA/°C
		B connection		-1.2	
		C connection		-2.4	
	Output power dissipation	A connection	P_O	360	mW
		B connection		201	
		C connection		403	
	Output power dissipation derating (Ta ≥ 25°C)	A connection	$\Delta P_O / ^\circ\text{C}$	-3.6	mW/°C
B connection		-2.0			
C connection		-4.0			
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	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).

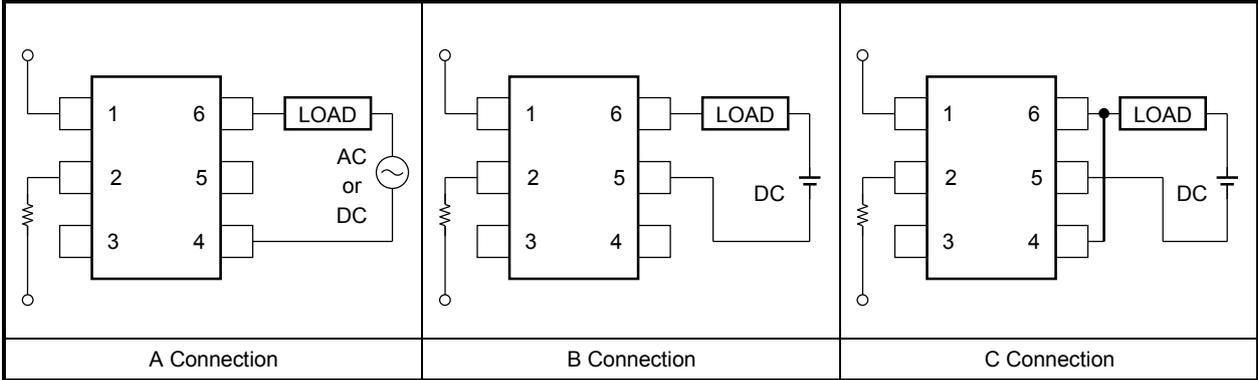
Note 1: Device considered a two-terminal device: LED side pins shorted together, and DETECTOR side pins and 6 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{DD}	—	—	280	V
Forward current	I_F	5	—	25	mA
On-state current	I_{ON}	—	—	120	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



Electrical Characteristics (Ta = 25°C)

Characteristics		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	C _T	V _F = 0 V, f = 1 MHz	—	30	—	pF
Detector	Off-state current	I _{OFF}	V _{OFF} = 350 V, I _F = 5 mA	—	—	1	μA
	Capacitance	C _{OFF}	V = 0 V, f = 1 MHz, I _F = 5 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 μA	—	1	3	mA
Return LED current		I _{FT}	I _{ON} = 120 mA	0.1	—	—	mA
On-state resistance	A connection	R _{ON}	I _{ON} = 120 mA	—	15	25	Ω
	B connection		I _{ON} = 120 mA	—	8	14	
	C connection		I _{ON} = 240 mA	—	4	—	

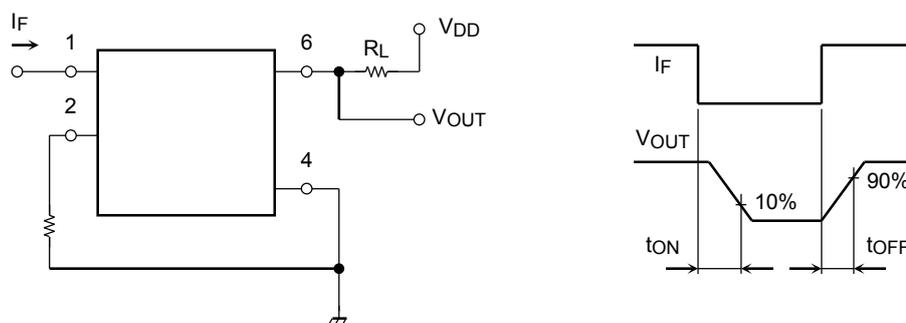
Isolation Characteristics (Ta = 25°C)

