TOSHIBA Photocoupler GaAs Ired & Photo-MOS FET

# **TLP197G**

Modem

Fax

**PBX** 

#### Measurement Instrumentation

The TOSHIBA mini flat photo relay TLP197G is a small outline photo relay, suitable for surface mount assembly. The TLP197G consists of an gallium arsenide infrared emitting diode optically coupled to a photo—MOS FET in a six lead 2.1mm height package, which enable TLP197G to be applied in card modems. The TLP197G is a bi—directional switch which can replace mechanical relays in fax machines and modems etc.

• SOP 6pin(2.54SOP6): 1-form-A

• Peak off-state voltage: 350V (min)

• Trigger LED current: 3mA (max)

• On-state current:120mA(max)

(A connection)

On-state resistance: 35Ω(max)

• Isolation voltage: 1500Vrms (min)

• UL recognized: UL1577, file No./E67349

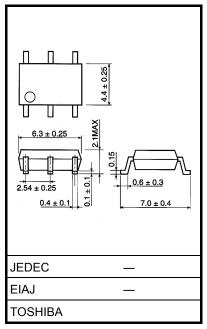
• BSI approved: BS EN60065: 2002, certificate No.8753

BS EN60950-1: 2002, certificate No.8754

• SEMKO approved: SS EN60065 SS EN60950

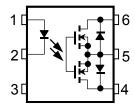
• Option(V4)type

TUV approved: DIN EN 60747-5-2 Certificate no. 40009351 Unit in mm



Weight: 0.13g

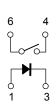
### Pin Configuration (top view)



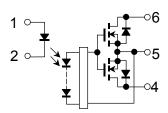
1 : Anode 2 : Cathode

3 : NC 4 : Drain D1

5 : Source 6 : Drain D2 1-Form-a



#### **Schematic**



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

Characteristics			Symbol	Rating	Unit	
	Forward current	lF	50	mA		
	Forward current derating (Ta ≥ 25°C)	ΔI <sub>F</sub> /°C	-0.5	mA/°C		
Led	Pulse forward current (100µs pulse,100	pps)	IFP	1	Α	
	Reverse voltage		V <sub>R</sub>	5	V	
	Junction temperature		Tj	125	°C	
	Off-state output terminal voltage	V <sub>OFF</sub>	350	V		
		A connection		120		
	On-state current	B connection	I <sub>ON</sub>		mA	
ctor		C connection				
Detector		A connection	Δl <sub>ON</sub> /°C	-1.2		
	On–state current derating (Ta ≥ 25°C)	B connection			mA/°C	
		C connection				
	Junction temperature	Tj	125	°C		
Storage temperature range			T <sub>stg</sub>	-55~125	°C	
Operating temperature range			T <sub>opr</sub>	<b>−40~85</b>	°C	
Lead soldering temperature(10 s)			T <sub>sol</sub>	260	°C	
Isola	Isolation voltage (AC,1 min.,RH ≤ 60%) (Note 1)			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).

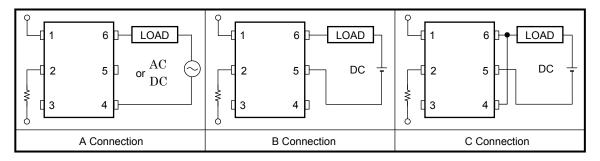
(Note 1): Device considered a two-terminal device: Pins1,2 and 3 shorted together and pins 4,5 and 6 shorted together.

### **Recommended Operating Conditions**

Characteristic	Symbol	Min.	Тур.	Max.	Unit
Supply voltage	V <sub>OFF</sub>	_	_	280	V
Forward current	lF	5	7.5	25	mA
On-state current(A connection)	I <sub>ON</sub>	_	_	100	mA
Operating temperature	T <sub>opr</sub>	-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)

	Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
	Forward voltage	$V_{F}$	I <sub>F</sub> =10mA	1.0	1.15	1.3	V
Led	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5V	_	_	10	μΑ
	Capacitance	C <sub>T</sub>	V=0, f=1MHz	_	30	_	pF
Detector	Off-state current	l <sub>OFF</sub>	V <sub>OFF</sub> =350V	l	l	1	μА
Dete	Capacitance	C <sub>OFF</sub>	V=0, f=1MHz	ı	40		pF

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

Characteristic		Symbol	Test Condition	Min.	Тур.	Max.	Unit
Trigger LED current		I <sub>FT</sub>	I <sub>ON</sub> =120mA	_	1	3	mA
	Α		I <sub>ON</sub> =120mA, I <sub>F</sub> =5mA	_	22	35	
On–state resistance	connection	R <sub>ON</sub>	I <sub>ON</sub> =20~120mA, I <sub>F</sub> =5mA	_	26	40	Ω

