

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.

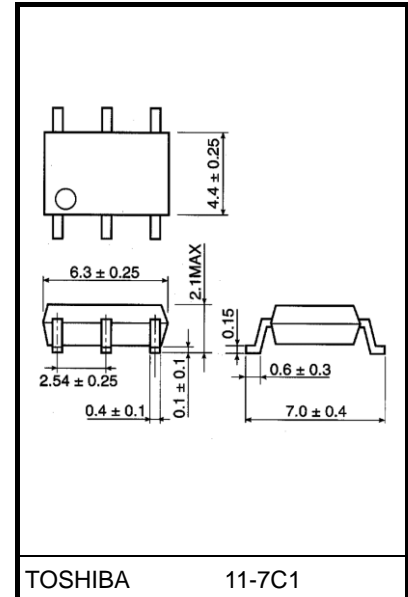
The TLP197G consists of a gallium arsenide infrared emitting diode optically coupled to a photo—MOS FET in a six lead 2.1mm height package, which enable TLP197G to be applied in card modems.

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 approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service
No. 5A, File No.E67349
- Option (V4) VDE approved : DIN EN60747-5-5 (Note1)

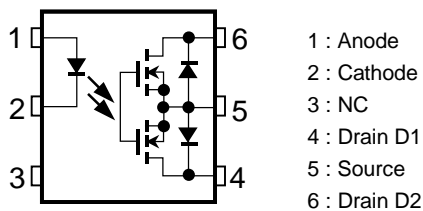
Note 1 : When a EN60747-5-5 approved type is needed, please designate “Option(V4)”

Unit: mm

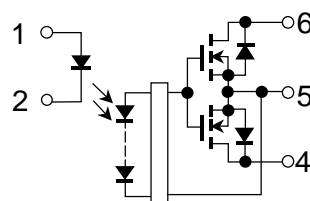


Weight: 0.13g (typ.)

Pin Configuration (top view)



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)		ΔI _F /°C	−0.5	mA/°C
	Pulse forward current (100μs pulse,100pps)		I _{FP}	1	A
	Reverse voltage		V _R	5	V
	Diode power dissipation		P _D	50	mW
	Diode power dissipation derating (Ta >25°C)		ΔP _D /°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			
		C connection			
	On-state current derating (Ta ≥ 25°C)	A connection	ΔI _{ON} /°C	−1.2	mA/°C
		B connection			
		C connection			
	Output power dissipation	A connection	P _O	300	mW
		B connection			
		C connection			
	Output power dissipation derating (Ta ≥ 25°C)	A connection	Δ P _O /°C	-3.0	mW /°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	V _{rms}	

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).

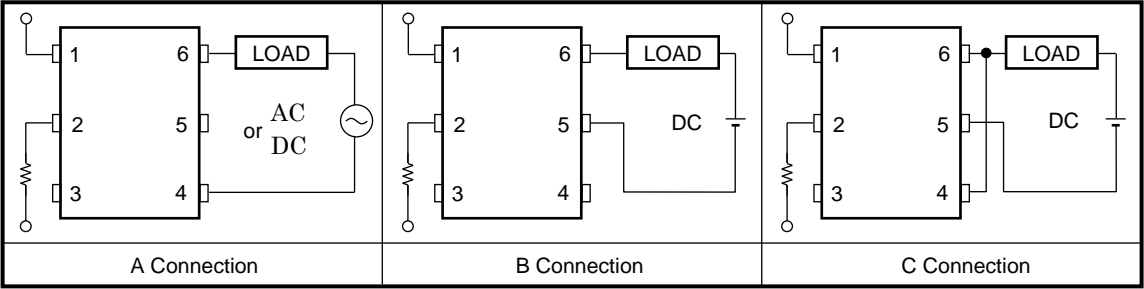
Note 1: Device considered a two-terminal device: Pins1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _{CC}	—	—	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	μA
	Capacitance	C_T	$V_F=0\text{V}$, $f=1\text{MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF}=350\text{V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V=0\text{V}$, $f=1\text{MHz}$	—	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	Ω
			$I_{ON}=20$ to 120mA , $I_F=5\text{mA}$	—	26	40	

