

TOSHIBA Photocoupler Photorelay

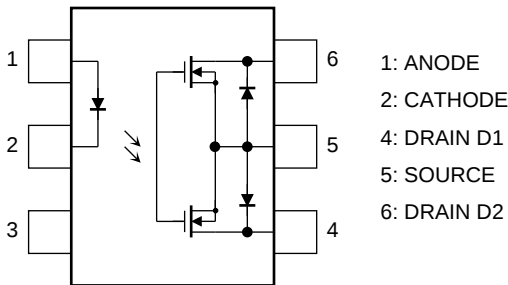
TLP4597G

PBX
Telecommunication
Modem • FAX Cards, Modems In PC
Measurement Instrumentation

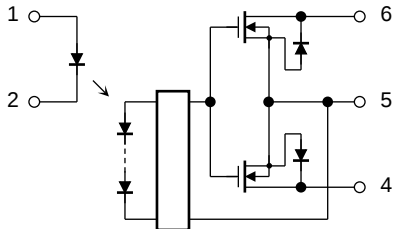
The TOSHIBA TLP4597G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a six lead plastic DIP package (DIP6).
The TLP4597G is a bi-directional switch which can replace mechanical relays in many applications.

- 6 pin DIP (DIP6)
- 1-form-B
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 150 mA (max)
- On-state resistance: 25 Ω (max)
- Isolation voltage: 2500 Vrms (min)
- UL recognized: UL1577, File No. E67349

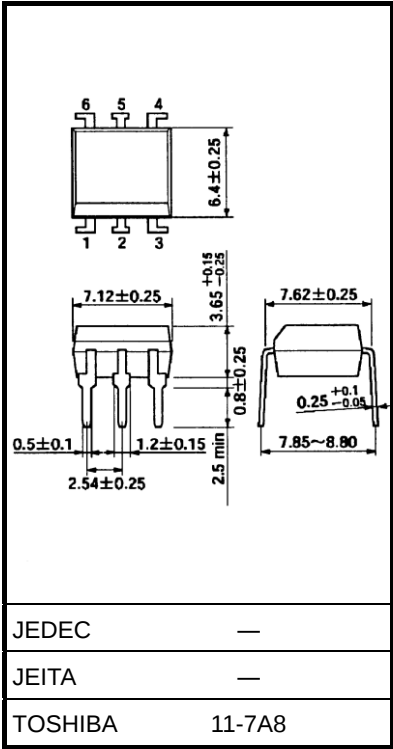
Pin Configuration (top view)



Schematic



Unit: mm



Weight: 0.4 g (typ.)

Start of commercial production
2000-09

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
	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)		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}	150	mA
		B connection		150	
		C connection		300	
	On-state current derating (Ta ≥ 25°C)	A connection	ΔI _{ON} /°C	−1.5	mA/°C
		B connection		−1.5	
		C connection		−3.0	
	Output power dissipation	A connection	P _O	506	mW
		B connection		283	
		C connection		567	
	Output power dissipation derating (Ta ≥ 25°C)	A connection	ΔP _O /°C	-5.06	mW/°C
		B connection		-2.83	
		C connection		-5.67	
	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	2500	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).

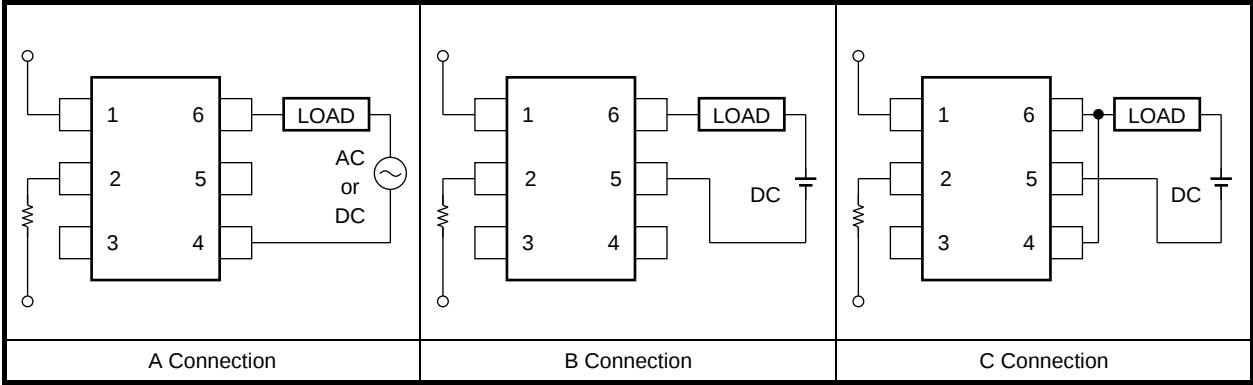
Note 1: Device considered a two-terminal device: LED side pins shorted together, and DETECTOR side pins shorted together.

