

TOSHIBA Photocoupler Photorelay

TLP197D

PC Card Modems

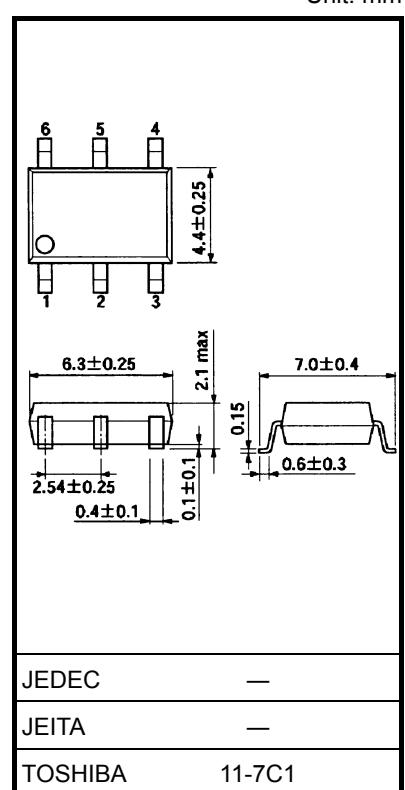
PBX

Measurement Equipment

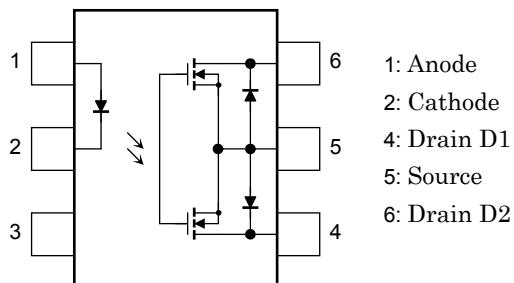
The Toshiba TLP197D consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP package.

TLP197D is housed in a compact and thin SOP package and has characteristics of high-withstanding voltage and low ON-state resistance, which enable TLP197D to be applied in hook switches, dial-pulse switches for modems and facsimiles, and switches for test circuit switching in PBXes.

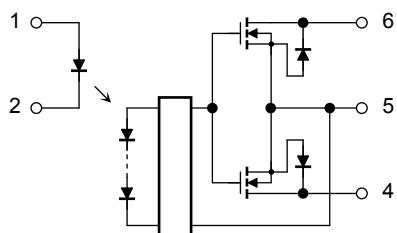
- 6-pin SOP (2.54SOP6): Height = 2.1 mm, pitch = 2.54 mm
- Normally open (1-form-A) device
- Peak OFF-state voltage: 200 V (min)
- Trigger LED current: 3 mA (max)
- ON-state current: 200 mA (max)
- ON-state resistance: 8 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1577, file no. E67349



Weight: 0.13 g (typ.)



Schematic



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
	Junction temperature	T _j	125	°C
Detector	Off-state output terminal voltage	V _{OFF}	200	V
	On-state current	I _{ON}	200	mA
			200	
			400	
	On-state current derating (Ta ≥ 25°C)	ΔI _{ON} /°C	-2.0	mA/°C
			-2.0	
			-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 min, R.H. ≤ 60%) (Note 1)	BVs	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).

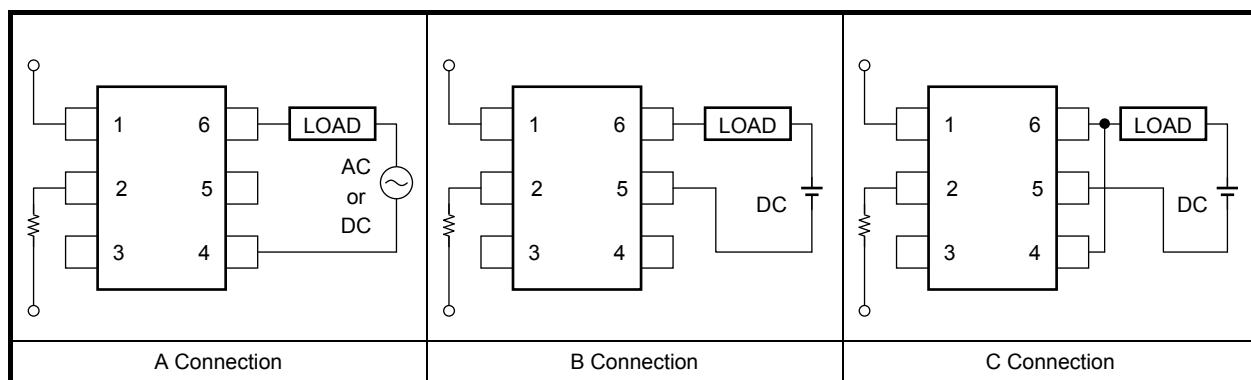
Note 1: Pins 1, 2 and 3 are shorted together, and pins 4, 5 and 6 are shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _D D	—	—	160	V
Forward current	I _F	5	7.5	25	mA
On-state current	I _{ON}	—	—	130	mA
Operating temperature	T _{opr}	-20	—	60	°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 ($T_a = 25^\circ\text{C}$)

