

TENTATIVE

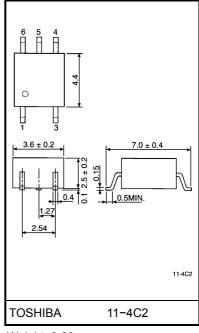
TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

# TLP141G

Programmable Controllers AC-Output Module Solid State Relay

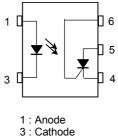
The TOSHIBA mini flat coupler TLP141G is a small outline coupler, suitable for surface mount assembly. The TLP141G consists of a photo thyristor, optically coupled to a gallium arsenide infrared emitting diode.

- Peak off-state voltage: 400 V (min.)
- Trigger LED current: 10 mA (max.)
- On-state current: 150 mA (max.)
- Isolation voltage: 2500 Vrms (min.)
- UL recognized: UL1577, file no. E67349



Weight: 0.09 g

#### **Pin Connections**



4 : Cathode 5 : Anode.

<sup>6 :</sup> Gate

### Maximum Ratings (Ta = 25°C)

|          | Characteristic                                   | Symbol                        | Rating  | Unit    |  |
|----------|--|-------------------------------|---------|---------|--|
| LED      | Forward current                                  | lF                            | 50      | mA      |  |
|          | Forward current derating (Ta ≥ 53°C)             | ΔI <sub>F</sub> /°C           | -0.7    | mA / °C |  |
|          | Peak forward current (100 µs pulse, 100 pps)     | I <sub>FP</sub>               | 1       | А       |  |
|          | Reverse voltage                                  | V <sub>R</sub>                | 5       | V       |  |
|          | Junction temperature                             | Tj                            | 125     | °C      |  |
|          | Peak forward voltage( $R_{GK}$ = 27k $\Omega$ )  | V <sub>DRM</sub>              | 400     | V       |  |
| Detector | Peak reverse voltage( $R_{GK}$ = 27k $\Omega$ )  | V <sub>DRM</sub>              | 400     | V       |  |
|          | On-state current                                 | I <sub>T(RMS)</sub>           | 150     | mA      |  |
|          | On–state current derating (Ta ≥ 25°C)            | ΔI <sub>T</sub> / °C          | -2.0    | mA / °C |  |
|          | Peak one cycle surge current                     | I <sub>TSM</sub>              | 2       | А       |  |
|          | Peak reverse gate voltage                        | V <sub>GM</sub>               | 5       | V       |  |
|          | Junction temperature                             | Tj                            | 100     | °C      |  |
| Storag   | e temperature range                              | T <sub>stg</sub>              | -55~125 | °C      |  |
| Operat   | ing temperature range                            | ange T <sub>opr</sub> -55~100 |         | °C      |  |
| Lead s   | oldering temperature (10 s)                      | T <sub>sol</sub>              | 260 °C  |         |  |
| Isolatic | on voltage (AC, 1 min., $RH \le 60\%$ ) (Note 1) | BVS                           | 2500    | Vrms    |  |

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

## **Recommended Operating Conditions**

| Characteristic              | Symbol           | Min.  | Тур. | Max. | Unit |
|-----------------------------|------------------|-------|------|------|------|
| Supply voltage              | V <sub>AC</sub>  | — —   |      | 120  | Vac  |
| Forward current             | ١ <sub>F</sub>   | 15 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 capacitance | C <sub>GK</sub>  |       | 0.01 | 0.1  | μF   |

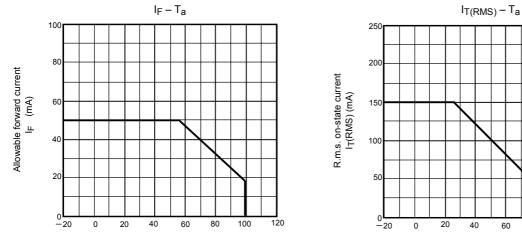
# Individual Electrical Characteristics (Ta = 25°C)

| Characteristic |                                  | Symbol           | Test Condition                                     |               | Min. | Тур. | Max. | Unit   |
|----------------|----------------------------------|------------------|--|---------------|------|------|------|--------|
| LED            | Forward voltage                  | V <sub>F</sub>   | I <sub>F</sub> = 10 mA                             |               | 1.0  | 1.15 | 1.3  | V      |
|                | Reverse current                  | I <sub>R</sub>   | V <sub>R</sub> = 5 V                               |               |      | _    | 10   | μA     |
|                | Capacitance                      | CT               | V = 0, f = 1 MHz                                   |               | _    | 30   | _    | pF     |
| Detector       | Off-state current                | IDRM             | V <sub>AK</sub> = 400 V<br>R <sub>GK</sub> = 27 kΩ | Ta = 25°C     |      | 10   | 5000 | nA     |
|                |                                  |                  |  | Ta = 100°C    | _    | 1    | 100  | μA     |
|                | Reverse current                  | I <sub>RRM</sub> | V <sub>KA</sub> = 70 mA                            | Ta = 25°C     | _    | 10   | 5000 | nA     |
|                |                                  |                  | R <sub>GK</sub> = 27 kΩ                            | Ta = 100°C    | _    | 1    | 100  | μA     |
|                | On-state voltage                 | V <sub>TM</sub>  | I <sub>TM</sub> = 100 mA                           |               | _    | 0.9  | 1.3  | V      |
|                | Holding current                  | Iн               | R <sub>GK</sub> = 27 kΩ                            |               | _    | 0.2  | 1    | mA     |
|                | Off-state dv / dt                | dv/dt            | V <sub>AK</sub> = 280 V, R <sub>GK</sub> = 27 kΩ   |               | 5    | 10   | _    | V / µs |
|                | Capacitance C <sub>j</sub> V = 0 | C.               | V = 0, f = 1 MHz                                   | Anode to gate | _    | 20   | _    | - pF   |
|                |                                  | v = 0, i = 1 MHZ | Gate to cathode                                    | _             | 350  | _    | μr   |        |

