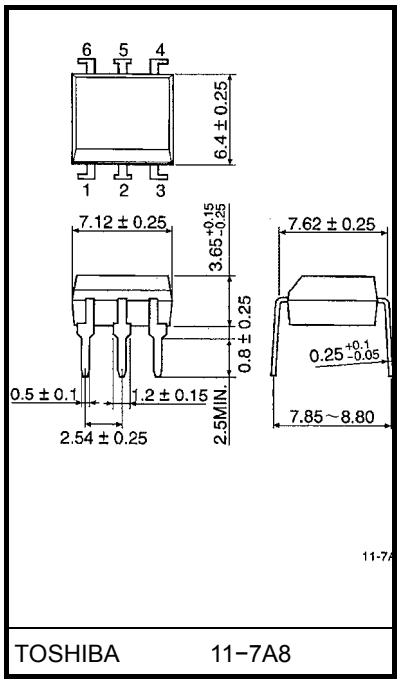
TOSHIBA Photocoupler GaAs IRed & Photo-Thyristor

TENTATIVE

# TLP748J

Office Machine
Household Use Equipment
Solid State Relay
Switching Power Supply

Unit in mm




TOSHIBA 11−7A8

Weight: 0.42g

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:

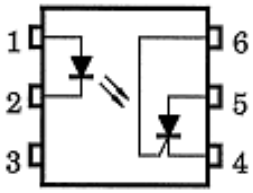
- SEMKO approved (scheduled): SS4330784、
  SS-EN60950
- Isolation voltage: 4000 Vrms (min.)
- Option (D4) type
  VDE approved (scheduled): DIN EN 60747-5-2

  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 standard type | 10.16 mm pich (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.) |

## 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 |
|---|---|---|---|---|
| LED | Forward current | $I_F$ | 50 | mA |
| | Forward current derating (Ta ≥ 39°C) | $\Delta I_F$ / °C | −0.7 | mA / °C |
| | Peak forward current (100 μs pulse, 100 pps) | $I_{FP}$ | 1 | A |
| | Reverse voltage | $V_R$ | 5 | V |
| Detector | Peak forward voltage ($R_{GK}$ = 27 kΩ) | $V_{DRM}$ | 600 | V |
| | Peak reverse voltage ($R_{GK}$ = 27 kΩ) | $V_{RRM}$ | 600 | V |
| | On−state current | $I_{T(RMS)}$ | 150 | mA |
| | On−state current derating (Ta ≥ 25°C) | $\Delta I_T$ / °C | −2.0 | mA / °C |
| | Peak on−state current (100μs pulse, 120 pps) | $I_{TP}$ | 3 | A |
| | Peak one cycle surge current | $I_{TSM}$ | 2 | A |
| | Peak reverse gate voltage | $V_{GM}$ | 5 | V |
| Storage temperature range | | $T_{stg}$ | −55~125 | °C |
| Operating temperature range | | $T_{opr}$ | −55~100 | °C |
| Lead soldering temperature (10 s) | | $T_{sol}$ | 260 | °C |
| Isolation voltage (AC, 1 min., R.H.≤ 60%) | | $BV_S$ | 4000 | $V_{rms}$ |

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. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Supply voltage | $V_{AC}$ | — | — | 240 | $V_{ac}$ |
| Forward current | $I_F$ | 15 | — | 25 | mA |
| Operating temperature | $T_{opr}$ | −25 | — | 85 | °C |
| Gate to cathode resistance | $R_{GK}$ | — | 10 | 27 | kΩ |
| Gate to cathode capacity | $C_{GK}$ | — | 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. | 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 | $I_{DRM}$ | $V_{AK}$ = 600 V, $R_{GK}$ = 27 kΩ | | — | — | 5 | μA |
| | Reverse current | $I_{RRM}$ | $V_{KA}$ = 600 V, $R_{GK}$ = 27 kΩ | | — | — | 5 | μA |
| | On−state voltage | $V_{TM}$ | $I_{TM}$ = 100 mA | | — | — | 1.45 | V |
| | Holding current | $I_H$ | $R_{GK}$ = 27 kΩ | | — | — | 1 | mA |
| | Off−state dv / dt | dv / dt | $V_{AK}$ = 420 V, $R_{GK}$ = 27 kΩ | | 5 | — | — | V/μs |
| | Capacitance | $C_j$ | V = 0, f = 1 MHz | Anode to gate | — | — | — | pF |
| | | | | Gate to cathode | — | — | — | |

## Coupled Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Trigger LED current | $I_{FT}$ | $V_{AK}$ = 6 V, $R_{GK}$ = 27 kΩ | — | — | 10 | mA |
| Turn−on time | $t_{ON}$ | $I_F$ = 30 mA, $V_{AA}$ = 50 V<br>$R_{GK}$ = 27 kΩ | — | — | — | μs |
| Capacitance (input to output) | $C_S$ | $V_S$ = 0, f = 1 MHz | — | 0.8 | — | pF |
| Isolation resistance | $R_S$ | $V_S$ = 500 V | $1\times10^{12}$ | $10^{14}$ | — | Ω |
| Isolation voltage | $BV_S$ | AC, 1 minute | 4000 | — | — | $V_{rms}$ |
| | | AC, 1 second, in oil | — | 10000 | — | |
| | | DC, 1 minute, in oil | — | 10000 | — | $V_{dc}$ |

## 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.
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- 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.