

## TLP741J

Office Machine

Household Use Equipment

Solid State Relay

Switching Power Supply

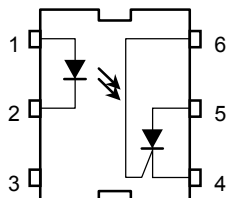
The TOSHIBA TLP741J consists of a photo-thyristor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- Peak off-state voltage: 600 V (min.)
- Trigger LED current: 10 mA (max.)
- On-state current: 150 mA (max.)
- UL recognized: UL1577, file no. E67349
- BSI approved: BS EN60065: 2002  
Certificate no. 8877  
BS EN60950-1: 2002  
Certificate no. 8878  
Isolation voltage: 4000 V<sub>rms</sub> (min.)
- Option (D4) type  
VDE approved: DIN EN 60747-5-2  
Certificate no. 40009302  
Maximum operating insulation voltage: 630 VPK  
Highest permissible over voltage: 6000 VPK

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

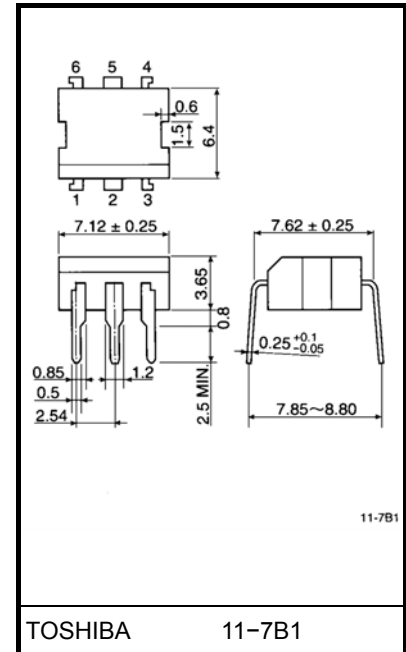
|                         | 7.62 mm pich<br>standard type | 10.16 mm pich<br>(LF2) type |
|-------------------------|-------------------------------|-----------------------------|
| • Creepage distance:    | 7.0 mm (min.)                 | 8.0 mm (min.)               |
| • Clearance:            | 7.0 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

Unit in mm



Weight: 0.35 g (typ.)

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

| Characteristic                                       |                                              | Symbol                        | Rating  | Unit      |
|------------------------------------------------------|----------------------------------------------|-------------------------------|---------|-----------|
| LED                                                  | Forward current                              | $I_F$                         | 60      | mA        |
|                                                      | Forward current derating (Ta ≥ 39°C)         | $\Delta I_F / ^\circ\text{C}$ | -0.7    | mA / °C   |
|                                                      | Peak forward current (100 μs pulse, 100 pps) | $I_{FP}$                      | 1       | A         |
|                                                      | Power dissipation                            | $P_D$                         | 100     | mW        |
|                                                      | Power dissipation derating (Ta ≥ 25°C)       | $\Delta P_D / ^\circ\text{C}$ | -1.0    | mW / °C   |
|                                                      | Reverse voltage                              | $V_R$                         | 5       | V         |
|                                                      | Junction temperature                         | $T_j$                         | 125     | °C        |
| Detector                                             | Peak forward voltage (RGK = 27 kΩ)           | $V_{DRM}$                     | 600     | V         |
|                                                      | Peak reverse voltage (RGK = 27 kΩ)           | $V_{RRM}$                     | 600     | V         |
|                                                      | On-state current                             | $I_{T(RMS)}$                  | 150     | mA        |
|                                                      | On-state current derating (Ta ≥ 25°C)        | $\Delta I_T / ^\circ\text{C}$ | -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         |
|                                                      | Power dissipation                            | $P_D$                         | 150     | mW        |
|                                                      | Power dissipation derating (Ta ≥ 25°C)       | $\Delta P_D / ^\circ\text{C}$ | -2.0    | mW / °C   |
|                                                      | Junction temperature                         | $T_j$                         | 100     | °C        |
|                                                      | 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        |
| Total package power dissipation                      |                                              | $P_T$                         | 250     | mW        |
| Total package power dissipation derating (Ta ≥ 25°C) |                                              | $\Delta P_T / ^\circ\text{C}$ | -3.3    | mW / °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   | 20   | 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       |

