

TOSHIBA PHOTOCOUPLER GaAs IRED &amp; PHOTO-TRIAC

# TLP3527

TRIAC DRIVER

PROGRAMMABLE CONTROLLERS

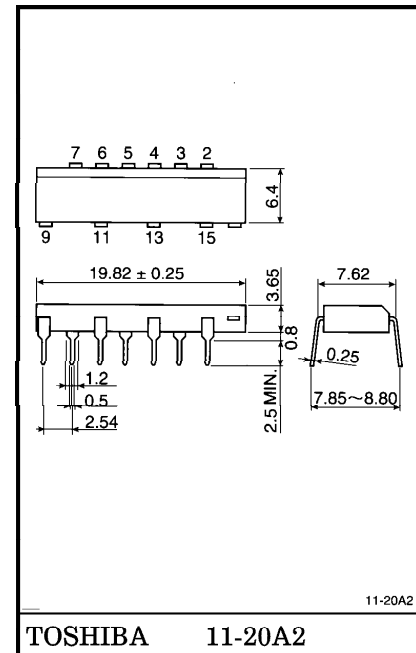
AC-OUTPUT MODULE

SOLID STATE RELAY

The TOSHIBA TLP3527 consists of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a 16 lead plastic DIP package.

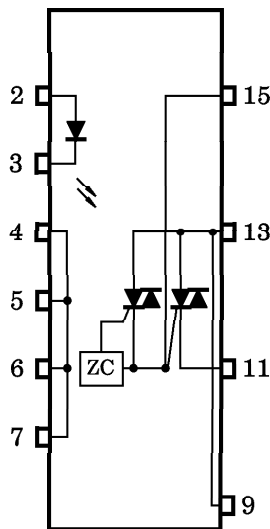
- Peak Off-State Voltage : 600V (MIN.)
- Trigger LED Current : 10mA (MAX.)
- On-State Current : 1.0A<sub>rms</sub> (MAX.)
- Isolation Voltage : 2500V<sub>rms</sub> (MIN.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



Weight : 1.13g

## PIN CONFIGURATION (TOP VIEW)



- 2 : ANODE
- 3 : CATHODE
- 4, 5, 6, 7 : N.C.
- 9, 13 : TRIAC T2
- 11 : TRIAC T1
- 15 : TRIAC GATE

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## MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC                                    |                                                         | SYMBOL               | RATING  | UNIT             |
|---------------------------------------------------|---------------------------------------------------------|----------------------|---------|------------------|
| LED                                               | Forward Current                                         | I <sub>F</sub>       | 50      | mA               |
|                                                   | Forward Current Derating (Ta ≥ 53°C)                    | ΔI <sub>F</sub> / °C | −0.7    | mA / °C          |
|                                                   | Peak Forward Current (100μs pulse, 100pps)              | I <sub>FP</sub>      | 1       | A                |
|                                                   | Reverse Voltage                                         | V <sub>R</sub>       | 5       | V                |
|                                                   | Junction Temperature                                    | T <sub>j</sub>       | 125     | °C               |
| DETECTOR                                          | Off-State Output Terminal Voltage                       | V <sub>DRM</sub>     | 600     | V                |
|                                                   | On-State RMS Current                                    | I <sub>T</sub> (RMS) | 1.0     | A                |
|                                                   |                                                         |                      | 0.7     |                  |
|                                                   | On-State Current Derating (Ta ≥ 40°C)                   | ΔI <sub>T</sub> / °C | −14.3   | mA / °C          |
|                                                   | Peak Current from Snubber Circuit (100μs pulse, 120pps) | I <sub>SP</sub>      | 2       | A                |
|                                                   | Peak Nonrepetitive Surge Current (50Hz, Peak)           | I <sub>TSM</sub>     | 10      | A                |
| Junction Temperature                              |                                                         | T <sub>j</sub>       | 110     | °C               |
| Storage Temperature Range                         |                                                         | T <sub>stg</sub>     | −40~125 | °C               |
| Operating Temperature Range                       |                                                         | T <sub>opr</sub>     | −20~80  | °C               |
| Lead Soldering Temperature (10s)                  |                                                         | T <sub>sol</sub>     | 260     | °C               |
| Isolation Voltage (AC, 1 min., R.H. ≤ 60%) (Note) |                                                         | BV <sub>S</sub>      | 2500    | V <sub>rms</sub> |

