

# TLP647G

## GaAs IRED & PHOTO-THYRISTOR

(TLP647G)

OFFICE MACHINE.  
HOUSEHOLD USE EQUIPMENT.  
SOLID STATE RELAY.  
SWITCHING POWER SUPPLY.

The TOSHIBA TLP647G consists of a photo-thyristor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- Peak Off-State Voltage : 400V (MIN.)
  - Trigger LED Current : 15mA (MAX.)
  - On-State Current : 150mA (MAX.)
  - UL Recognized : UL1577, File No. E67349
  - BSI Approved : BS415 : 1990, BS7002 : 1989 (EN60950)  
Certificate No. 7123
  - SEMKO Approved : SS4330784,  
Certificate No. 8937148
- Isolation Voltage : 4000Vrms (MIN.)
- Option (D4) type  
VDE Approved : DIN VDE0884 / 08.87,  
Certificate No. 68367

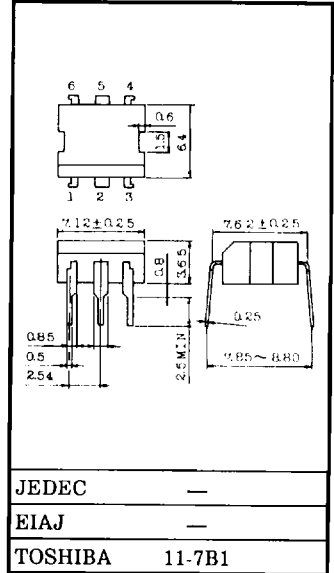
Maximum Operating Insulation Voltage : 630V<sub>PK</sub>

Highest Permissible Over Voltage : 6000V<sub>PK</sub>

(Note) When a VDE0884 approved type is needed,  
please designate the "Option (D4)"

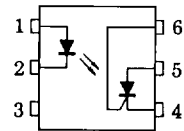
	7.62mm pich standard type	10.16mm pich (LF2) type
• Creepage Distance	: 7.0mm (MIN.)	8.0mm (MIN.)
Clearance	: 7.0mm (MIN.)	8.0mm (MIN.)
Internal Creepage Pass	: 4.0mm (MIN.)	4.0mm (MIN.)
Insulation Thickness	: 0.5mm (MIN.)	0.5mm (MIN.)

Unit in mm



Weight : 0.37g

### PIN CONFIGURATIONS (TOP VIEW)



- 1 : ANODE
- 2 : CATHODE
- 3 : NC
- 4 : CATHODE
- 5 : ANODE
- 6 : GATE

(TLP647G)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	60	mA
	Forward Current Derating (Ta ≧ 39°C)	ΔI <sub>F</sub> /°C	-0.7	mA / °C
	Peak Forward Current (100μs pulse, 100pps)	I <sub>FP</sub>	1	A
	Reverse Voltage	V <sub>R</sub>	5	V
	Junction Temperature	T <sub>j</sub>	125	°C
DETECTOR	Peak Forward Voltage (R <sub>GK</sub> = 27kΩ)	V <sub>DRM</sub>	400	V
	Peak Reverse Voltage (R <sub>GK</sub> = 27kΩ)	V <sub>RDM</sub>	400	V
	On-State Current	I <sub>T (RMS)</sub>	150	mA
	On-State Current Derating (Ta ≧ 25°C)	ΔI <sub>T</sub> /°C	-2.0	mA / °C
	Peak On-State Current (100μs pulse, 120pps)	I <sub>TP</sub>	3	A
	Peak One Cycle Surge Current	I <sub>TSM</sub>	2	A
	Peak Reverse Gate Voltage	V <sub>GM</sub>	5	V
	Junction Temperature	T <sub>j</sub>	100	°C
Storage Temperature Range		T <sub>stg</sub>	-55~150	°C
Operating Temperature Range		T <sub>opr</sub>	-55~100	°C
Lead Soldering Temperature (10sec.)		T <sub>sol</sub>	260	°C
Isolation Voltage (AC, 1min., R.H. ≦ 60%) (Note 1)		BV <sub>S</sub>	4000	Vrms

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



# TLP647G

(TLP647G)

## 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	$\mu\text{A}$	
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	30	—	pF	
DETECTOR	Off-State Current	$I_{DRM}$	$V_{AK} = 400\text{V}$ $R_{GK} = 27\text{k}\Omega$	Ta = 25°C	—	10	5000	nA
				Ta = 100°C	—	1	100	$\mu\text{A}$
	Reverse Current	$I_{RRM}$	$V_{KA} = 400\text{V}$ $R_{GK} = 27\text{k}\Omega$	Ta = 25°C	—	10	5000	nA
				Ta = 100°C	—	1	100	$\mu\text{A}$
	On-State Voltage	$V_{TM}$	$I_{TM} = 100\text{mA}$	—	0.9	1.3	V	
	Holding Current	$I_H$	$R_{GK} = 27\text{k}\Omega$	—	0.2	—	mA	
Off-State dv / dt	dv / dt	$V_{AK} = 280\text{V}, R_{GK} = 27\text{k}\Omega$	5	10	—	V / $\mu\text{s}$		
Capacitance	$C_j$	V = 0, f = 1MHz Anode to Gate Gate to Cathode	—	20	—	pF		
			—	350	—			

## COUPLED CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Trigger LED Current	$I_{FT}$	$V_{AK} = 6\text{V}, R_{GK} = 27\text{k}\Omega$	—	—	15	mA
Turn-on Time	$t_{on}$	$I_F = 30\text{mA}, V_{AA} = 50\text{V}$ $R_{GK} = 27\text{k}\Omega$	—	10	—	$\mu\text{s}$
Coupled dv / dt	dv / dt	$V_S = 500\text{V}, R_{GK} = 27\text{k}\Omega$	500	—	—	V / $\mu\text{s}$
Capacitance (Input to Output)	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
Isolation Resistance	$R_S$	$V_S = 500\text{V}$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	4000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

## RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{AC}$	—	—	120	Vac
Forward Current	$I_F$	20	—	25	mA
Operating Temperature	$T_{opr}$	-25	—	85	°C
Gate to Cathode Resistance	$R_{GK}$	—	27	33	k $\Omega$
Gate to Cathode Capacitance	$C_{GK}$	—	0.01	0.1	$\mu\text{F}$

(TLP647G)

