

# TLP197G

Modem

Fax

PBX

Measurement Instrumentation

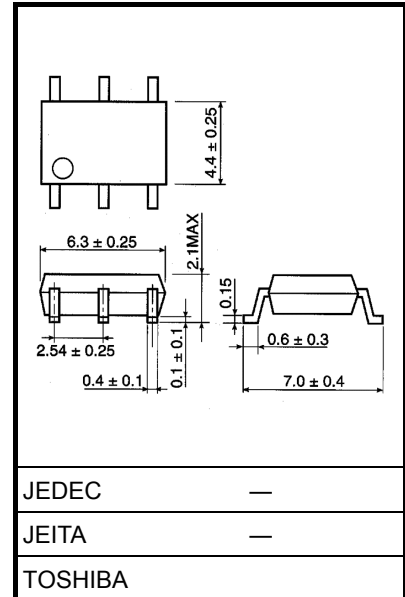
The TOSHIBA mini flat photo relay TLP197G is a small outline photo relay, suitable for surface mount assembly.

The TLP197G consists of a 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.

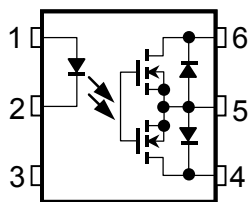
- SOP 6pin(2.54SOP6): 1-form-A
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max) (A connection)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1577, file No.E67349
- BSI approved: BS EN60065: 2002, certificate 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: mm



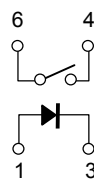
Weight: 0.13g (typ.)

## Pin Configuration (top view)

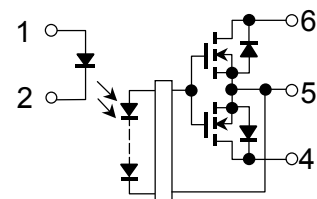


- 1 : Anode
- 2 : Cathode
- 3 : NC
- 4 : Drain D1
- 5 : Source
- 6 : Drain D2

1-Form-a



## Schematic



Start of commercial production  
1996/03

## 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	
	Pulse forward current (100µs pulse, 100pps)	$I_{FP}$	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	$I_{ON}$	120	mA
		B connection			
		C connection			
	On-state current derating (Ta ≥ 25°C)	A connection	$\Delta I_{ON}/^\circ\text{C}$	-1.2	mA/°C
		B connection			
		C connection			
Junction temperature	$T_j$	125	°C		
Storage temperature range	$T_{stg}$	-55 to 125	°C		
Operating temperature range	$T_{opr}$	-40 to 85	°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).

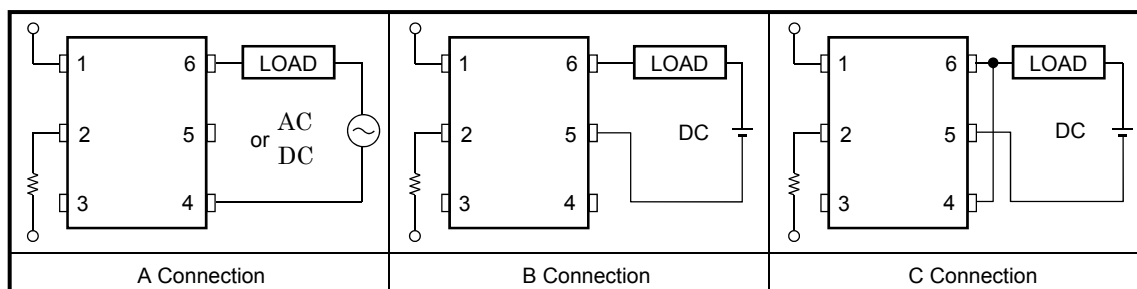
(Note 1): Device considered a two-terminal device: Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

## Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	$V_{OFF}$	—	—	280	V
Forward current	$I_F$	5	7.5	25	mA
On-state current(A connection)	$I_{ON}$	—	—	100	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)

Characteristic		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	$I_{OFF}$	$V_{OFF}=350\text{V}$	—	—	1	$\mu\text{A}$
	Capacitance	$C_{OFF}$	$V=0, f=1\text{MHz}$	—	40	—	pF

