Preliminary

TOSHIBA Photocoupler Photorelay

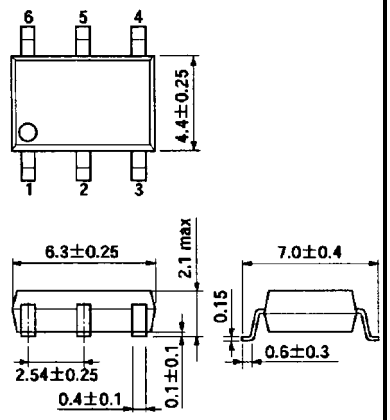
TLP197D

PC Card Modems

PBX

Measurement Equipment

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	11-7C1

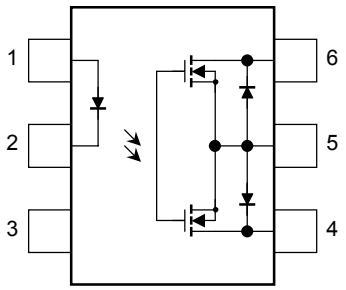
Weight: 0.13 g (typ.)

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.

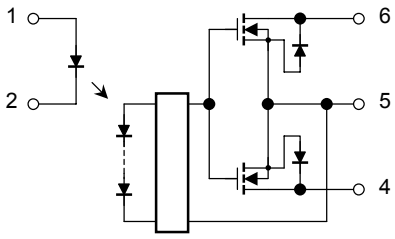
- 6-pin SOP (2.54SOP6): Height = 2.1 mm, pitch = 2.54 mm
- Normally open (1-form-A) device
- Peak OFF-state voltage: 200 V (min)
- Trigger LED current: 3 mA (max)
- ON-state current: 200 mA (max)
- ON-state resistance: 8 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL recognized: UL1577, file no. E67349

Pin Configuration (top view)



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

Schematic



Maximum Ratings (Ta = 25°C)

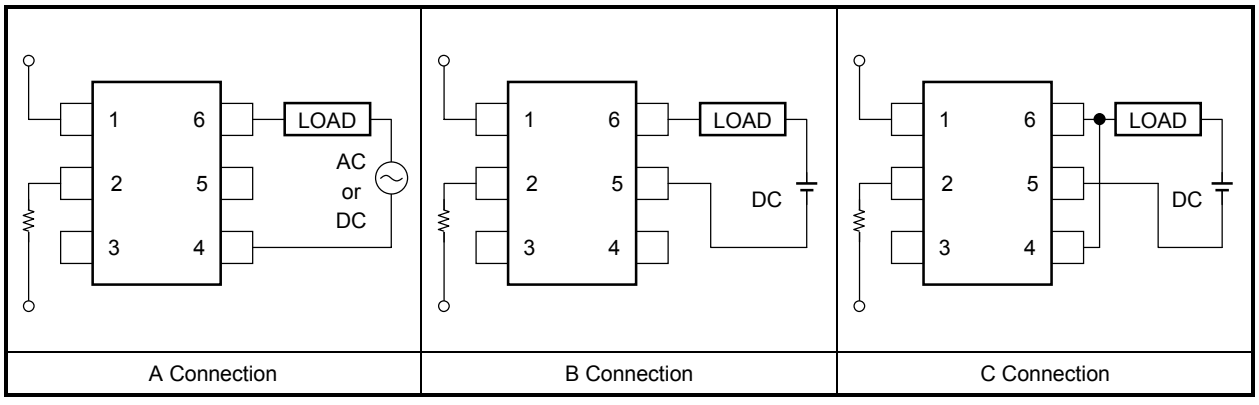
Characteristics			Symbol	Rating	Unit
LED	Forward current		I_F	50	mA
	Forward current derating (Ta ≧ 25°C)		ΔI_F/°C	−0.5	mA/°C
	Peak forward current (100 μs pulse, 100 pps)		I_{FP}	1	A
	Reverse voltage		V_R	5	V
	Junction temperature		T_j	125	°C
Detector	Off-state output terminal voltage		V_{OFF}	200	V
	On-state current	A connection	I_{ON}	200	mA
		B connection		200	
		C connection		400	
	On-state current derating (Ta ≧ 25°C)	A connection	ΔI_{ON}/°C	−2.0	mA/°C
		B connection		−2.0	
		C connection		−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)			BV_S	1500	Vrms

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_{DD}	—	—	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

Circuit Connections



A Connection | B Connection | C Connection

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
Detec-tor	Off-state current	I_{OFF}	V_{OFF} = 200 V	—	—	1	μA
	Capacitance	C_{OFF}	V = 0, f = 1 MHz	—	100	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

