

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-THYRISTOR

## TLP543J, TLP545J

PROGRAMMABLE CONTROLLERS

AC-OUTPUT MODULE

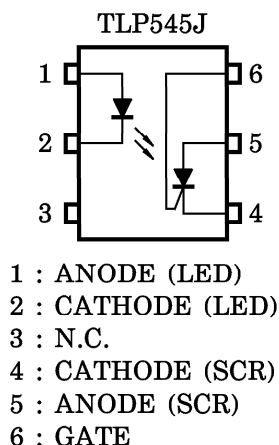
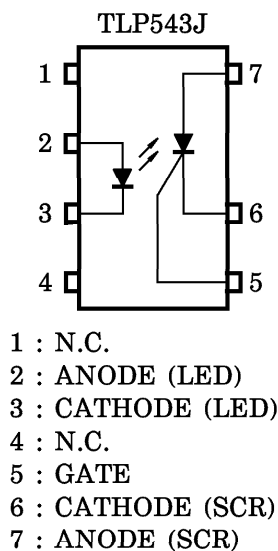
SOLID STATE RELAY

The TOSHIBA TLP543J consists of a phot-thyristor optically coupled to a gallium arsenide infrared emitting diode in a seven lead plastic DIP package.

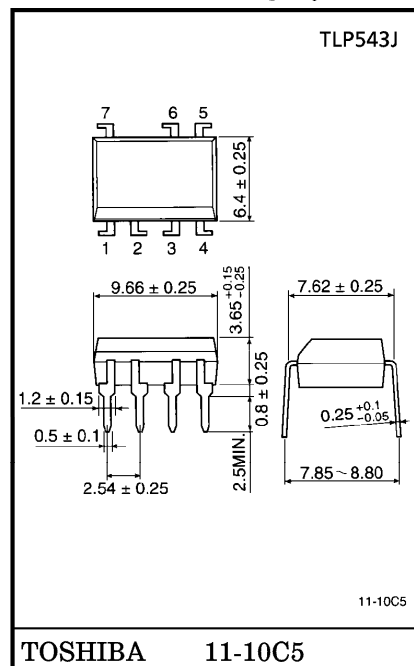
The TOSHIBA TLP545J consists of a photo-thyristor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

- Trigger LED Current :  $I_{FT}=10\text{mA}$  (Max.)
- On-State Current :  $I_T(\text{RMS})=150\text{mA}$
- Peak Off-State Voltage :  $V_{DRM}=V_{RRM}=600\text{V}$  (Min.)
- Isolation Voltage :  $2500V_{\text{rms}}$  (Min.)
- UL Recognized : UL1577, File No. E67349

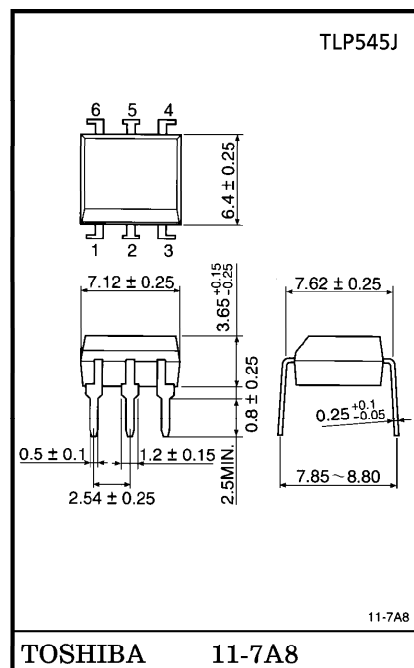
PIN CONFIGURATIONS (TOP VIEW)



