

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-THYRISTOR

# TLP747G

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

The TOSHIBA TLP747G consists of a photo-thyristor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP.

- Peak Off-State Voltage : 400V (Min.)
- Trigger LED Current : 15mA (Max.)
- On-State Current : 150mA (Max.)
- UL Recognized : UL1577, File No. E67349
- BSI Approved : BS EN60065:1994  
Certificate No. 7364  
BS EN60950:1992  
Certificate No. 7365
- SEMKO Approved : SS4330784, Certificate No. 9325163, 9522142  
Isolation Voltage : 4000Vrms (Min.)
- Option (D4) type  
VDE Approved : DIN VDE0884 / 06.92,  
Certificate No. 74286, 91808

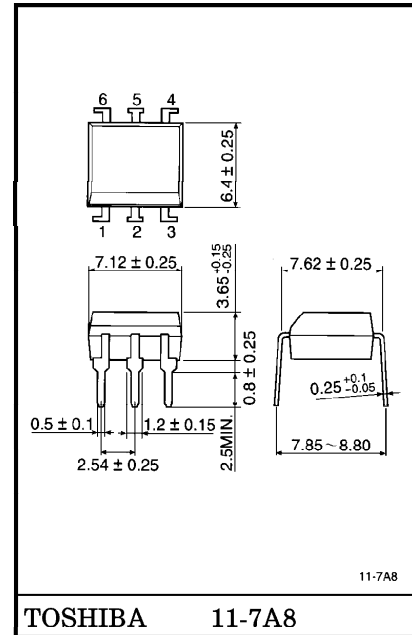
Maximum Operating Insulation Voltage : 630, 890V<sub>PK</sub>

Highest Permissible Over Voltage : 6000, 8000V<sub>PK</sub>

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

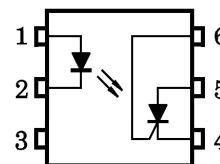
- |                      | 7.62mm pich<br>standard type | 10.16mm pich<br>TLP×××F type |
|----------------------|------------------------------|------------------------------|
| ● Creepage Distance  | : 7.0mm (Min.)               | : 8.0mm (Min.)               |
| Clearance            | : 7.0mm (Min.)               | : 8.0mm (Min.)               |
| Insulation Thickness | : 0.5mm (Min.)               | : 0.5mm (Min.)               |

Unit in mm



Weight : 0.42g

**PIN CONFIGURATIONS (TOP VIEW)**



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

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

## 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</sub> (RMS)	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
	Power Dissipation	P <sub>D</sub>	150	mW
	Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>D</sub> /°C	-2.0	mW/°C
	Junction Temperature	T <sub>j</sub>	100	°C
Storage Temperature Range		T <sub>stg</sub>	-55~125	°C
Operating Temperature Range		T <sub>opr</sub>	-40~100	°C
Lead Soldering Temperature (10s)		T <sub>sol</sub>	260	°C
Total Package Power Dissipation		P <sub>T</sub>	250	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP <sub>T</sub> /°C	-3.3	mW/°C
Isolation Voltage (AC, 1min., R.H. ≤ 60%) (Note)		BV <sub>S</sub>	4000	V <sub>rms</sub>

(Note) 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 <sub>AC</sub>	—	—	120	V <sub>ac</sub>
Forward Current	I <sub>F</sub>	20	—	25	mA
Operating Temperature	T <sub>opr</sub>	-25	—	85	°C
Gate to Cathode Resistance	R <sub>GK</sub>	—	27	33	kΩ
Gate to Cathode Capacity	C <sub>GK</sub>	—	0.01	0.1	μF

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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 foreign exchange and foreign trade control laws.
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- The information contained herein is subject to change without notice.

## 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	—	20	—	pF	
			Gate to Cathode	—	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	$R_S$	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	4000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