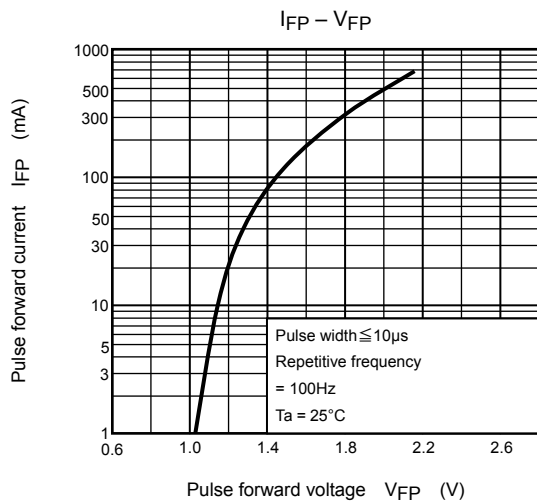
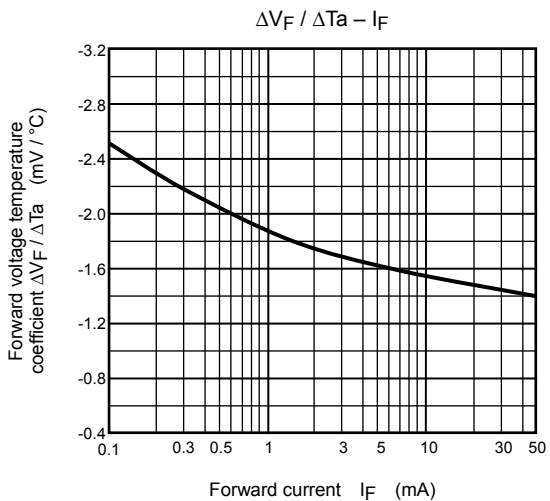
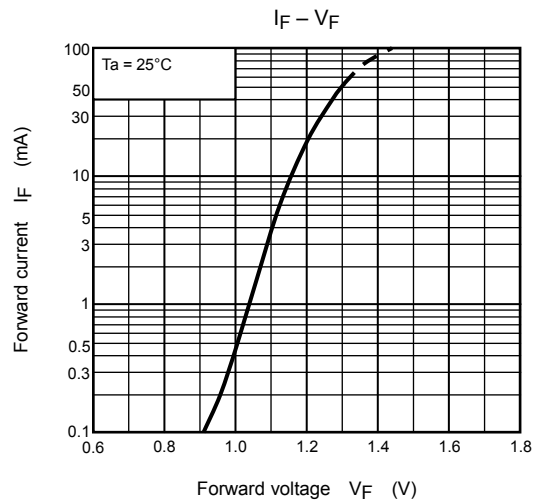
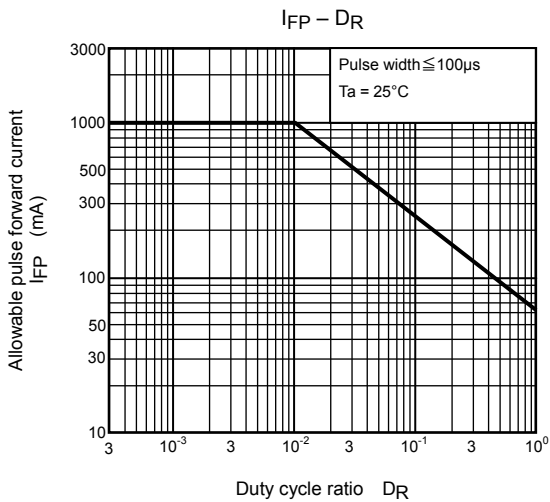
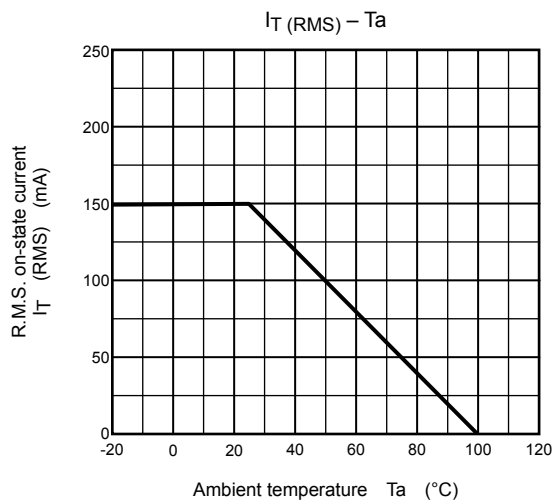
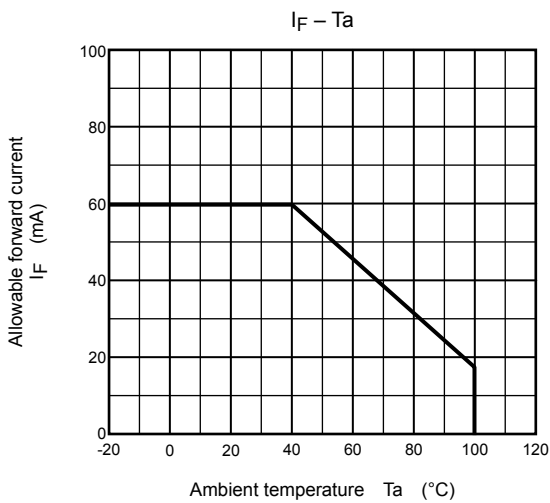
Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