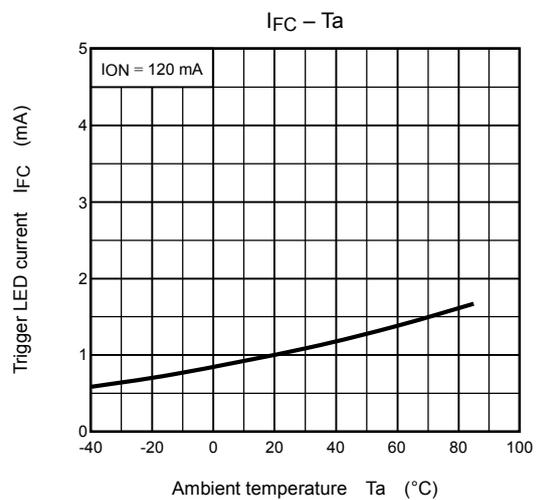
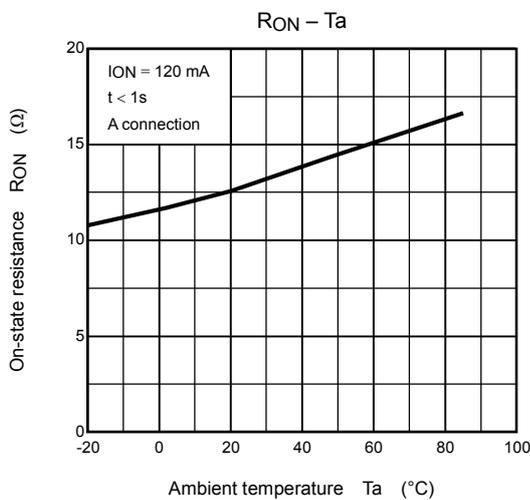
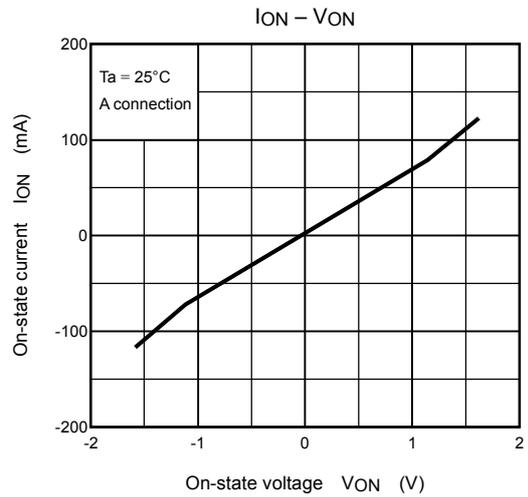
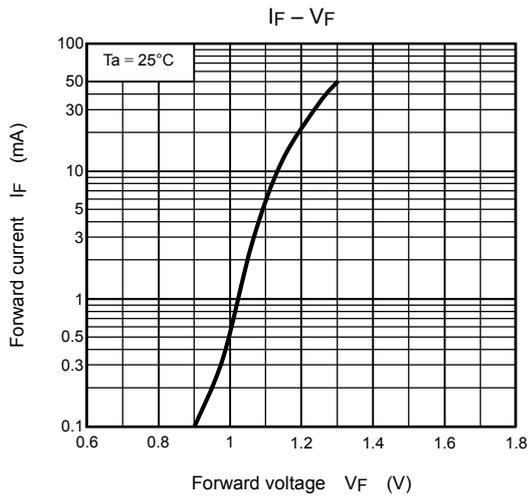
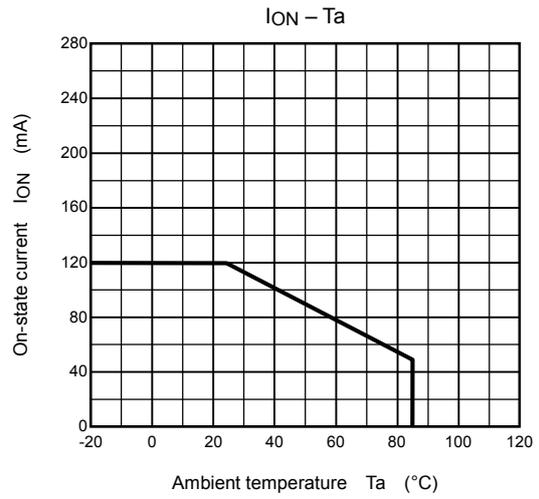
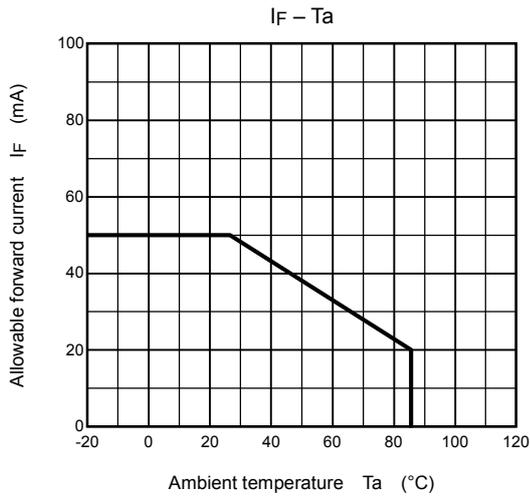
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output		C _S	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance		R _S	V _S = 500 V, R.H. ≤ 60%	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage		BV _S	AC, 1 minute	1500	—	—	V _{rms}
			AC, 1 second, in oil	—	3000	—	
			DC, 1 minute, in oil	—	3000	—	V _{dc}