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}	—	—	150	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)

Characteristics		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	$V = 0\text{ V}$, $f = 1\text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 350\text{ V}$, $I_F = 5\text{ mA}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0\text{ V}$, $f = 1\text{ MHz}$, $I_F = 5\text{ mA}$	—	65	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		I_{FC}	$I_{OFF} = 10\text{ }\mu\text{A}$	—	1	3	mA
Return LED current		I_{FT}	$I_{ON} = 150\text{ mA}$	0.1	—	—	mA
On-state resistance	A connection	R_{ON}	$I_{ON} = 150\text{ mA}$	—	15	25	Ω
	B connection		$I_{ON} = 150\text{ mA}$	—	8	14	
	C connection		$I_{ON} = 300\text{ mA}$	—	4	—	

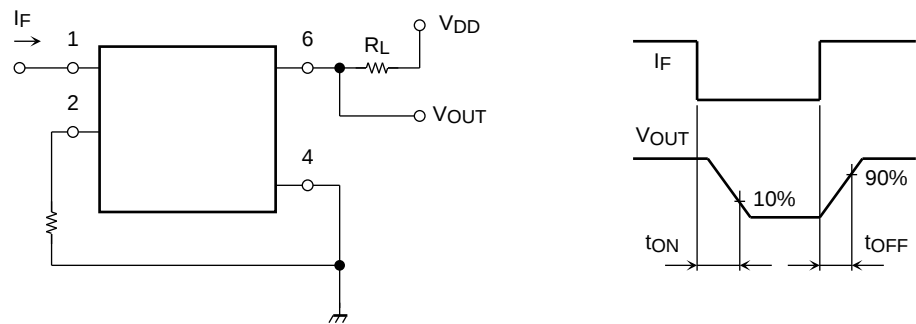
Isolation Characteristics (Ta = 25°C)

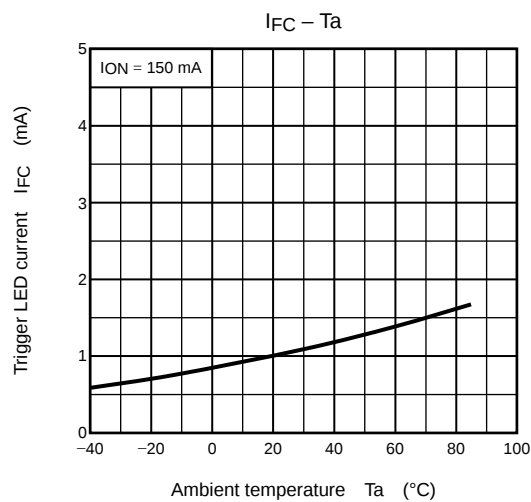
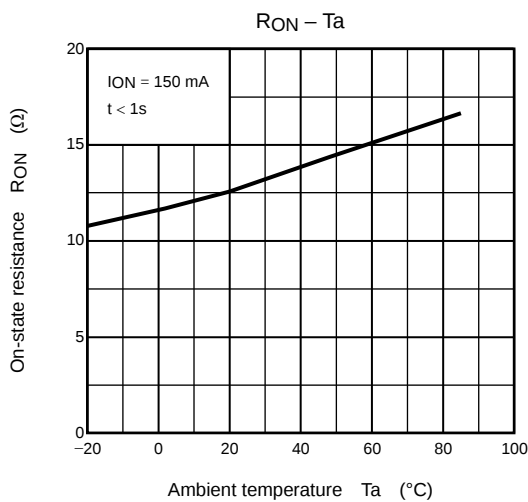
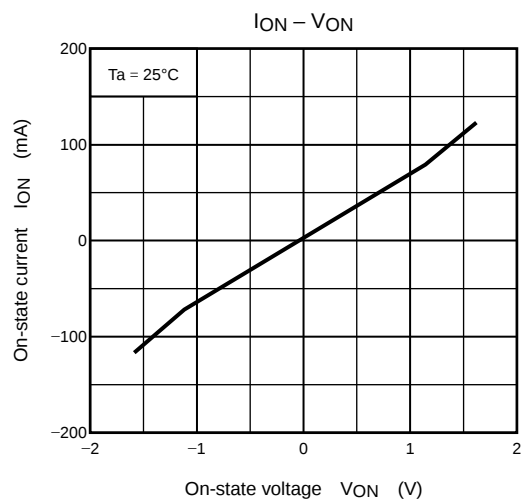
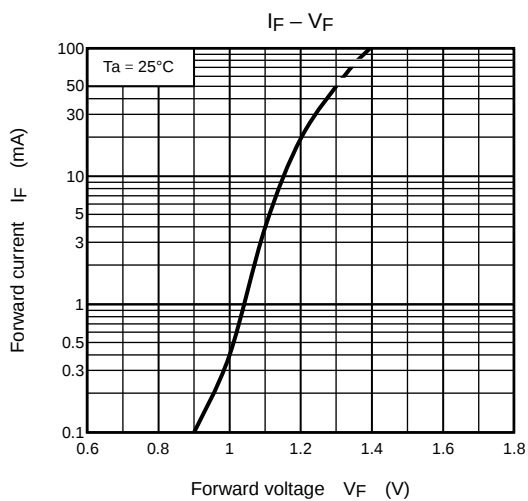
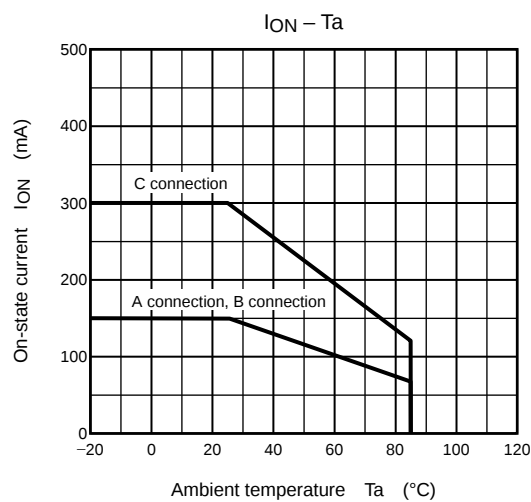
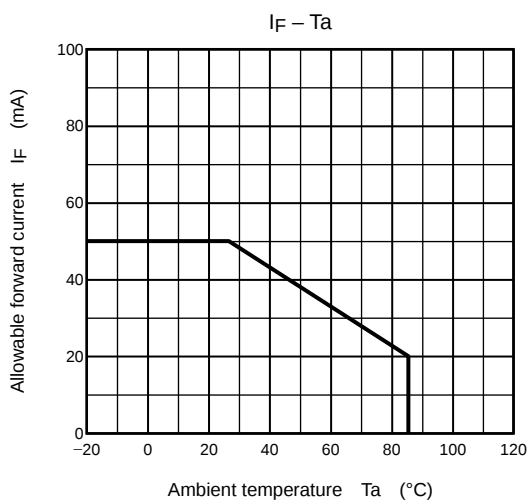
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output		C_S	$V_S = 0\text{ V}$, $f = 1\text{ MHz}$	—	0.8	—	pF
Isolation resistance		R_S	$V_S = 500\text{ V}$, R.H. $\leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage		BV_S	AC, 1 minute	2500	—	—	Vrms
			AC, 1 second, in oil	—	5000	—	
			DC, 1 minute, in oil	—	5000	—	Vdc