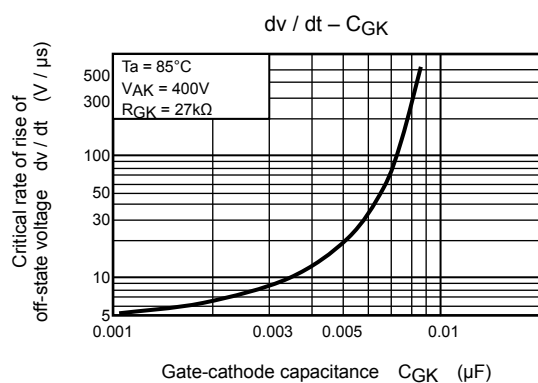
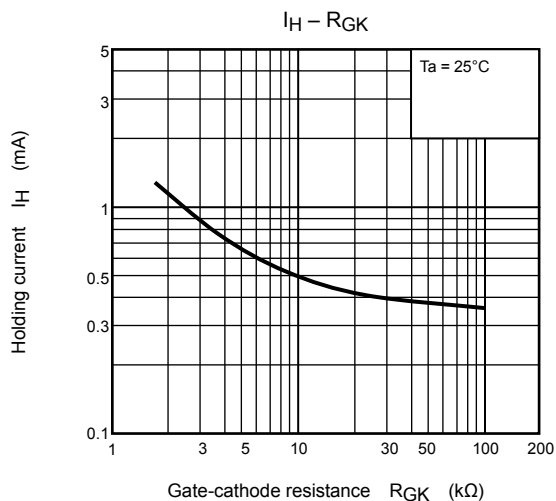
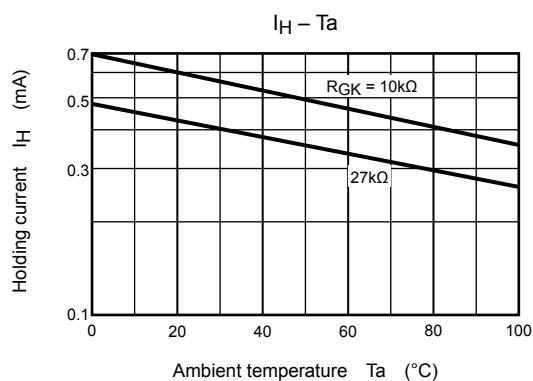
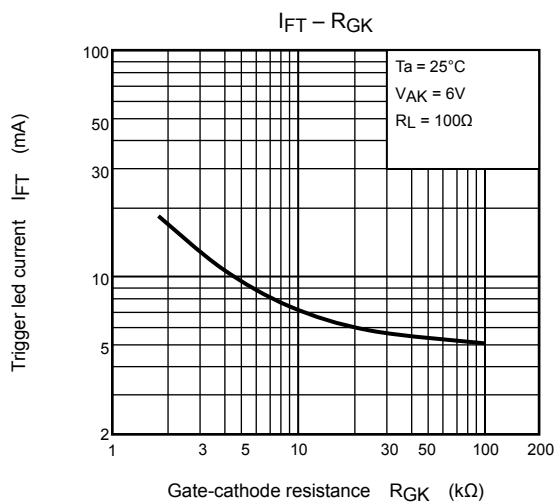
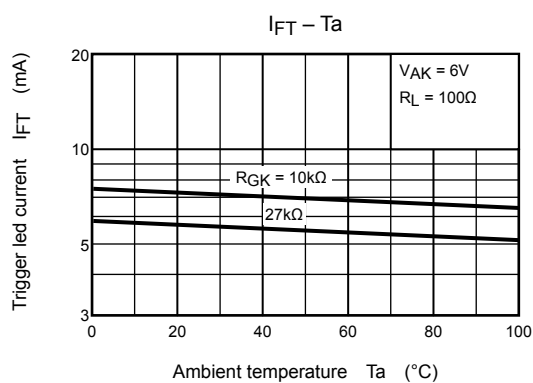
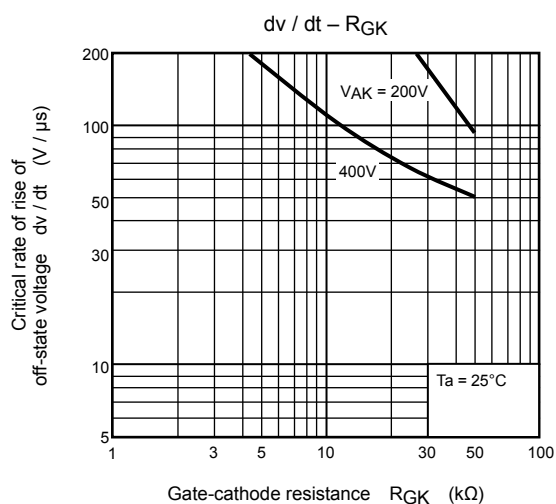
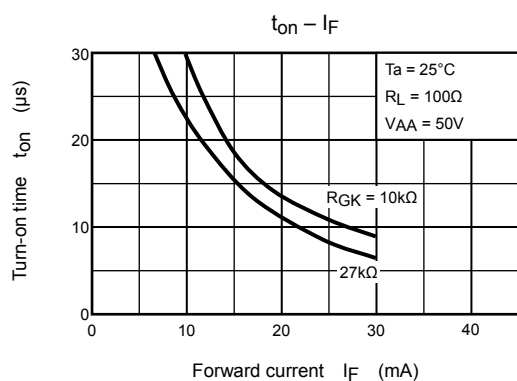
**Individual Electrical Characteristics (Ta = 25°C)**