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		$I_{FT}$	$I_{ON}=120\text{mA}$	—	1	3	mA
On-state resistance	A connection	$R_{ON}$	$I_{ON}=120\text{mA}, I_F=5\text{mA}$	—	22	35	$\Omega$
			$I_{ON}=20\sim 120\text{mA}, I_F=5\text{mA}$	—	26	40	

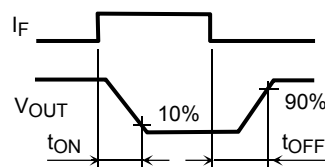
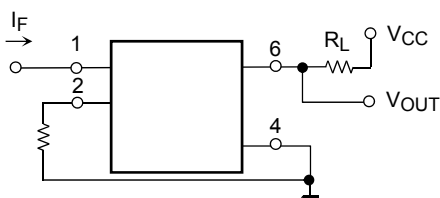
## Isolation Characteristics (Ta = 25°C)

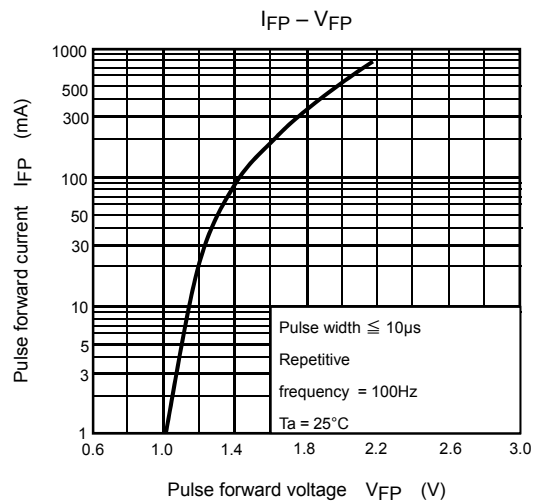
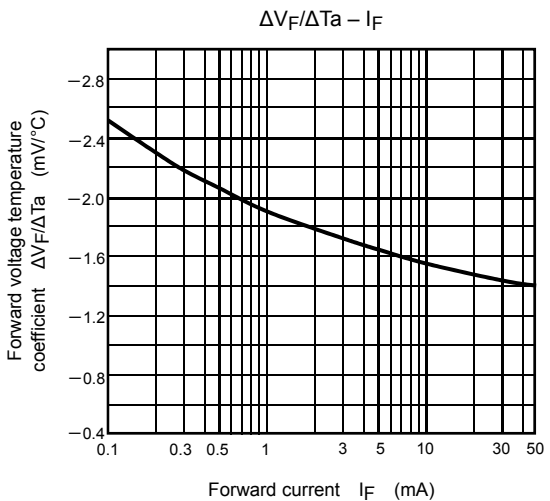
