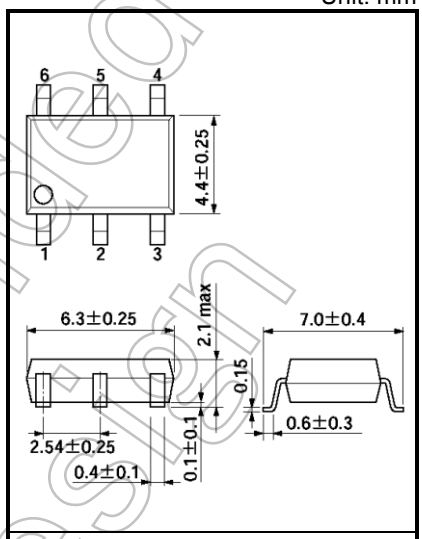
TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP199D

MEASUREMENT INSTRUMENTS

Unit: mm



JEDEC	
JEITA	
TOSHIBA	11-7C1

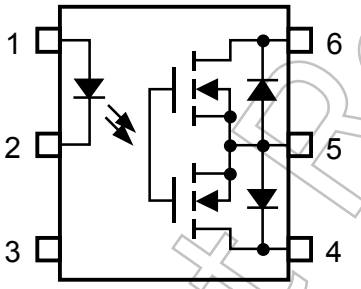
Weight: 0.13 g (typ.)

The TOSHIBA TLP199D consists of an infrared emitting diode optically coupled to a photo-MOS FET in a plastic SOP package.
Its characteristics include low OFF-state current and low output pin capacitance, enabling it to be used in high-frequency measurement instruments.

Features

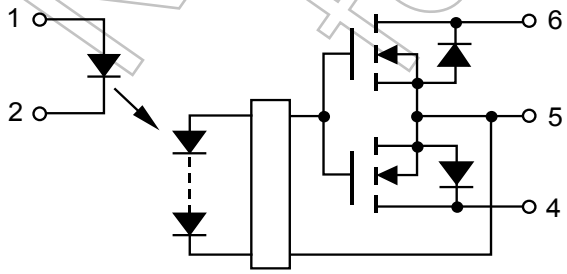
- 6 pin SOP (2.54SOP6) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak Off-State Voltage : 200 V (min)
- Trigger LED Current : 3 mA (max)
- On-State Current : 50 mA (max)
- On-State Resistance : 50 Ω (max)
- Output Capacitance : 20 pF (max)
- Isolation Voltage : 1500 Vrms (min)
- UL-recognized : UL 1577, File No.E67349
- cUL-recognized : CSA Component Acceptance Service No.5A
  File No.E67349

Pin Configuration (Top View)



1 : ANODE
2 : CATHODE
3 : N.C.
4 : DRAIN D1
5 : SOURCE
6 : DRAIN D2

Schematic



Start of commercial production
2008-10

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
	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}	200	V
	On-State Current	A Connection	I_{ON}	50	mA
		B Connection		50	
		C Connection		100	
	On-State Current Derating (Ta ≥ 25°C)	A Connection	ΔI_{ON}/°C	-0.5	mA/°C
		B Connection		-0.5	
		C Connection		-1.0	
	Output Power Dissipation	A Connection	P_O	125	mW
		B Connection		52.5	
		C Connection		105	
	Output Power Dissipation Derating (Ta ≥ 25°C)	A Connection	ΔP_O /°C	-1.25	mW / °C
		B Connection		-0.525	
		C Connection		-1.05	
	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, 60 s, 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).

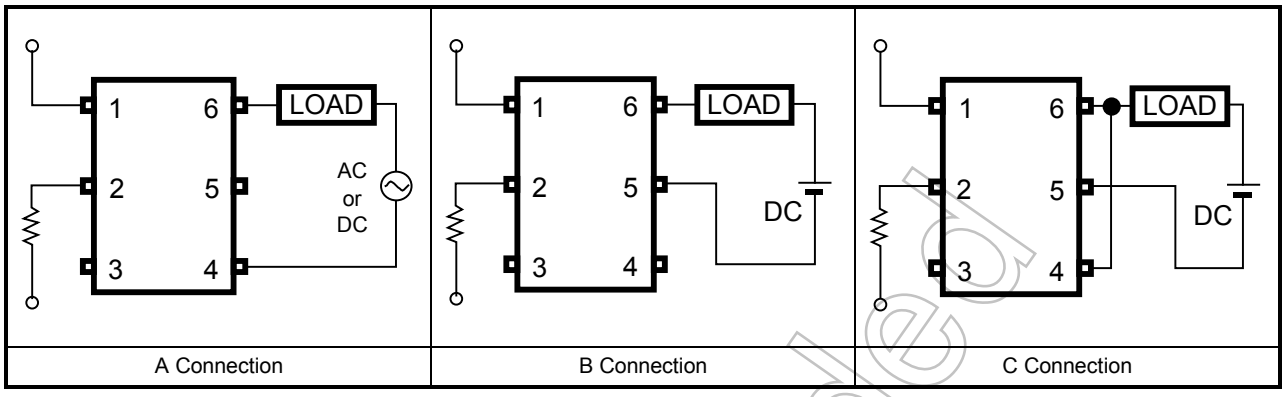
Note 1: Device considered a two-terminal device: LED side pins are shorted together, and DETECTOR side pins are shorted together.

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	Min	Typ.	Max	UNIT
Supply Voltage	V_{DD}	—	—	160	V
Forward Current	I_F	5	7.5	15	mA
On-State Current	I_{ON}	—	—	50	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



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_F = 0 V, f = 1 MHz	—	30	—	pF
DETECTOR	Off-State Current	I_{OFF}	V_{OFF} = 160 V	—	—	1	nA
	Capacitance	C_{OFF}	V = 0 V, f = 1 MHz	—	15	20	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unir
Trigger LED Current		I_{FT}	I_{ON} = 50 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} = 50 mA, I_F = 5 mA	—	40	50	Ω
	B Connection		I_{ON} = 50 mA, I_F = 5 mA	—	30	40	
	C Connection		I_{ON} = 100 mA, I_F = 5 mA	—	15	—	

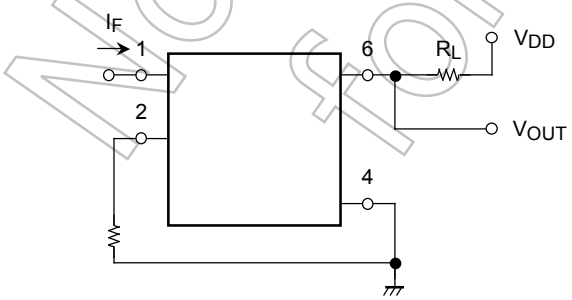
Isolation Characteristics (Ta = 25°C)

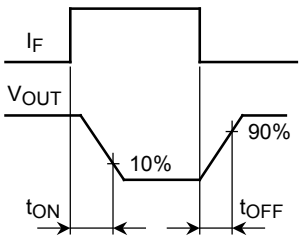
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance Input to Output	C_S	V_S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S = 500 V, R.H. ≤ 60 %	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 60 s	1500	—	—	Vrms

Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Turn-on Time	t_{ON}	R_L = 200 Ω (Note 2) V_{DD} = 10 V, I_F = 5 mA	—	—	0.5	ms
Turn-off Time	t_{OFF}		—	—	0.2	

Note 2: SWITCHING TIME TEST CIRCUIT





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