

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

# TLP3506

TRIAC DRIVER

PROGRAMMABLE CONTROLLERS

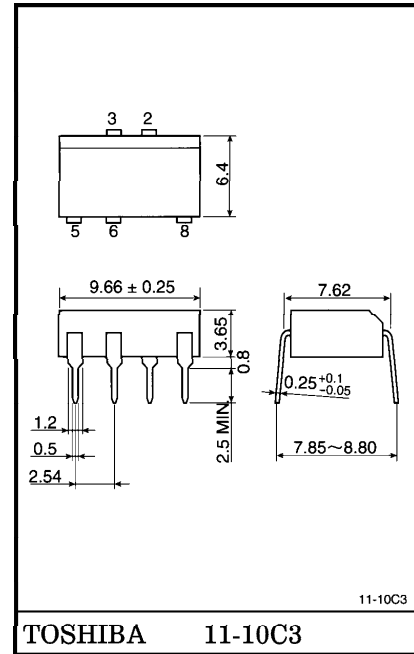
AC-OUTPUT MODULE

SOLID STATE RELAY

The TOSHIBA TLP3506 consists of a photo-triac optically coupled to a gallium arsenide infrared emitting diode in a 8 lead plastic DIP.

- Peak Off-State Voltage : 600V (MIN.)
- Trigger LED Current : 10mA (MAX.)
- On-State Current : 0.5A<sub>rms</sub> (MAX.)
- Isolation Voltage : 2500V<sub>rms</sub> (MIN.)
- UL Recognized : UL1577, File No. E67349

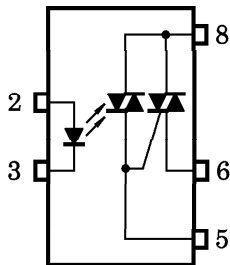
Unit in mm



TOSHIBA 11-10C3

Weight : 0.52g

**PIN CONFIGURATION (TOP VIEW)**



- 2 : ANODE
- 3 : CATHODE
- 5 : TRIAC GATE
- 6 : TRIAC T1
- 8 : TRIAC T2

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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                                    | Ta = 40°C            | 0.5              | A       |
|   |   | Ta = 60°C            | 0.35             |         |
|   | On-State Current Derating (Ta ≥ 40°C)                   | ΔI <sub>T</sub> / °C | -7.2             | 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>     | 5                | 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                       | $I_{DRM}$  | $V_{DRM} = 600\text{V}, T_a = 110^\circ\text{C}$              | —    | —    | 100  | $\mu\text{A}$          |
|                | Peak On-State Voltage                        | $V_{TM}$   | $I_{TM} = 0.75\text{A}$                                       | —    | —    | 3.0  | V                      |
|                | Holding Current                              | $I_H$      | —   | —    | —    | 25   | mA                     |
|                | Critical Rate of Rise of Off-State Voltage   | $dv/dt$    | $V_{in} = 240\text{V}_{rms}$ (Fig.1)                          | —    | 500  | —    | $\text{V}/\mu\text{s}$ |
|                | Critical Rate of Rise of Commutating Voltage | $dv/dt(c)$ | $V_{in} = 240\text{V}_{rms}, I_T = 0.5\text{A}_{rms}$ (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           | $I_{FT}$ | $V_T = 6\text{V}$          | —                  | —         | 10   | mA        |
| 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               | —         | —    | $V_{rms}$ |
|                               |          | AC, 1 second, in oil       | —                  | 5000      | —    |           |
|                               |          | DC, 1 minute, in oil       | —                  | 5000      | —    | $V_{dc}$  |

Fig.1 : dv/dt TEST CIRCUIT