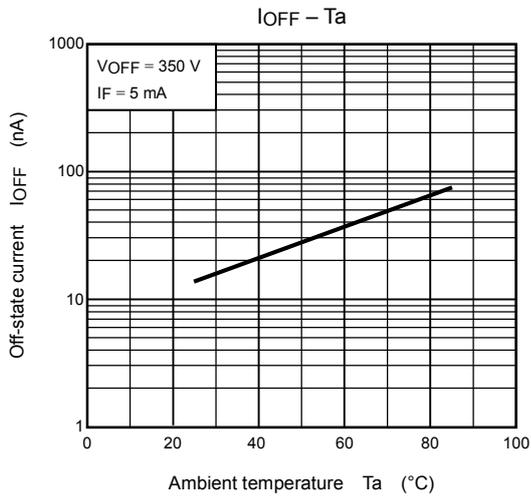
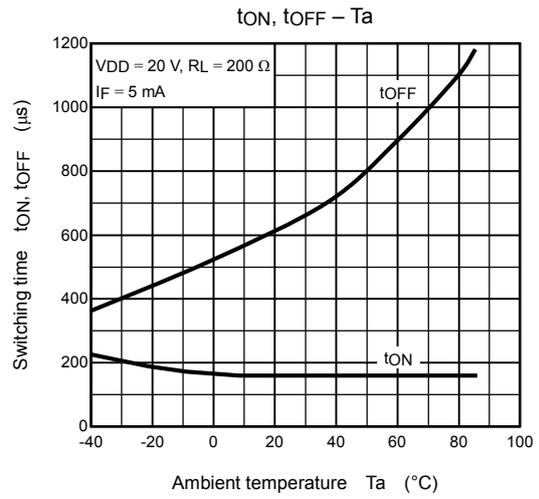
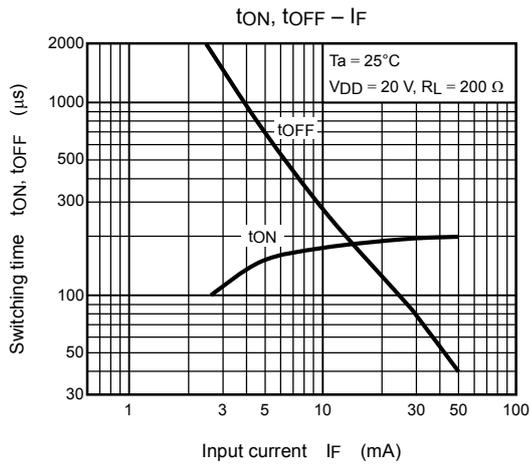
Switching Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t _{ON}	R _L = 200 Ω	(Note 2)	—	—	1	ms
Turn-off time	t _{OFF}	V _{DD} = 20 V, I _F = 5 mA		—	—	3	ms

Note 2: Switching time test circuit







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