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	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 200 \text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0, f = 1 \text{ MHz}$	—	100	—	pF

Coupled Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current	I_{FT}	$I_{ON} = 200 \text{ mA}$	—	1	3	—	mA
Return LED current	I_{FC}	$I_{OFF} = 100 \mu\text{A}$	0.1	—	—	—	mA
On-state resistance	A connection	R_{ON}	$I_{ON} = 200 \text{ mA}, I_F = 5 \text{ mA}$	—	5	8	Ω
	B connection		$I_{ON} = 200 \text{ mA}, I_F = 5 \text{ mA}$	—	3	5	
	C connection		$I_{ON} = 400 \text{ mA}, I_F = 5 \text{ mA}$	—	1.4	—	

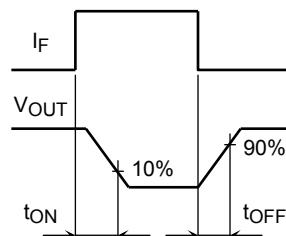
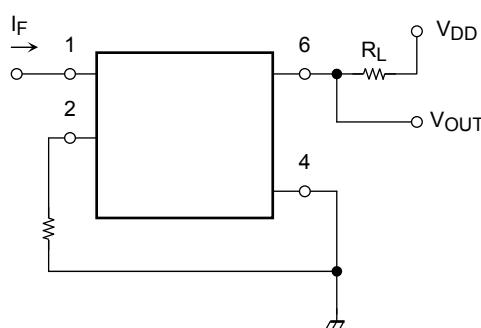
Isolation Characteristics ($T_a = 25^\circ\text{C}$)

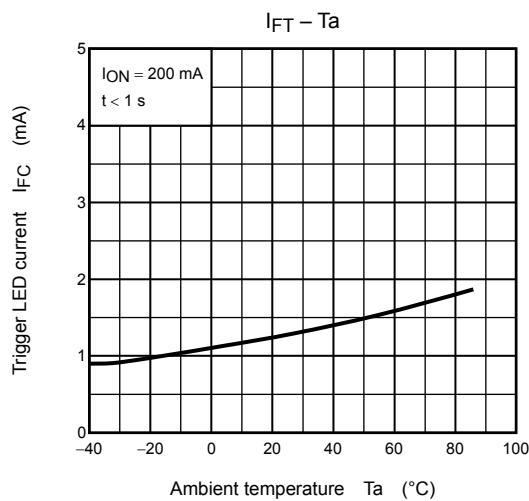
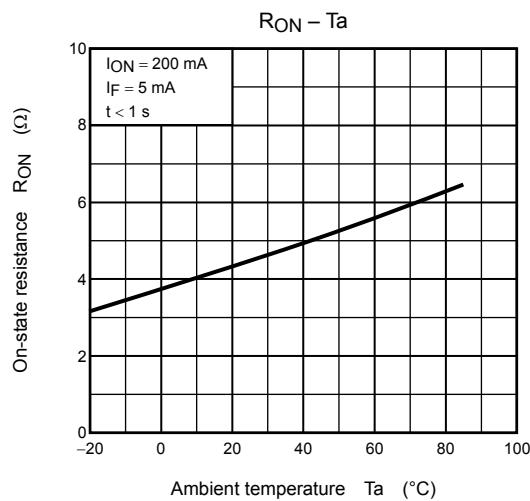
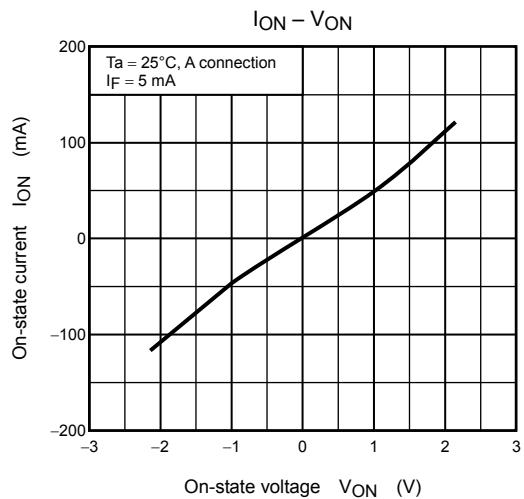
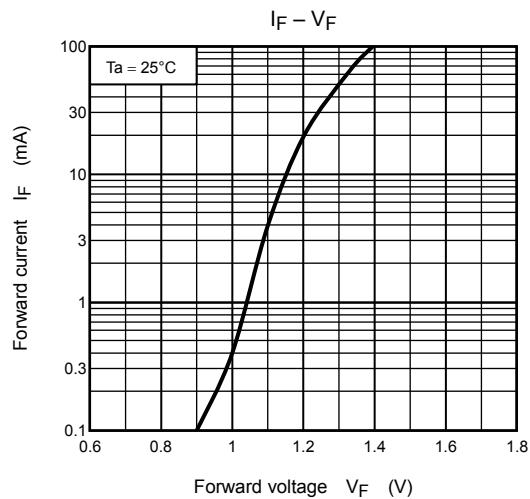
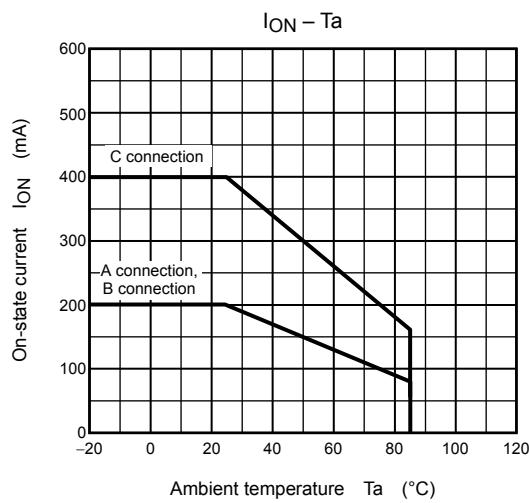
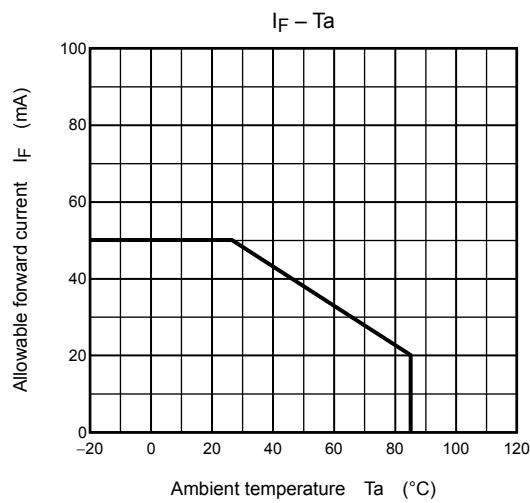
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	—	Ω
Isolation voltage	BV_S		AC, 1 min	1500	—	—	Vrms
			AC, 1 s, in oil	—	3000	—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

