

TOSHIBA Photocoupler Photo Relay

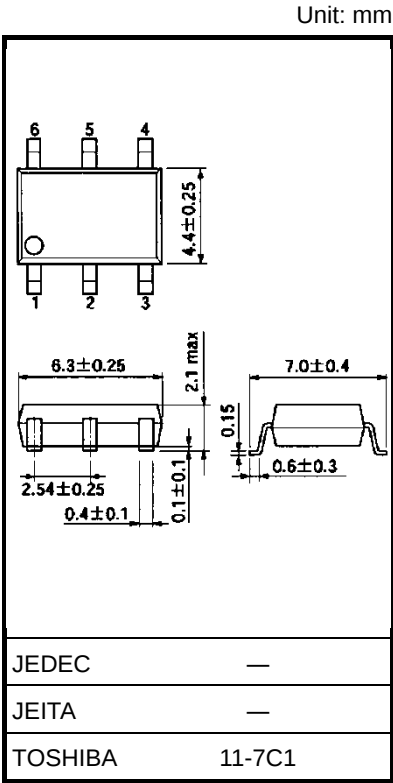
TLP197A

Telecommunication
Data Acquisition
Measurement Instrument
Programmable Control

The TOSHIBA TLP197A consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a SOP, which is suitable for surface mount assembly.

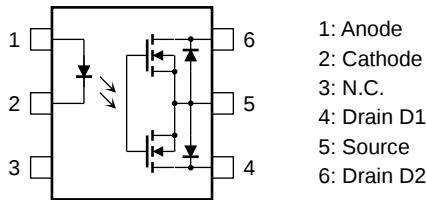
The TLP197A is suitable for replacement of mechanical relays in many applications which require space savings.

- 6 pin SOP (2.54SOP6): 2.1 mm high, 2.54 mm pitch
- 1-form-A
- Peak off-state voltage: 60 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 400 mA (max)
- On-state resistance: 2 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL approved: UL1577, File No.E67349
- cUL approved :CSA Component Acceptance Service
No. 5A, File No.E67349

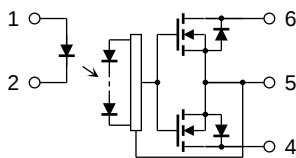


Weight: 0.13 g (typ.)

Pin Configurations (top view)



Schematic



Start of commercial production
2001-07

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}	60	V
	On-state RMS current	A connection	I _{ON}	400	mA
		B connection		400	
		C connection		800	
	On-state current derating (Ta ≥ 25°C)	A connection	ΔI _{ON} /°C	−4.0	mA/°C
		B connection		−4.0	
		C connection		−8.0	
	Output power dissipation	A connection	P _O	288	mW
		B connection		144	
		C connection		288	
	Output power dissipation derating (Ta ≥ 25°C)	A connection	ΔP _O / °C	−2.88	mW / °C
		B connection		−1.44	
		C connection		−2.88	
	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	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.).

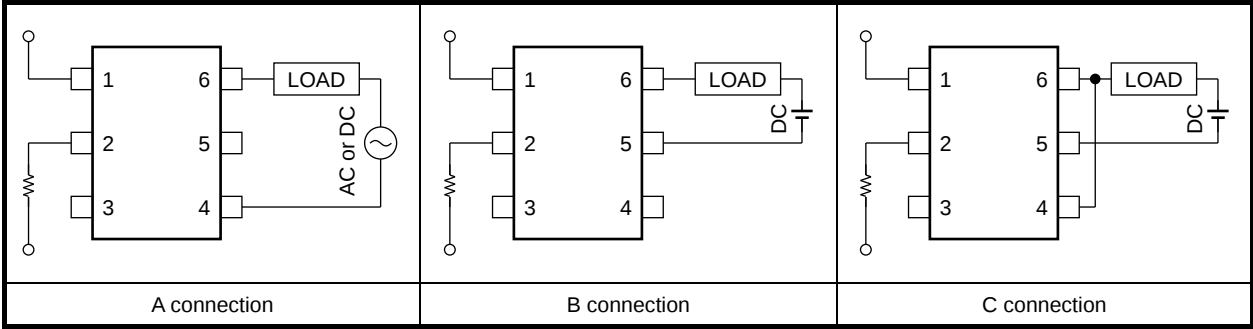
Note 1: Device considered a two-terminal device: Pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _{DD}	—	—	48	V
Forward current	I _F	5	7.5	25	mA
On-state current	I _{ON}	—	—	300	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	$V_F = 0\text{ V}, f = 1\text{ MHz}$	—	30	—	pF
Detector	Off-state current	I_{OFF}	$V_{OFF} = 60\text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0\text{ V}, f = 1\text{ MHz}$	—	130	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Trigger LED current		I_{FT}	$I_{ON} = 400\text{ mA}$	—	—	3	mA
Close LED current		I_{FC}	$I_{OFF} = 100\text{ }\mu\text{A}$	0.1	—	—	mA
On-state resistance	A connection	R_{ON}	$I_{ON} = 400\text{ mA}, I_F = 5\text{ mA}$	—	1	2	Ω
	B connection		$I_{ON} = 400\text{ mA}, I_F = 5\text{ mA}$	—	0.5	1	
	C connection		$I_{ON} = 800\text{ mA}, I_F = 5\text{ mA}$	—	0.25	—	