# Coupled Characteristics (Ta = 25°C)

| Characteristic                | Symbol          | Test Condition                                   | Min.               | Тур.             | Max. | Unit   |
|-------------------------------|-----------------|--|--------------------|------------------|------|--------|
| Trigger LED current           | I <sub>FT</sub> | V <sub>AK</sub> = 6 V, R <sub>GK</sub> = 27kΩ    | _                  | 4                | 10   | mA     |
| Turn–on time                  | t <sub>on</sub> | I <sub>F</sub> = 50mA, R <sub>GK</sub> = 27kΩ    | —                  | 10               | _    | μs     |
| Coupled dv / dt               | dv/dt           | $V_{\rm S}$ = 500 V, $R_{\rm GK}$ = 27k $\Omega$ | 500                | _                | —    | V / 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, R.H. ≤ 60%               | 5×10 <sup>10</sup> | 10 <sup>14</sup> | _    | Ω      |
|                               | BVS             | AC, 1 minute                                     | 2500               | _                | _    | Vrms   |
| Isolation voltage             |                 | AC, 1 second, in oil                             | —                  | 5000             | _    | VIIIS  |
|                               |                 | DC, 1 minute, in oil                             | _                  | 5000             | —    | Vdc    |

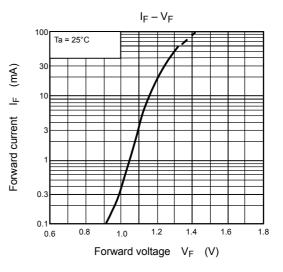
# TOSHIBA

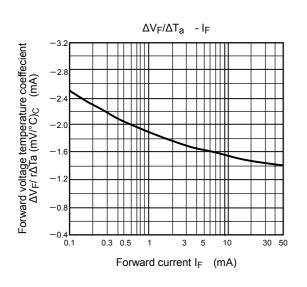


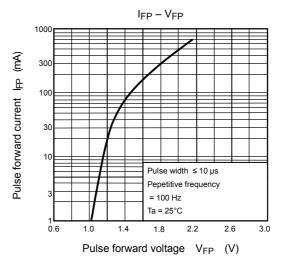


Ambient temperature T<sub>a</sub> (°C)

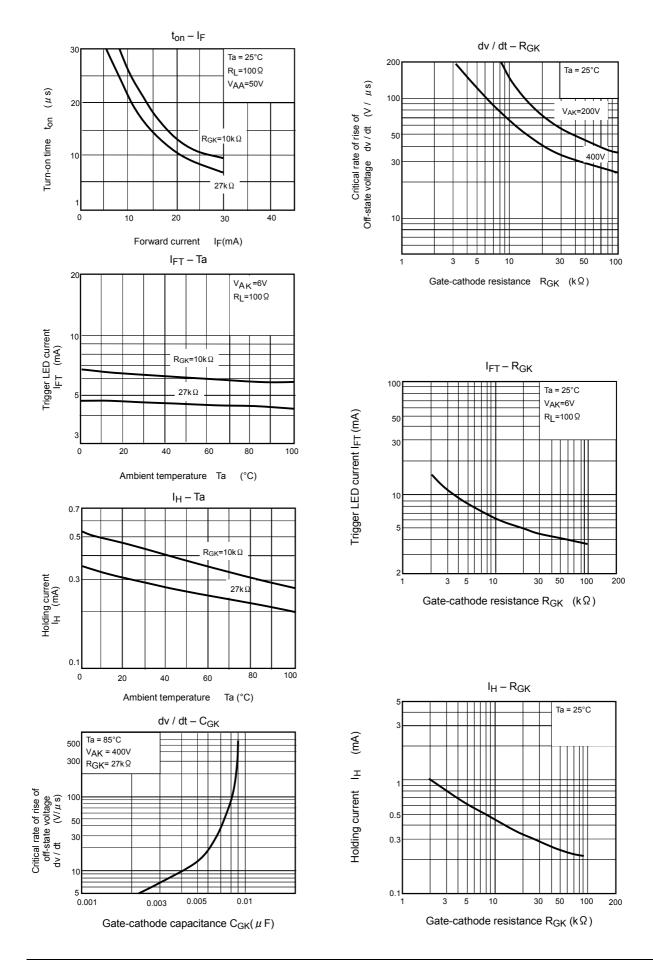
 $I_{FP} - D_R$ 3000 Pulse width ≤ 100 µs Ta = 25°C 1000 Allowable pulsed forward current IFP (mA) 100 30 Π 10 10<sup>-3</sup> 3 10-2 3 10-3 10<sup>0</sup> Duty cycle ratio D<sub>R</sub>







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