

TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP599G

TELECOMMUNICATION

DATA ACQUISITION

MEASUREMENT INSTRUMENTATION

The TOSHIBA TLP599G consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).

The TLP599G is a bi-directional switch which can replace mechanical relays in many applications.

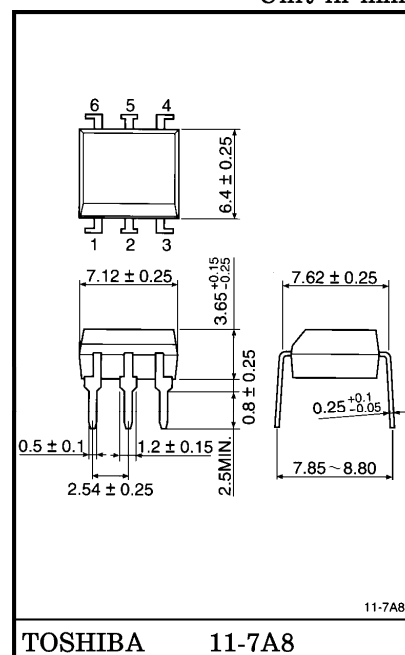
- Peak Off-State Voltage : 400 V (MIN.)
- On-State Current : 120 mA (MAX.) (A Connection)
- On-State Resistance : 30 Ω (MAX.) (A Connection)
- Insulation Thickness : 0.4 mm (MAX.)
- Isolation Voltage : 2500 Vrms (MIN.)
- UL Recognized : UL1577, File No. E67349
- Trigger LED Current (Ta = 25°C)

CLASSIFICATION (Note 1)	Trigger LED Current (mA)		MARKING OF CLASSIFICATION
	@I _{ON} = 120 mA		
	Min.	Max.	
(IFT2)	—	2	T2
Standard	—	5	T2, blank

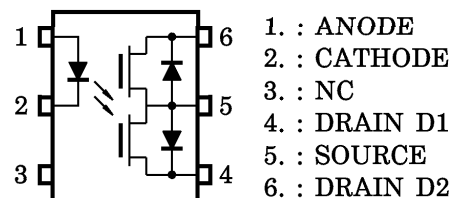
(Note 1) : Application type name for certification test, please use standard product type name, i.e.

TLP599G (IFT2) : TLP599G

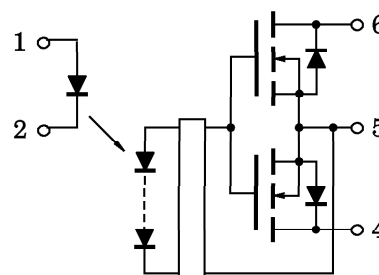
Unit in mm



PIN CONFIGURATION (TOP VIEW)



SCHEMATIC



980910EBC2

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- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
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MAXIMUM RATINGS (Ta = 25°C)

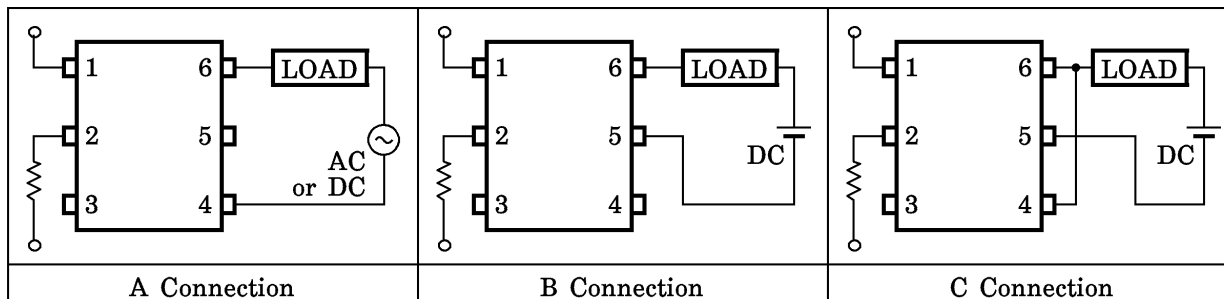
CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	50	mA
	Forward Current Derating (Ta $\geq$ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.5	mA / °C
	Peak Forward Current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V_{OFF}	400	V
	On-State RMS Current	A Connection	120	mA
		B Connection	150	
		C Connection	200	
	On-State Current Derating (Ta $\geq$ 25°C)	A Connection	-1.2	mA / °C
		B Connection	-1.5	
		C Connection	-2.0	
	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 min., R.H. $\leq$ 60%) (Note 2)		BV_S	2500	Vrms

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

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{DD}	—	—	320	V
Forward Current	I_F	7.5	15	25	mA
On-State Current	I_{ON}	—	—	120	mA
Operating Temperature	T_{opr}	-20	—	80	°C

CIRCUIT CONNECTIONS



INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10 \text{ mA}$	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}	$V_{OFF} = 400 \text{ V}$	—	—	1	μA
	Capacitance	C_{OFF}	$V = 0, f = 1 \text{ MHz}$	—	—	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current		I_{FT}	$I_{ON} = 120 \text{ mA}$	—	1	5	mA
On-State Resistance	A Connection	R_{ON}	$I_{ON} = 120 \text{ mA}, I_F = 10 \text{ mA}$	—	20	30	Ω
	B Connection		$I_{ON} = 150 \text{ mA}, I_F = 10 \text{ mA}$	—	12	20	
	C Connection		$I_{ON} = 200 \text{ mA}, I_F = 10 \text{ mA}$	—	6	10	

ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	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	$V_S = 500 \text{ V}, R.H. \leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		AC, 1 second (in oil)	—	5000	—	
		DC, 1 minute (in oil)	—	5000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-on Time	t_{on}	$R_L = 200 \Omega$	—	—	2	ms
Turn-off Time	t_{off}	$V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$	—	—	2	

SWITCHING TIME TEST CIRCUIT

