TOSHIBA TLP748J

TOSHIBA Photocoupler GaAs IRed & Photo-Thyristor

# **TENTATIVE**

# TLP748J

Office Machine
Household Use Equipment
Solid State Relay
Switching Power Supply

The TOSHIBA TLP748J 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: 600 V (min.)
- Trigger LED current: 10 mA (max.)
- On-state current: 150 mA (max.)
- UL recognized (scheduled): UL1577, file no. E67349
- BSI approved (scheduled): BS EN60065

#### BS EN60950:

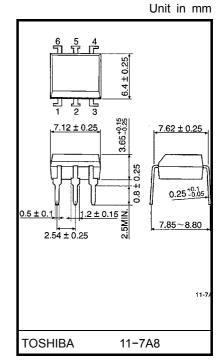
- SEMKO approved (scheduled): SS4330784,
   SS-EN60950
- Isolation voltage: 4000 Vrms (min.)
- Option (D4) type

VDE approved (scheduled): DIN EN 60747-5-2

Maximum operating insulation voltage:  $630\ V_{pk}$ ,  $890\ V_{pk}$  Highest permissible over voltage:  $6000\ V_{pk}$ ,  $8000\ V_{pk}$ 

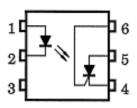
# (Note) When a EN 60747-5-2 approved type is needed, please designate the "option (D4)"

		7.62 mm pich	10.16 mm pich			
		standard type	(LF2) type			
•	Creepage distance:	7.0 mm (min.)	8.0 mm (min.)			
	Clearance:	7.0 mm (min.)	8.0 mm (min.)			
	Insulation thickness:	0.5 mm (min.)	0.5 mm (min.)			



Weight: 0.42g

### Pin Configuration (top view)



- 1: ANODE
- 2 : CATHODE
- 3: N.C.
- 4: CATHODE
- 5 : ANODE
- 6 : GATE



### Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Q	Forward current	l <sub>F</sub>	50	mA
	Forward current derating (Ta ≥ 39°C)	ΔI <sub>F</sub> / °C	-0.7	mA / °C
LED	Peak forward current (100 µs pulse, 100 pps)	I <sub>FP</sub>	1	Α
	Reverse voltage	V <sub>R</sub>	5	V
	Peak forward voltage ( $R_{GK}$ = 27 k $\Omega$ )	$V_{DRM}$	600	V
	Peak reverse voltage (R <sub>GK</sub> = 27 kΩ)	V <sub>RRM</sub>	600	V
jo	On-state current	I <sub>T(RMS)</sub>	150	mA
Detector	On–state current derating (Ta ≥ 25°C)	ΔI <sub>T</sub> / °C	-2.0	mA / °C
ă	Peak on-state current (100µs pulse, 120 pps)	I <sub>TP</sub>	3	Α
	Peak one cycle surge current	I <sub>TSM</sub>	2	Α
	Peak reverse gate voltage	V <sub>GM</sub>	5	V
Storag	Storage temperature range		-55~125	°C
Opera	Operating temperature range		-55~100	°C
Lead s	Lead soldering temperature (10 s)		260	°C
Isolatio	Isolation voltage (AC, 1 min., R.H.≤ 60%)		4000	V <sub>rms</sub>

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).

### **Recommended Operating Conditions**

Characteristic	Symbol	Min.	Тур.	Max.	Unit
Supply voltage	V <sub>AC</sub>	_	_	240	V <sub>ac</sub>
Forward current	l <sub>F</sub>	15	_	25	mA
Operating temperature	T <sub>opr</sub>	-25	_	85	°C
Gate to cathode resistance	R <sub>GK</sub>	_	10	27	kΩ
Gate to cathode capacity	C <sub>GK</sub>	_	0.01	0.1	μF

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.



## Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition		Min.	Тур.	Max.	Unit
	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA		1.0	1.15	1.3	V
LED	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5 V		_	_	10	μΑ
	Capacitance	C <sub>T</sub>	V = 0, f = 1 MHz		_	30	_	pF
	Off-state current	I <sub>DRM</sub>	V <sub>AK</sub> = 600 V, R <sub>GK</sub> = 27 kΩ		_	_	5	μA
	Reverse current	I <sub>RRM</sub>	$V_{KA} = 600 \text{ V}, R_{GK} = 27 \text{ k}\Omega$		_	_	5	μΑ
or	On-state voltage	V <sub>TM</sub>	I <sub>TM</sub> = 100 mA		_	_	1.45	V
Detector	Holding current	lΗ	R <sub>GK</sub> = 27 kΩ		_	_	1	mA
De	Off-state dv / dt	dv / dt	V <sub>AK</sub> = 420 V, R <sub>GK</sub> = 27 kΩ		5	_	_	V/µs
	Capacitance $C_j$ $V = 0, f =$	\/ = 0 f = 4 MH=	Anode to gate	_	_	_	, r	
		v = 0, i = 1 Winz	Gate to cathode		_		pF	

### Coupled Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit	
Trigger LED current	I <sub>FT</sub>	$V_{AK}$ = 6 V, $R_{GK}$ = 27 k $\Omega$	_	_	10	mA	
Turn-on time	ton	$I_F$ = 30 mA, $V_{AA}$ = 50 V $R_{GK}$ = 27 k $\Omega$	_	_	_	μs	
Capacitance (input to output)	CS	V <sub>S</sub> = 0, f = 1 MHz	_	0.8	_	pF	
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V	1×10 <sup>12</sup>	10 <sup>14</sup>	_	Ω	
	BVS	AC, 1 minute	4000	_	_	V	
Isolation voltage		AC, 1 second, in oil	_	10000	_	V <sub>rms</sub>	
		DC, 1 minute, in oil	_	10000	_	V <sub>dc</sub>	

TOSHIBA TLP748J

#### **RESTRICTIONS ON PRODUCT USE**

20070701-EN

- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in his document shall be made at the customer's own risk.
- The products described in this document shall not be used or embedded to any downstream products of which
  manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patents or other rights of TOSHIBA or the third parties.
- GaAs(Gallium Arsenide) is used in this product. The dust or vapor is harmful to the human body. Do not break, cut, crush or dissolve chemically.
- Please use this product in compliance with all applicable laws and regulations that regulate the inclusion or use of
  controlled substances. Toshiba assumes no liability for damage or losses occurring as a result of noncompliance
  with applicable laws and regulations.