

TOSHIBA PHOTOCOUPLER PHOTO RELAY

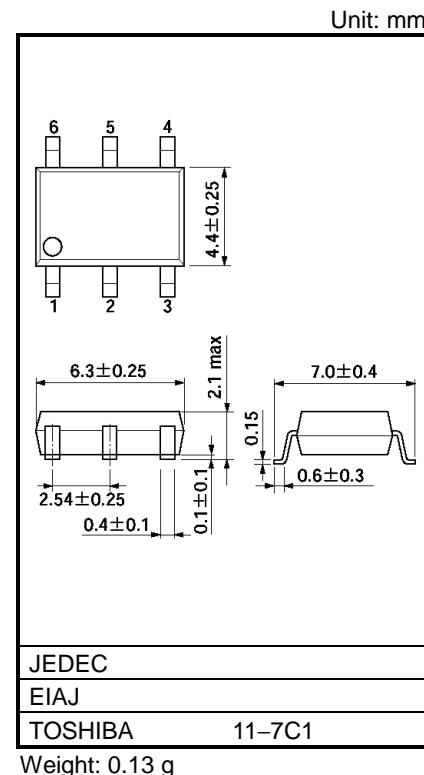
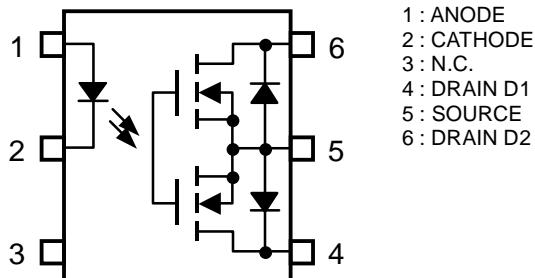
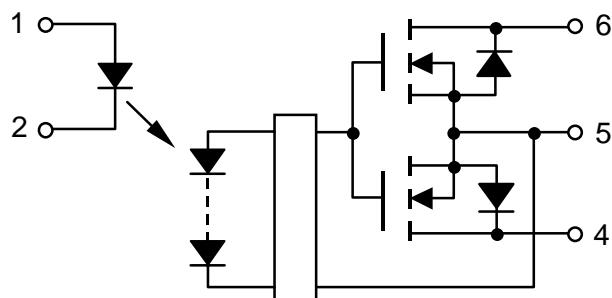
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MEASUREMENT INSTRUMENTS
 LOGIC IC TESTERS / MEMORY TESTERS
 BOARD TESTERS / SCANNERS

The TOSHIBA TLP199D consist of a gallium arsenide 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 ohm (max)
- Output Capacitance : 20 pF (max)
- Isolation Voltage : 1500 Vrms (min)

PIN CONFIGURATION (TOL VIEW)**SCHEMATIC**

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

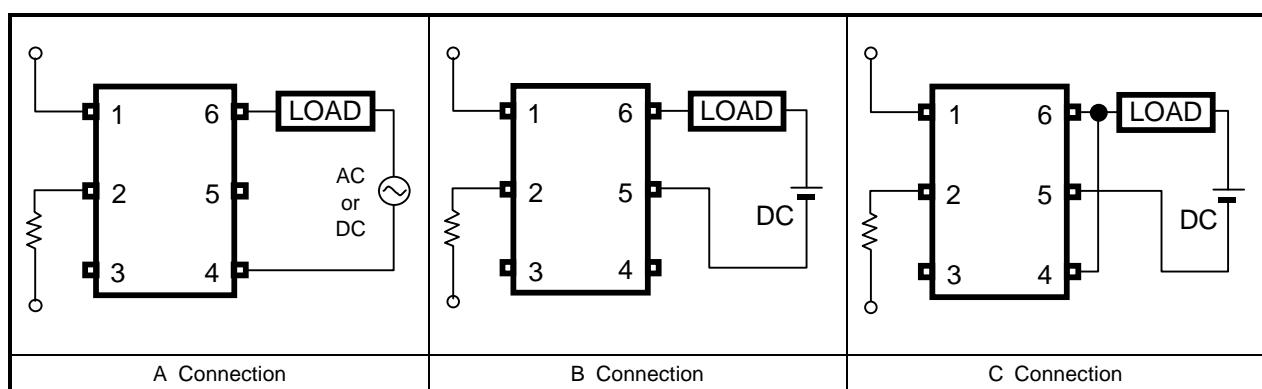
CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	50	mA
	Forward Current Derating ($T_a \geq 25^\circ\text{C}$)	$\Delta I_F/\text{ }^\circ\text{C}$	-0.5	mA/°C
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V_{OFF}	200	V
	On-State Current	I_{ON}	50	mA
			50	
			100	
	On-State Current Derating ($T_a \geq 25^\circ\text{C}$)	$\Delta I_{ON}/\text{ }^\circ\text{C}$	-0.5	mA/°C
			-0.5	
			-1.0	
	Junction Temperature	T_j	125	°C
	Storage Temperature Range	T_{stg}	-55~125	°C
Operating Temperature Range		T_{opr}	-40~85	°C
Lead Soldering Temperature (10 s)		T_{sol}	260	°C
Isolation Voltage (AC, 1 minute, R.H. $\leq 60\%$) (NOTE1)		BV_S	1500	Vrms

(NOTE1) : 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

CIRCUIT CONNECTIONS



INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		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
DETECTOR	Off-State Current	I _{OFF}	V _{OFF} = 160 V	—	—	1	nA
	Capacitance	C _{OFF}	V = 0, f = 1 MHz	—	15	20	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Trigger LED Current	I _{FT}	I _{ON}	I _{ON} = 50 mA	—	1	3	mA
Return LED Current	I _{FC}	I _{OFF}	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	—	

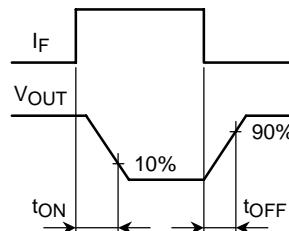
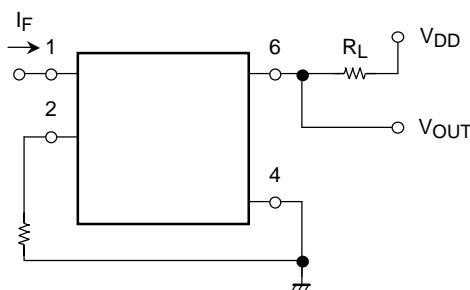
ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		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	B _V	AC, 1 minute	1500	—	—	—	V _{rms}
		AC, 1 second (in oil)	—	3000	—	—	
		DC, 1 minute (in oil)	—	3000	—	—	V _{dc}

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Turn-on Time	t _{ON}	R _L = 200 Ω V _{DD} = 10 V, I _F = 5 mA	(NOTE 2)	—	—	0.5	ms
Turn-off Time	t _{OFF}			—	—	0.2	

(NOTE 2) : SWITCHING TIME TEST CIRCUIT



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