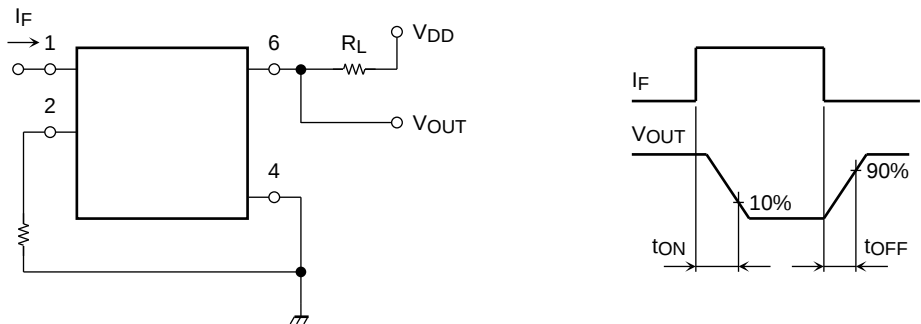
Isolation Characteristics (Ta = 25°C)

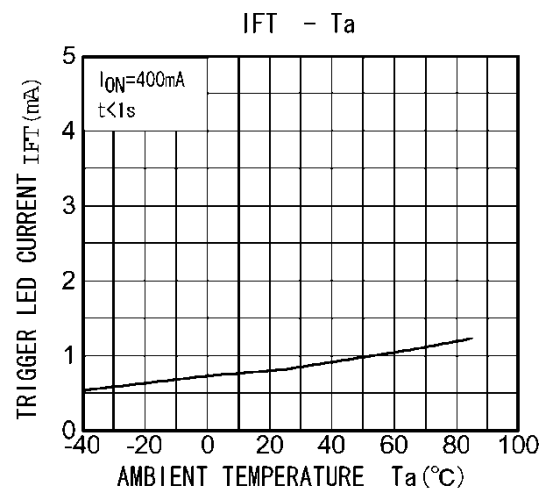
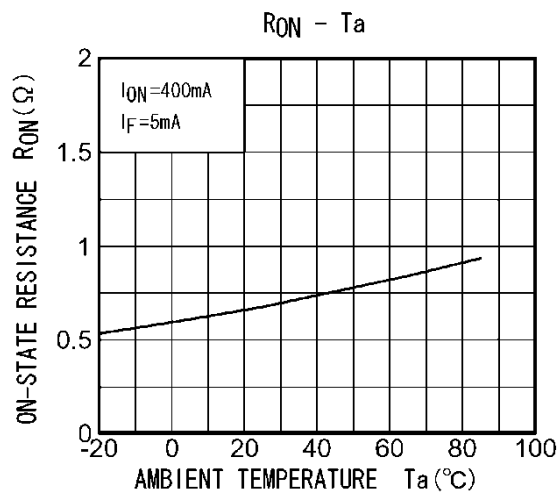
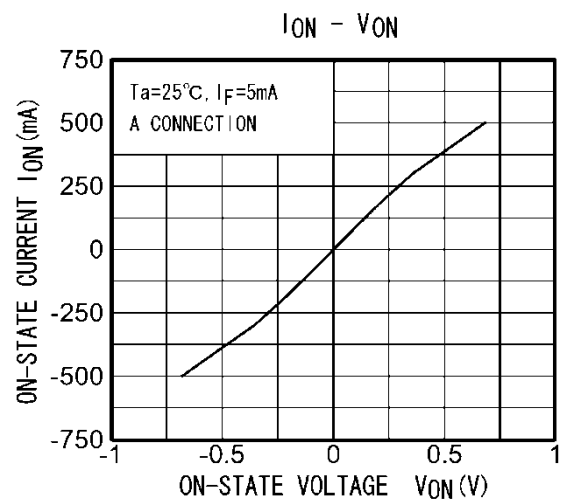
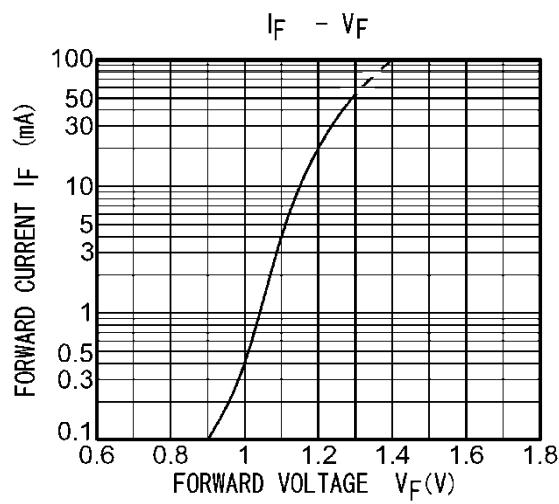
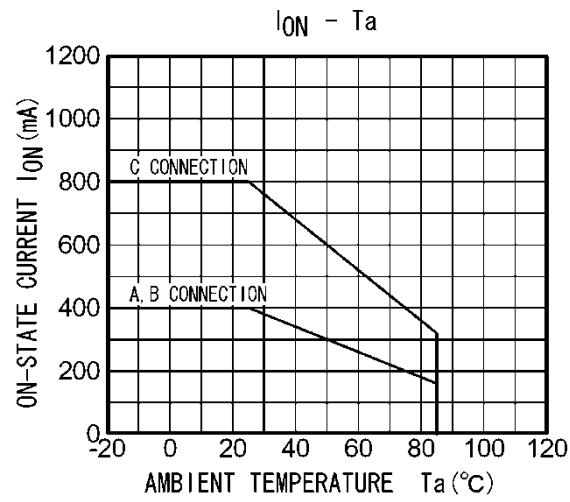
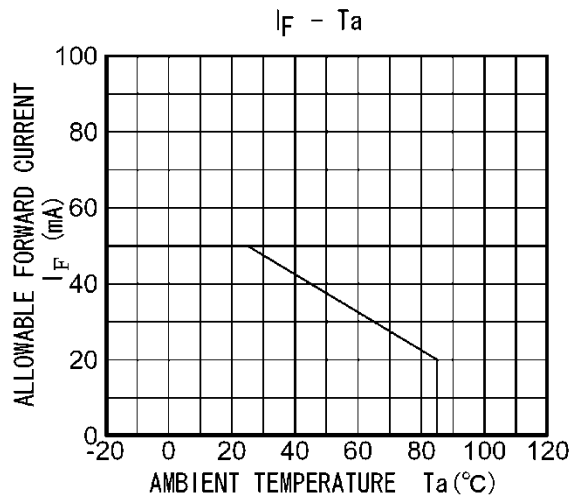
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	$V_S = 0\text{ V}, f = 1\text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500\text{ V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	1500	—	—	Vrms
		AC, 1 second (in oil)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