Unit in mm



Weight : 0.53g



Weight : 0.4g

## MAXIMUM RATINGS (Ta = 25°C)

|                                           |                                                      | SYMBOL                        | RATING  | UNIT    |
|-------------------------------------------|------------------------------------------------------|-------------------------------|---------|---------|
| LED                                       | Forward Current                                      | $I_F$                         | 70      | mA      |
|                                           | Forward Current Derating (Ta $\geq$ 25°C)            | $\Delta I_F / ^\circ\text{C}$ | -0.7    | mA / °C |
|                                           | Peak Forward Current (Note 1)                        | $I_{FP}$                      | 1       | A       |
|                                           | Reverse Voltage                                      | $V_R$                         | 5       | V       |
|                                           | Junction Temperature                                 | $T_j$                         | 125     | °C      |
| DETECTOR                                  | Peak Forward Voltage ( $R_{GK} = 27\text{k}\Omega$ ) | $V_{DRM}$                     | 600     | V       |
|                                           | Peak Reverse Voltage ( $R_{GK} = 27\text{k}\Omega$ ) | $V_{RRM}$                     |         |         |
|                                           | On-State Current                                     | $I_T(\text{RMS})$             | 150     | mA      |
|                                           | On-State Current Derating                            | $\Delta I_T / ^\circ\text{C}$ | -2      | mA / °C |
|                                           | Peak One Cycle Surge Current                         | $I_{TSM}$                     | 1       | A       |
|                                           | Peak Reverse Gate Voltage                            | $V_{GM}$                      | -5      | V       |
|                                           | Junction Temperature                                 | $T_j$                         | 100     | °C      |
| Operating Temperature Range               |                                                      | $T_{opr}$                     | -30~100 | °C      |
| Storage Temperature Range                 |                                                      | $T_{stg}$                     | -55~125 | °C      |
| Lead Soldering Temperature (10s) (Note 2) |                                                      | $T_{sol}$                     | 260     | °C      |

(Note 1) Pulse width  $\leq 100\mu\text{s}$ ,  $f = 100\text{Hz}$ 

(Note 2) Soldering portion of lead : up to 2mm from body of the device.

## RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC             | SYMBOL    | MIN. | TYP. | MAX. | UNIT            |
|----------------------------|-----------|------|------|------|-----------------|
| Supply Voltage             | $V_{AC}$  | —    | —    | 250  | V <sub>AC</sub> |
| Forward Current            | $I_F$     | 15   | 20   | 25   | mA              |
| Operating Temperature      | $T_{opr}$ | -30  | —    | 85   | °C              |
| Gate to Cathode Resistance | $R_{GK}$  | —    | 10   | 27   | k $\Omega$      |
| Gate to Cathode Capacity   | $C_{GK}$  | —    | 0.01 | 0.1  | $\mu\text{F}$   |