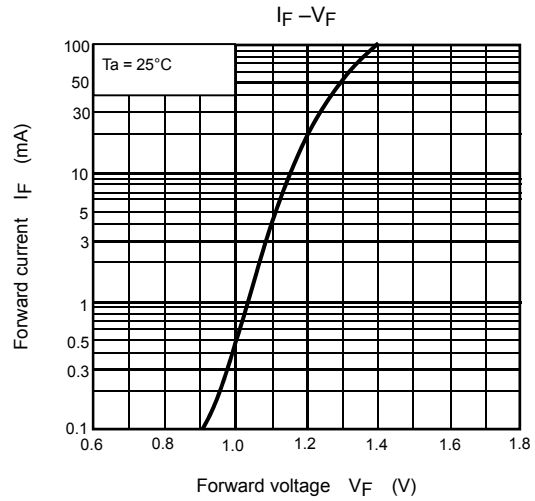
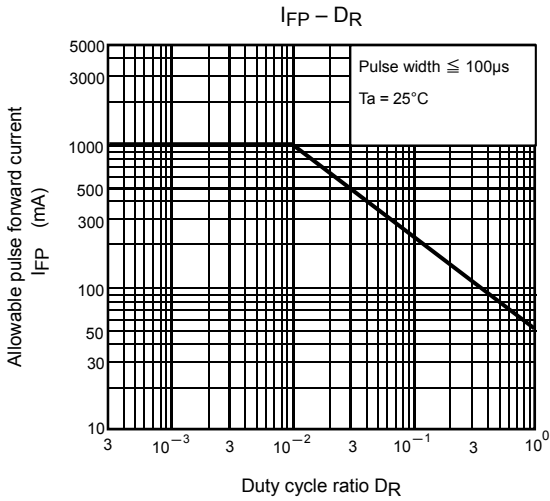
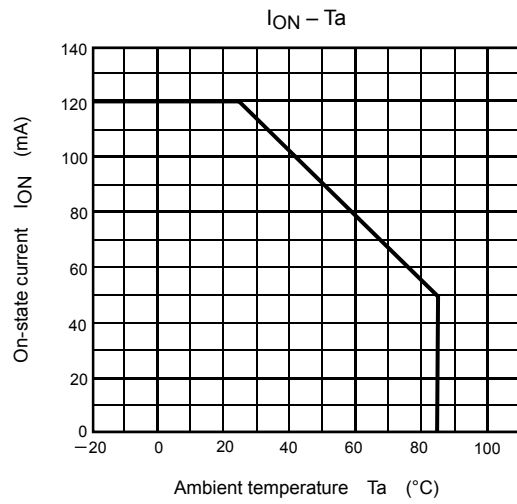
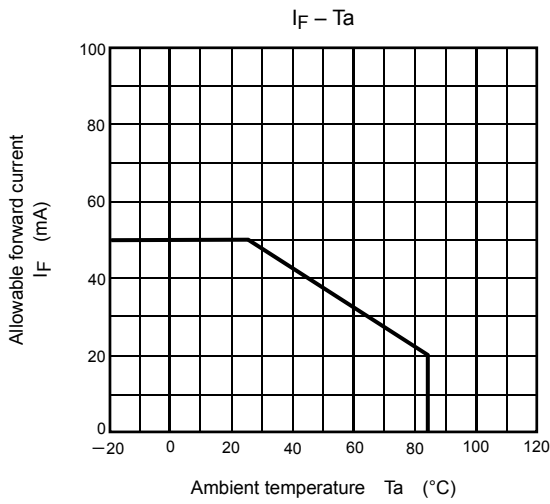
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	$C_S$	$V_S=0, f=1\text{MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S=500\text{V}, \text{R.H.} \leq 60\%$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	1500	—	—	$V_{rms}$
		AC, 1 second (in oil)	—	3000	—	
		DC, 1 minute (in oil)	—	3000	—	$V_{dc}$