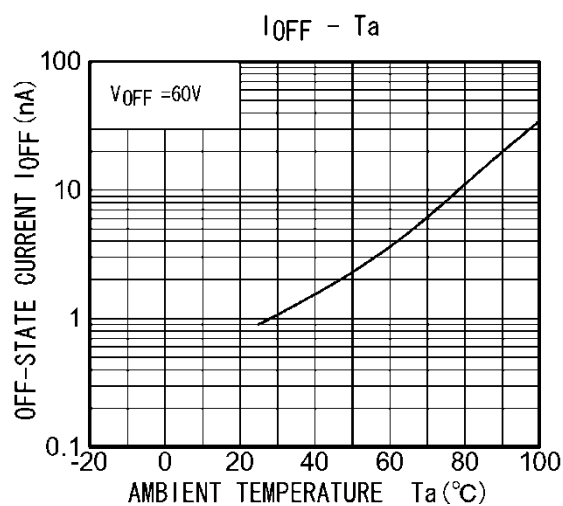
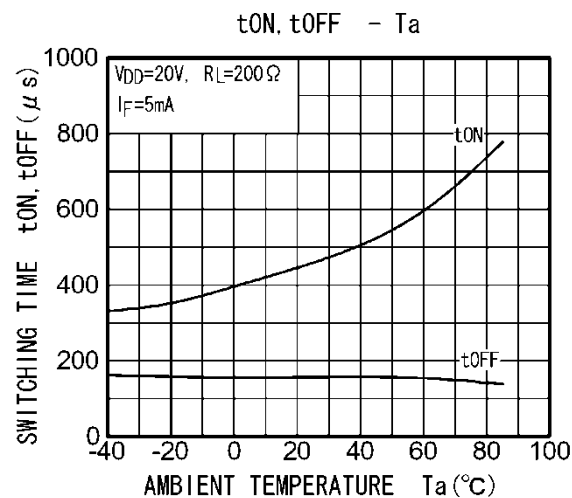
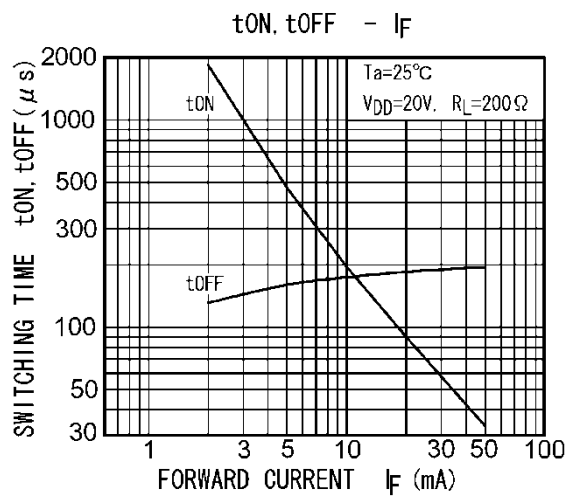
Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on time	t_{ON}	$R_L = 200\text{ }\Omega$ $V_{DD} = 20\text{ V}, I_F = 5\text{ mA}$ (Note)	—	0.6	2	ms
Turn-off time	t_{OFF}		—	0.1	1	ms

Note: Switching time test circuit







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