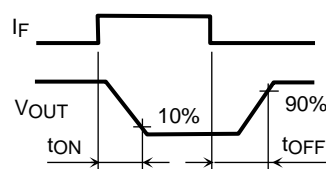
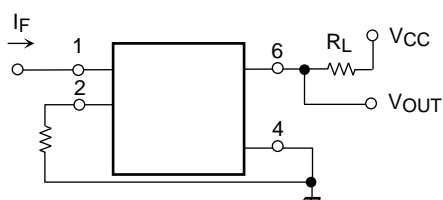
Isolation Characteristics (Ta = 25°C)

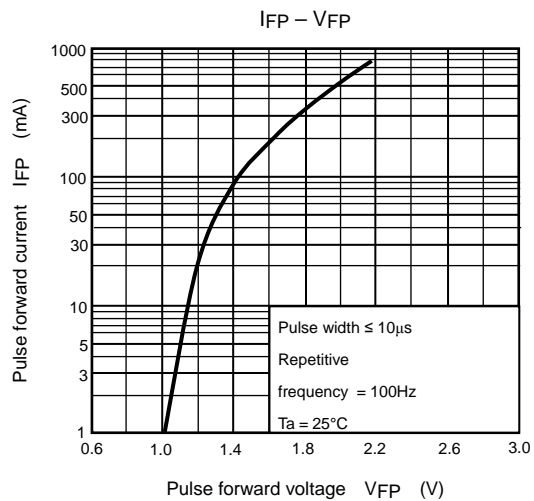
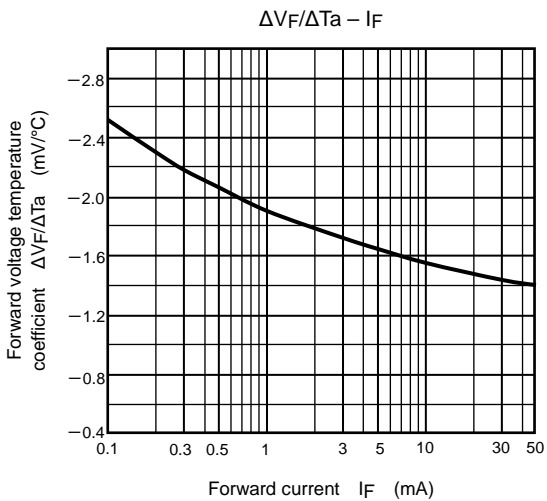
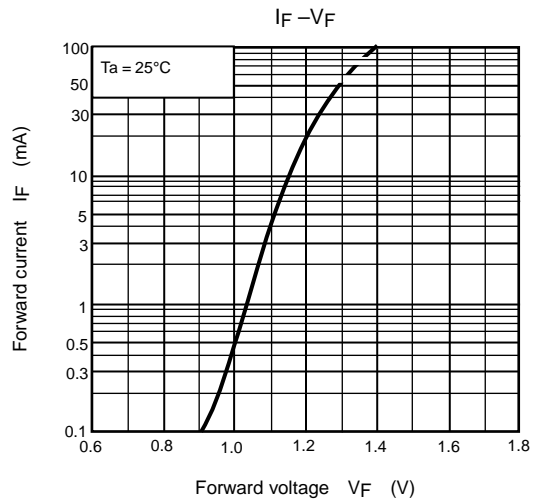
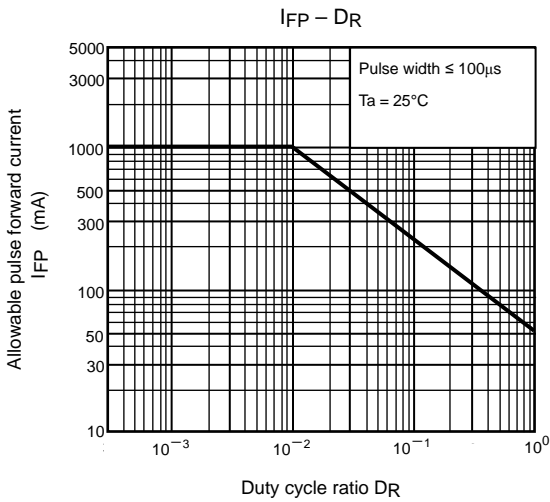
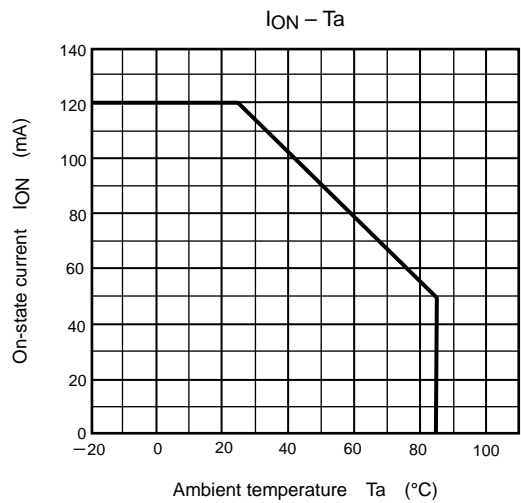
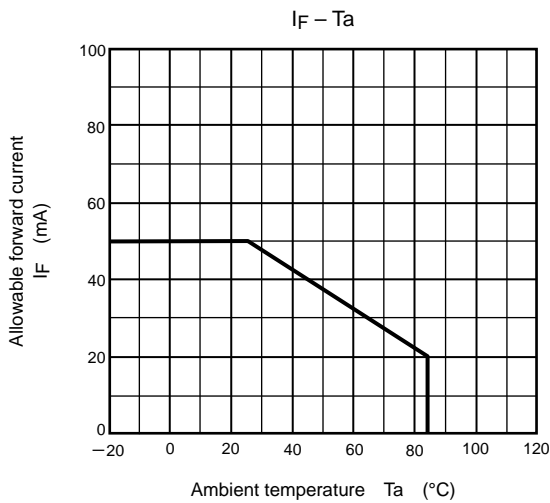
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S=0\text{V}$, $f=1\text{MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S=500\text{V}$, R.H. $\leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	1500	—	—	V_{rms}
		AC, 1 second (in oil)	—	3000	—	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