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

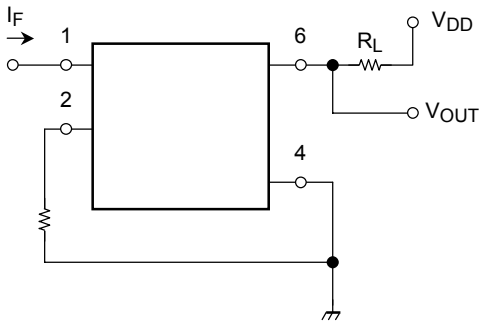
Isolation Characteristics (Ta = 25°C)

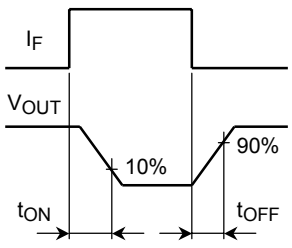
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H. ≦ 60%	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 min	1500	—	—	Vrms
		AC, 1 s, in oil	—	3000	—	
		DC, 1 min, in oil	—	3000	—	Vdc

Switching Characteristics (Ta = 25°C)

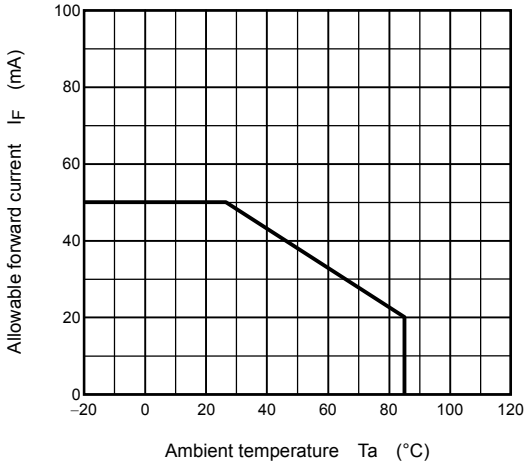
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	R_L = 200 Ω (Note 2)	—	0.6	1.5	ms
Turn-off time	t_{OFF}	V_{DD} = 20 V, I_F = 5 mA	—	0.1	1.0	ms