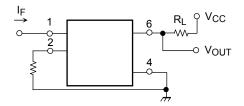
# Isolation Characteristics (Ta = 25°C)

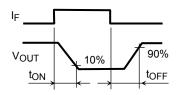
Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Capacitance input to output	CS	V <sub>S</sub> =0, f=1MHz	_	0.8	_	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> =500V, R.H. ≦ 60%	5×10 <sup>10</sup>	10 <sup>14</sup>	_	Ω
	BVS	AC,1minute	1500	_	_	.//
Isolation voltage		AC,1second (in oil)	_	3000	_	V <sub>rms</sub>
		DC,1minute (in oil)	_	3000	_	$V_{dc}$

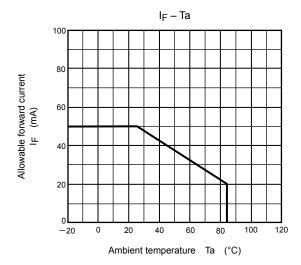
# **Switching Characteristics (Ta = 25°C)**

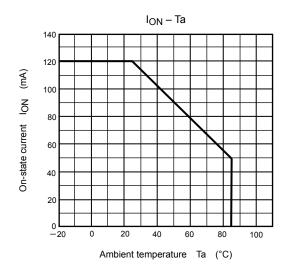
Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Turn-on time	t <sub>ON</sub>	$R_L=200\Omega$ (Note 2)	2) —	0.3	1	ms
Turn-off time	toff	V <sub>CC</sub> =20V, I <sub>F</sub> =5mA	_	0.1	1	1113

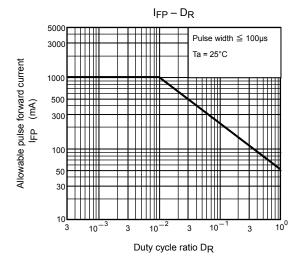
(Note2): Switching time test circuit

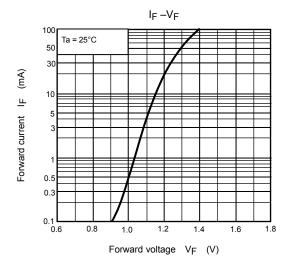


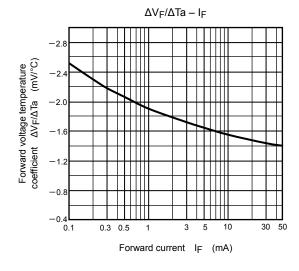


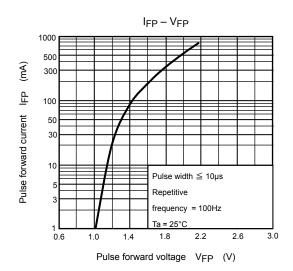




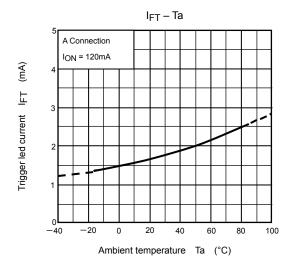


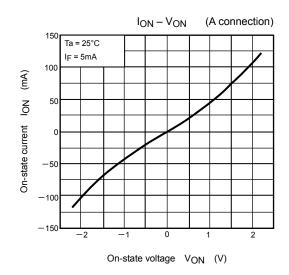


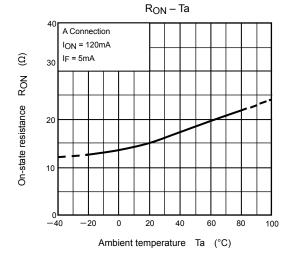


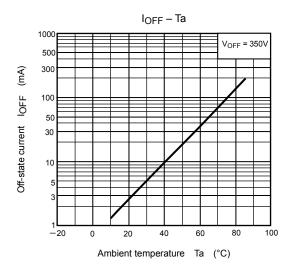


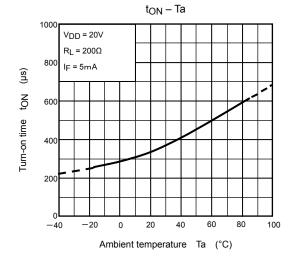
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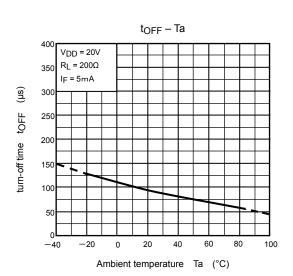












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