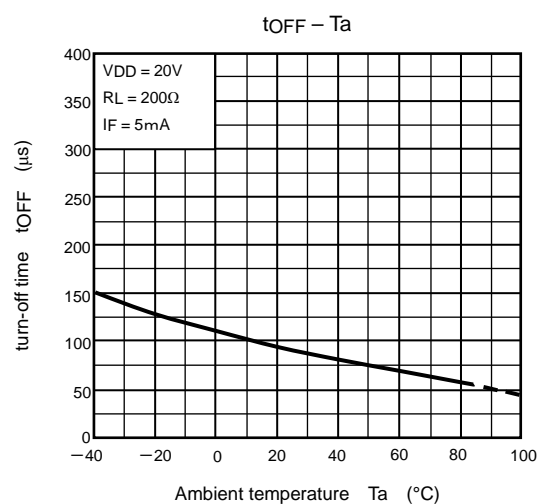
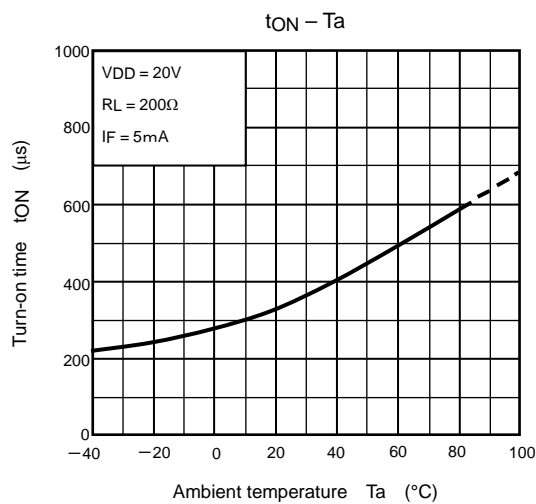
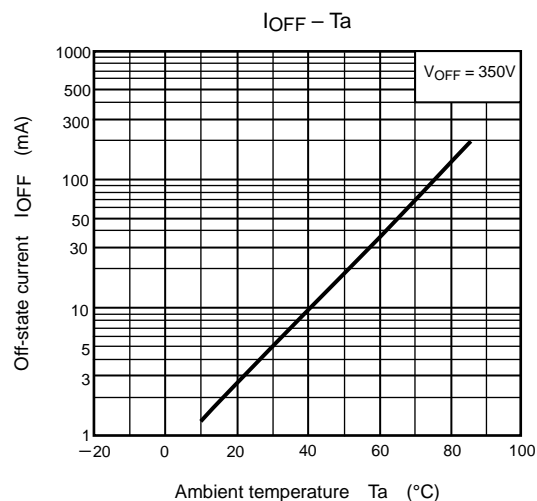
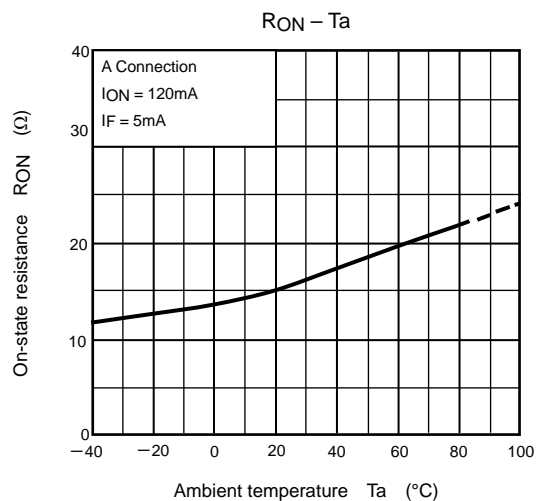
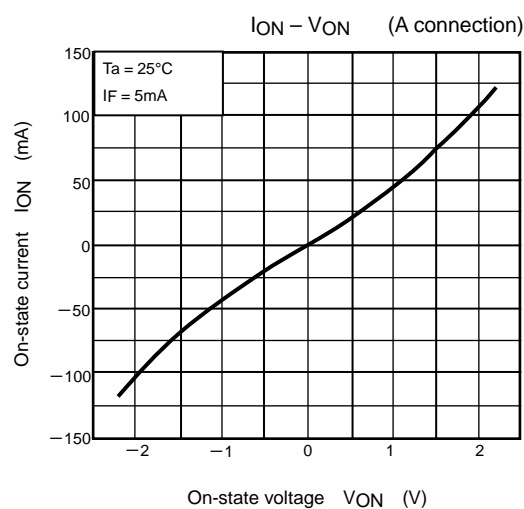
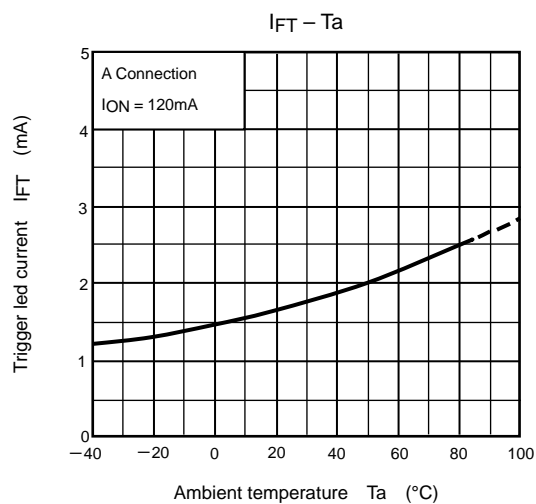
Switching Characteristics (Ta = 25°C)

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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