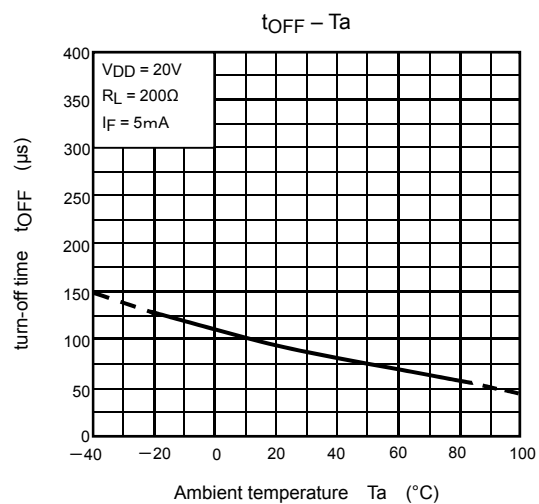
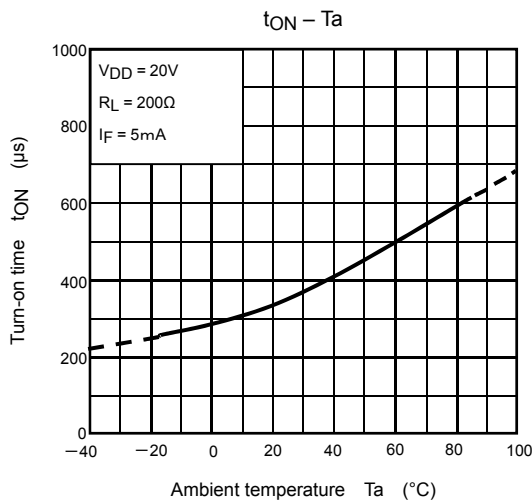
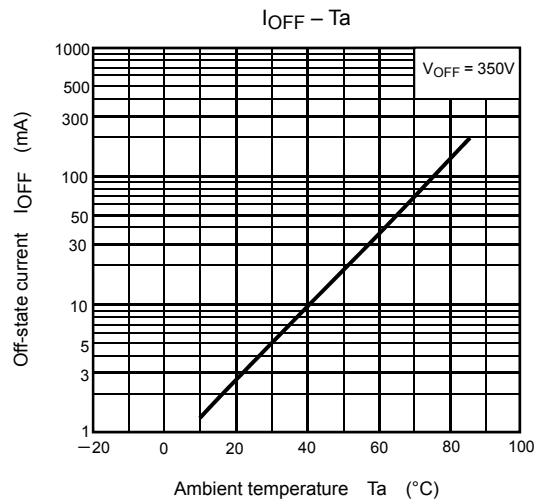
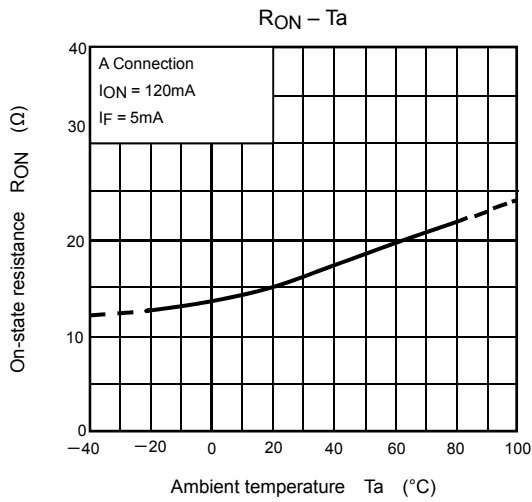
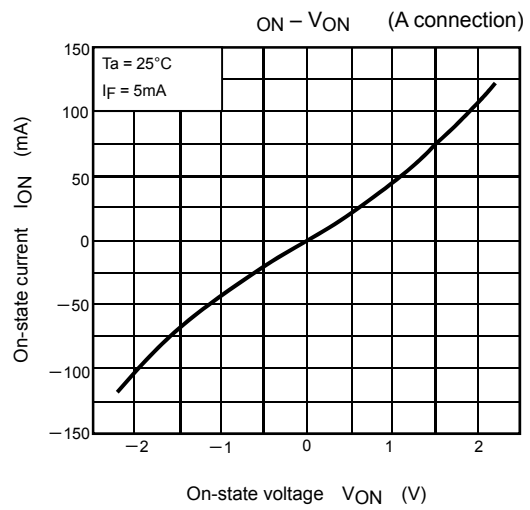
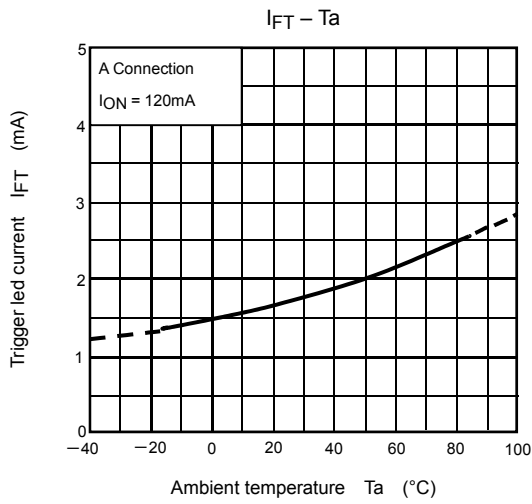
## Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	$t_{ON}$	$R_L=200\Omega$ (Note 2)	—	0.3	1	ms
Turn-off time	$t_{OFF}$	$V_{CC}=20\text{V}, I_F=5\text{mA}$	—	0.1	1	

(Note2): Switching time test circuit







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