Note 2: Switching time test circuit

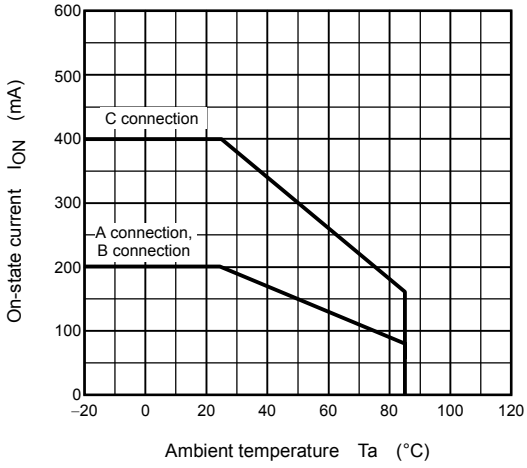




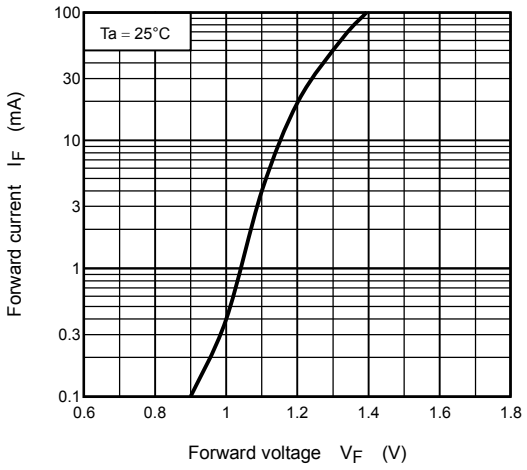
I_F – Ta



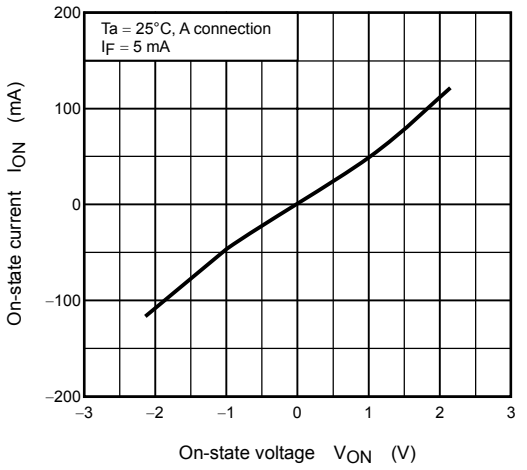
I_{ON} – Ta



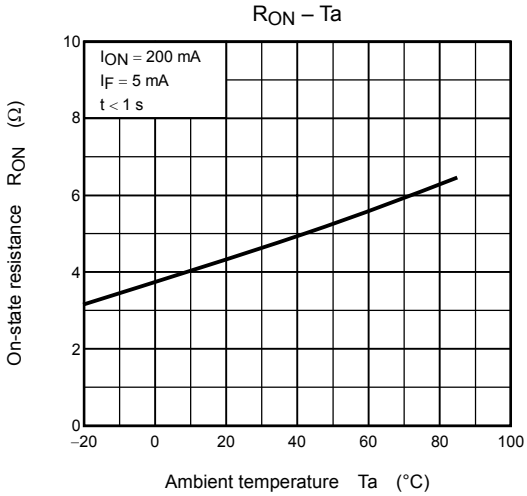
I_F – V_F



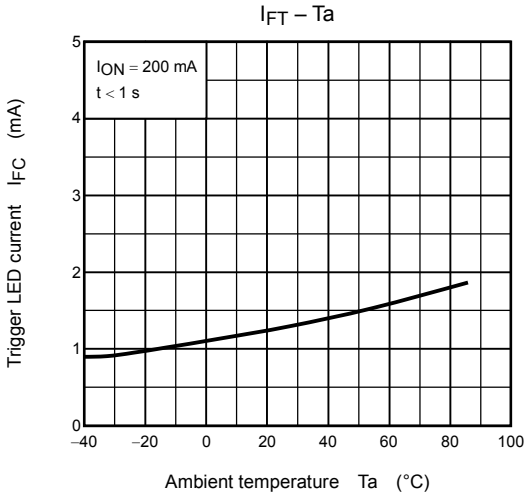
I_{ON} – V_{ON}



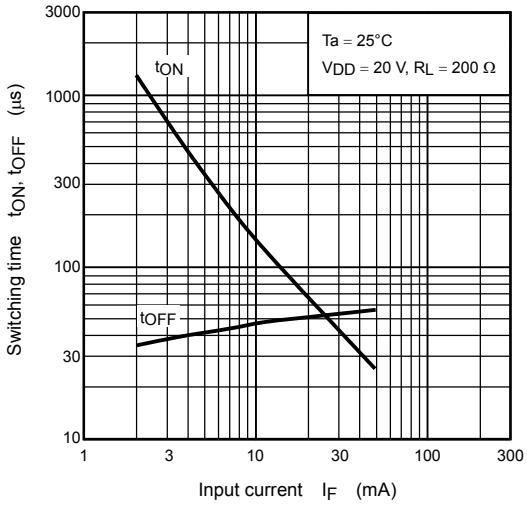
R_{ON} – Ta



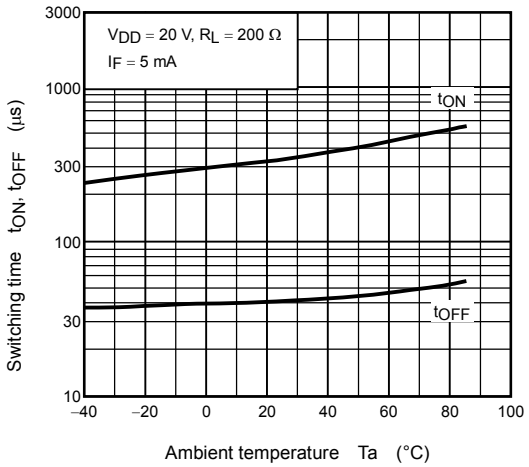
I_{FT} – Ta



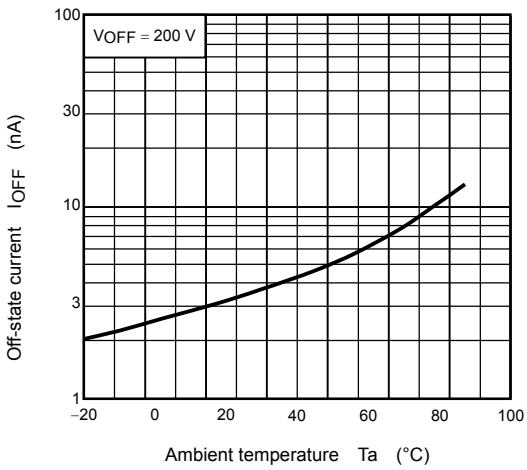
t_{ON}, t_{OFF} – I_F



t_{ON}, t_{OFF} – Ta



I_{OFF} – Ta



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