(Note) Device considered a two terminal : LED side pins shorted together and DETECTOR side pins shorted together.

## RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC                    | SYMBOL           | MIN. | TYP. | MAX. | UNIT            |
|-----------------------------------|------------------|------|------|------|-----------------|
| Supply Voltage                    | V <sub>AC</sub>  | —    | —    | 240  | V <sub>ac</sub> |
| Forward Current                   | I <sub>F</sub>   | 15   | 20   | 25   | mA              |
| Peak Current from Snubber Circuit | I <sub>SP</sub>  | —    | —    | 1    | A               |
| Operating Temperature             | T <sub>opr</sub> | −20  | —    | 80   | °C              |

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       | Peak Off-State Current                       | $I_{\text{DRM}}$ | $V_{\text{DRM}} = 600\text{V}, T_a = 110^\circ\text{C}$                            | —    | —    | 100  | $\mu\text{A}$          |
|                | Peak On-State Voltage                        | $V_{\text{TM}}$  | $I_{\text{TM}} = 1.5\text{A}$                                                      | —    | —    | 3.0  | V                      |
|                | Holding Current                              | $I_H$            | $R_L = 100\Omega$                                                                  | —    | —    | 25   | mA                     |
|                | Critical Rate of Rise of Off-State Voltage   | $dv/dt$          | $V_{\text{in}} = 240\text{V}_{\text{rms}}$ (Fig.1)                                 | —    | 500  | —    | $\text{V}/\mu\text{s}$ |
|                | Critical Rate of Rise of Commutating Voltage | $dv/dt(c)$       | $V_{\text{in}} = 240\text{V}_{\text{rms}}, I_T = 1.0\text{A}_{\text{rms}}$ (Fig.1) | —    | 5    | —    | $\text{V}/\mu\text{s}$ |

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                | SYMBOL          | TEST CONDITION                                                              | MIN.               | TYP.      | MAX. | UNIT             |
|-------------------------------|-----------------|-----------------------------------------------------------------------------|--------------------|-----------|------|------------------|
| Trigger LED Current           | $I_{\text{FT}}$ | $V_T = 6\text{V}$                                                           | —                  | —         | 10   | mA               |
| Inhibit Voltage               | $V_{\text{IH}}$ | $I_F = \text{Rated } I_{\text{FT}}$                                         | —                  | —         | 50   | V                |
| Leakage in Inhibited State    | $I_{\text{IH}}$ | $I_F = \text{Rated } I_{\text{FT}}$<br>$V_T = \text{Rated } V_{\text{DRM}}$ | —                  | 200       | —    | $\mu\text{A}$    |
| Capacitance (Input to Output) | $C_S$           | $V_S = 0, f = 1\text{MHz}$                                                  | —                  | 1.5       | —    | pF               |
| Isolation Resistance          | $R_S$           | $V_S = 500\text{V}$                                                         | $5 \times 10^{10}$ | $10^{14}$ | —    | $\Omega$         |
| Isolation Voltage             | $BV_S$          | AC, 1 minute                                                                | 2500               | —         | —    | $V_{\text{rms}}$ |
|                               |                 | AC, 1 second, in oil                                                        | —                  | 5000      | —    |                  |
|                               |                 | DC, 1 minute, in oil                                                        | —                  | 5000      | —    | $V_{\text{dc}}$  |

Fig.1 : dv / dt TEST CIRCUIT