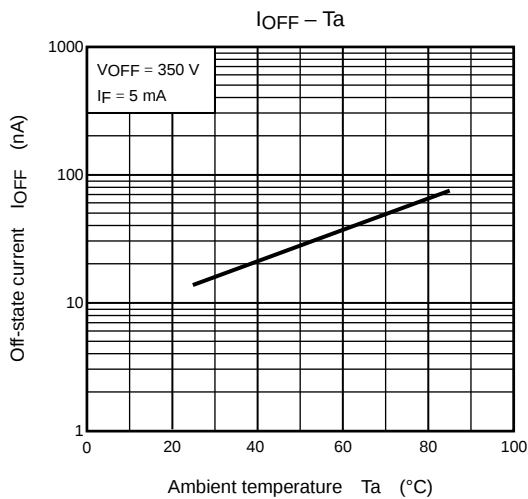
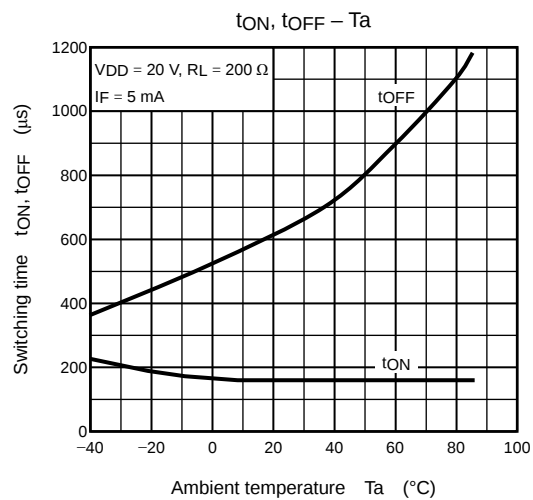
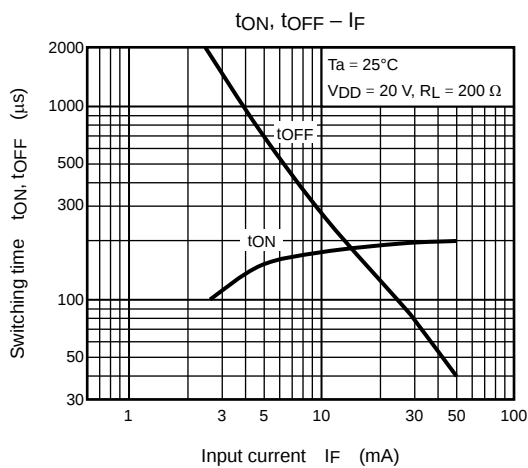
Switching Characteristics (Ta = 25°C)

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

Note 2: Switching time test circuit







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