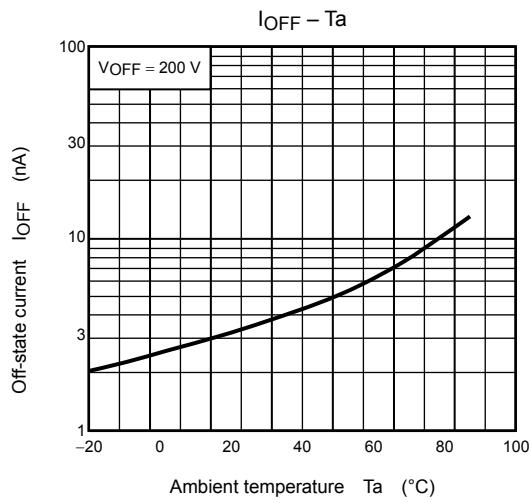
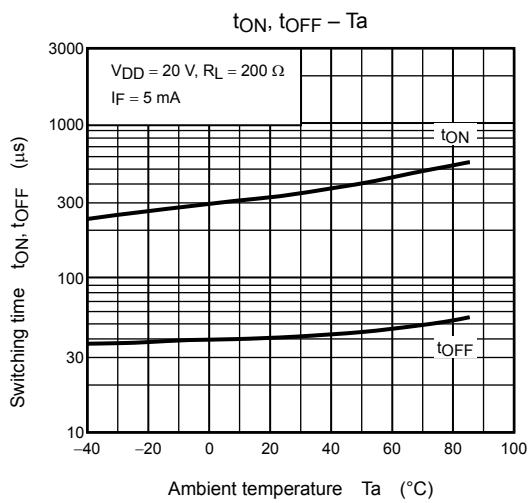
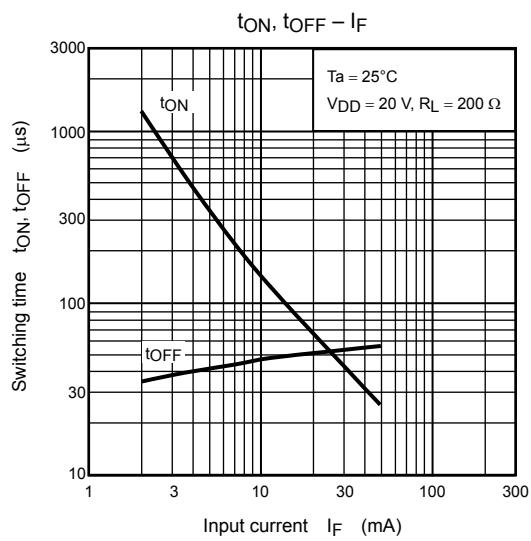
Switching Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	$R_L = 200 \Omega$ $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$	(Note 2)	—	0.6	1.5	ms
Turn-off time	t_{OFF}			—	0.1	1.0	ms

Note 2: Switching time test circuit







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