| Characteristic |                   | Symbol    | Test Condition                                            |                 | Min. | Typ. | Max. | Unit             |
|----------------|-------------------|-----------|-----------------------------------------------------------|-----------------|------|------|------|------------------|
| LED            | Forward voltage   | $V_F$     | $I_F = 10 \text{ mA}$                                     |                 | 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 | $I_{DRM}$ | $V_{AK} = 600 \text{ V}$<br>$R_{GK} = 27 \text{ k}\Omega$ | Ta = 25°C       | —    | 10   | 5000 | nA               |
|                |                   |           |                                                           | Ta = 85°C       | —    | 1    | 150  | $\mu\text{A}$    |
|                | Reverse current   | $I_{RRM}$ | $V_{KA} = 600 \text{ V}$<br>$R_{GK} = 27 \text{ k}\Omega$ | Ta = 25°C       | —    | 10   | 5000 | nA               |
|                |                   |           |                                                           | Ta = 85°C       | —    | 1    | 150  | $\mu\text{A}$    |
|                | 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   | $V_{AK} = 420 \text{ V}, R_{GK} = 27 \text{ k}\Omega$     |                 | —    | 10   | —    | V/ $\mu\text{s}$ |
|                | Capacitance       | $C_j$     | $V = 0, f = 1 \text{ MHz}$                                | 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           | $I_{FT}$ | $V_{AK} = 6 \text{ V}, R_{GK} = 27 \text{ k}\Omega$                           | —                  | 5         | 10   | mA                |
| Turn-on time                  | $t_{ON}$ | $I_F = 30 \text{ mA}, V_{AA} = 50 \text{ V}$<br>$R_{GK} = 27 \text{ k}\Omega$ | —                  | 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          | $R_S$    | $V_S = 500 \text{ V}$                                                         | $1 \times 10^{12}$ | $10^{14}$ | —    | $\Omega$          |
| Isolation voltage             | $BV_S$   | AC, 1 minute                                                                  | 4000               | —         | —    | $V_{rms}$         |
|                               |          | AC, 1 second, in oil                                                          | —                  | 10000     | —    |                   |
|                               |          | DC, 1 minute, in oil                                                          | —                  | 10000     | —    | $V_{dc}$          |





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