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

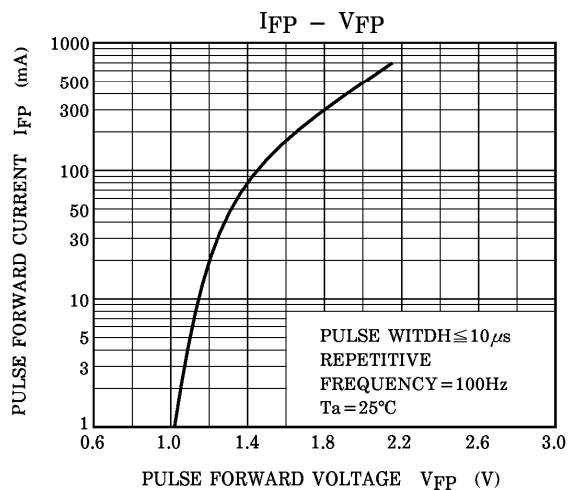
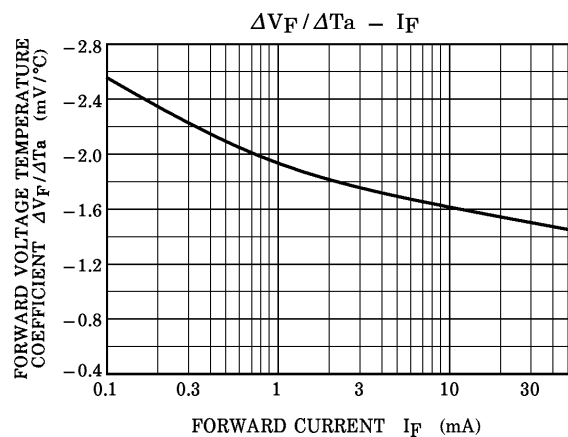
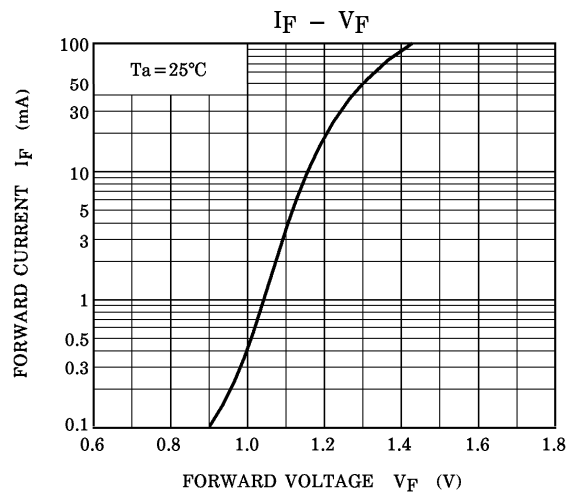
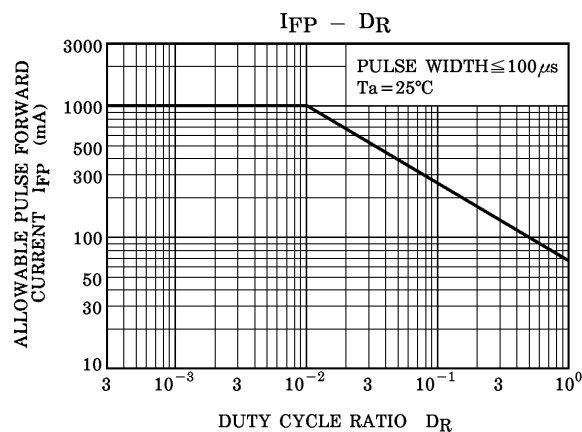
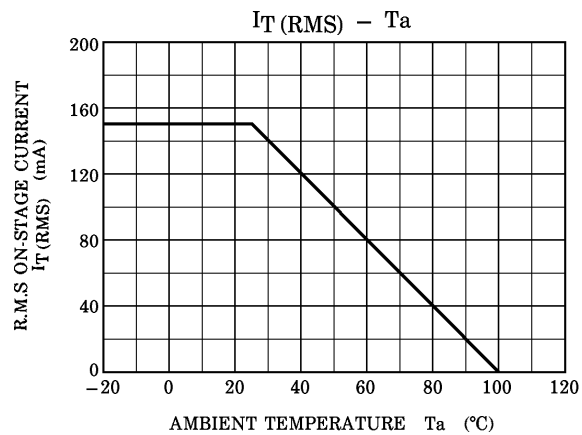
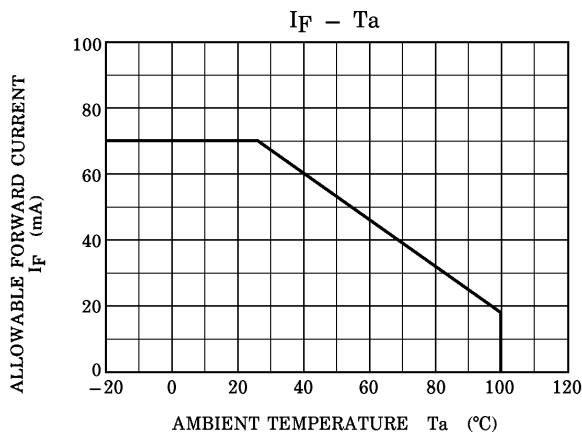
| CHARACTERISTIC |                                       | SYMBOL                  | TEST CONDITION                                       | MIN. | TYP. | MAX. | UNIT              |
|----------------|---------------------------------------|-------------------------|------------------------------------------------------|------|------|------|-------------------|
| 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 and Reverse Current | $I_{DRM}$ and $I_{RRM}$ | $V_{DRM} = \text{Rating}, R_{GK} = 27\text{k}\Omega$ | —    | —    | 5    | $\mu\text{A}$     |
|                | On-State Voltage                      | $V_{TM}$                | $I_{TM} = 100\text{mA}$                              | —    | —    | 1.3  | V                 |
|                | Holding Current                       | $I_H$                   | $R_{GK} = 27\text{k}\Omega$                          | —    | 0.2  | —    | mA                |
|                | Off-State $dv/dt$                     | $dv/dt$                 | $V_{AK} = \text{Rating}, R_{GK} = 27\text{k}\Omega$  | —    | 10   | —    | V / $\mu\text{s}$ |

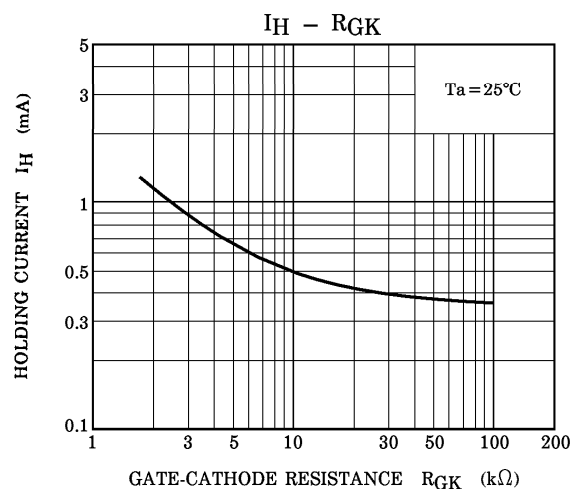
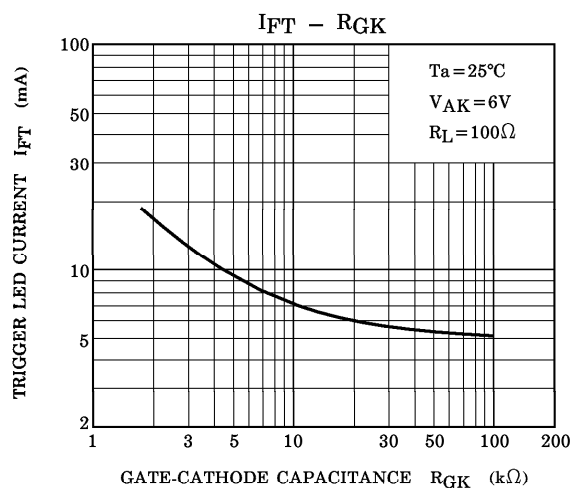
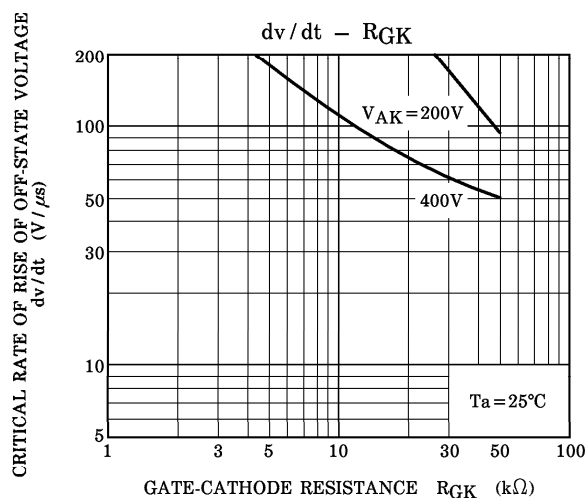
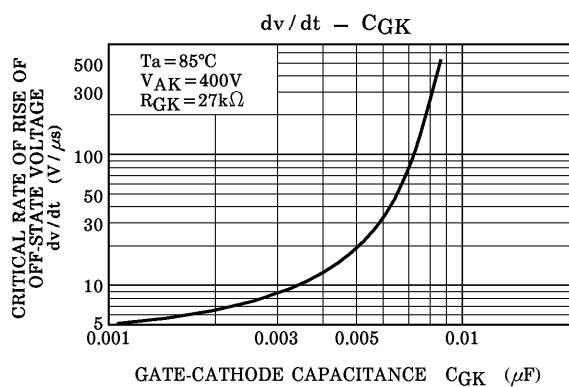
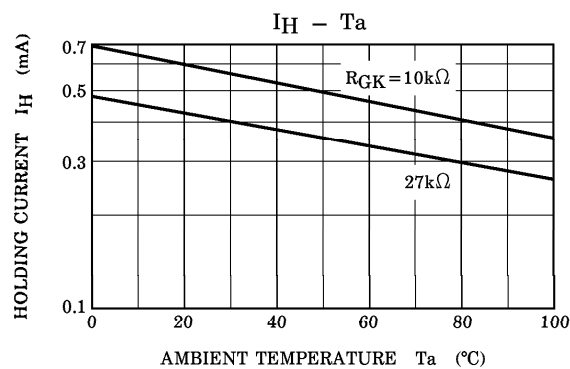
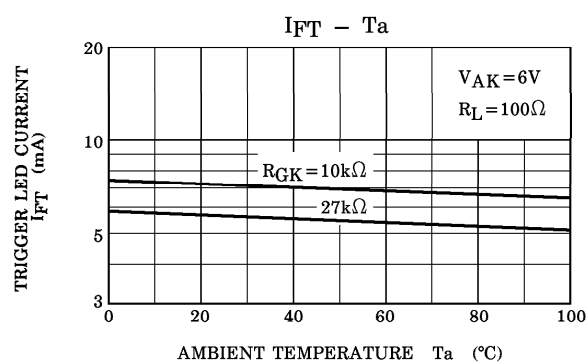
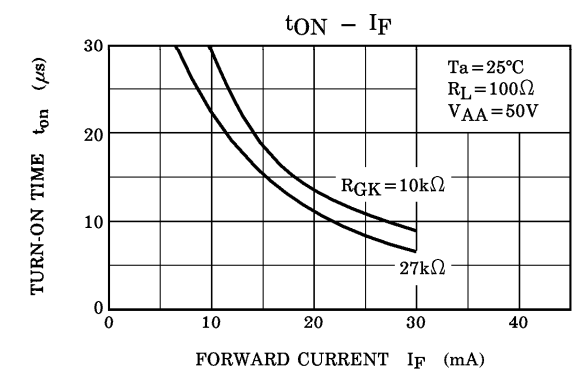
## COUPLED CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                | SYMBOL   | TEST CONDITION                                                       | MIN.               | TYP.      | MAX. | UNIT          |
|-------------------------------|----------|----------------------------------------------------------------------|--------------------|-----------|------|---------------|
| Trigger LED Current           | $I_{FT}$ | $V_{AK} = 6\text{V}, R_{GK} = 27\text{k}\Omega$<br>$R_L = 100\Omega$ | —                  | —         | 10   | mA            |
| Turn-On Time                  | $t_{ON}$ | $I_F = 50\text{mA}, R_{GK} = 27\text{k}\Omega$                       | —                  | 10        | —    | $\mu\text{s}$ |
| Capacitance (Input to Output) | $C_S$    | $V = 0, f = 1\text{MHz}$                                             | —                  | 0.8       | —    | pF            |
| Isolation Resistance          | $R_S$    | $R.H. \leq 60\%, V = 500\text{V}$                                    | $5 \times 10^{10}$ | $10^{14}$ | —    | $\Omega$      |
| Isolation Voltage (Note 3)    | $BV_S$   | AC, 1 minute, $R.H. \leq 60\%$                                       | 2500               | —         | —    | $V_{rms}$     |

(Note 3) TLP543J : Device considered a two terminal device : Pins 1, 2, 3 and 4 shorted together and pins 5, 6, 7 and 8 shorted together.

TLP545J : Device considered a two terminal device : Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.





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