

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

TLP3041(S),TLP3042(S),TLP3043(S)

- OFFICE MACHINE
- HOUSEHOLD USE EQUIPMENT
- TRIAC DRIVER
- SOLID STATE RELAY

Unit: mm

The TOSHIBA TLP3041 (S), TLP3042 (S), TLP3043 (S) consist of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

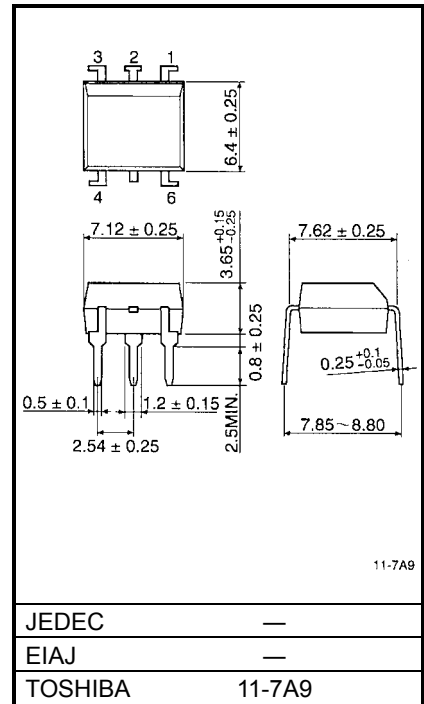
All parameters are tested to the specification of TLP3041, TLP3042, TLP3043.

- Peak Off-State Voltage : 400 V (min)
- Trigger LED Current : 15 mA (max) (TLP3041)
10 mA (max) (TLP3042)
5 mA (max) (TLP3043)
- On-State Current : 100 mA (max)
- UL Recognized : UL1577, File No. E67349
- Isolation Voltage : 5000 Vrms (min)
- Option (D4) Type VDE Approved : DIN VDE0884 / 06.92
Certificate No. 68329

Maximum Operating Insulation Voltage : 890 Vpk
Highest Permissible Over Voltage : 8000 Vpk

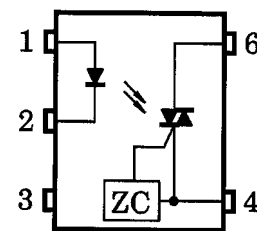
Note: When a VDE0884 approved type is needed, please designate the "Option (D4)"

| Device Construction | 7.62mm pich standard type | 10.16 mm pich (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) |



weight: 0.39g

PIN CONFIGURATION (Top view)



- 1: ANODE
- 2: CATHODE
- 3: N.C.
- 4: TERMINAL 1
- 6: TERMINAL 2

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|---|-------------------------------|-----------|---------|
| LED | Forward Current | I_F | 50 | mA |
| | Forward Current Derating (Ta ≥ 53°C) | $\Delta I_F / ^\circ\text{C}$ | -0.7 | mA / °C |
| | Peak Forward Current (100 μs pulse, 100pps) | 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 | Off-State Output Terminal Voltage | V_{DRM} | 400 | V |
| | On-Stage RMS Current | $I_{T(RMS)}$ | 100 | mA |
| | Current | | 50 | |
| | On-Stage Current Derating (Ta ≥ 25°C) | $\Delta I_T / ^\circ\text{C}$ | -1.1 | mA / °C |
| | Peak On-Stage Current (100 μs pulse, 120pps) | I_{TP} | 2 | A |
| | Peak Nonrepetitive Surge Current (PW = 10ms, DC = 10%) | I_{TSM} | 1.2 | A |
| | Power Dissipation | P_D | 300 | mW |
| | Power Dissipation Derating (Ta ≥ 25°C) | $\Delta P_D / ^\circ\text{C}$ | -4.0 | mW / °C |
| | Junction Temperature | T_j | 115 | °C |
| | Storage Temperature Range | T_{stg} | -55 ~ 150 | °C |
| Operating Temperature Range | T_{opr} | -40 ~ 100 | °C | |
| Lead Soldering Temperature (10s) | T_{sol} | 260 | °C | |
| Total Package Power Dissipation | P_T | 330 | mW | |
| Total Package Power Dissipation Derating (Ta ≥ 25°C) | $\Delta P_T / ^\circ\text{C}$ | -4.4 | mW / °C | |
| Isolation Voltage (AC, 1 min., R.H. ≤ 60%) (Note 1) | BV_S | 5000 | Vrms | |

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

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN | TYP. | MAX | UNIT |
|-----------------------|-----------|-----|------|-----|------|
| Supply Voltage | V_{AC} | — | — | 120 | Vac |
| Forward Current | I_F^* | 15 | 20 | 25 | mA |
| Peak On-Stage Current | I_{TP} | — | — | 1 | A |
| Operating Temperature | T_{opr} | -25 | — | 85 | °C |

* : In the case of TLP3042

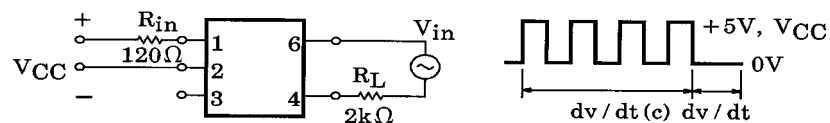
INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

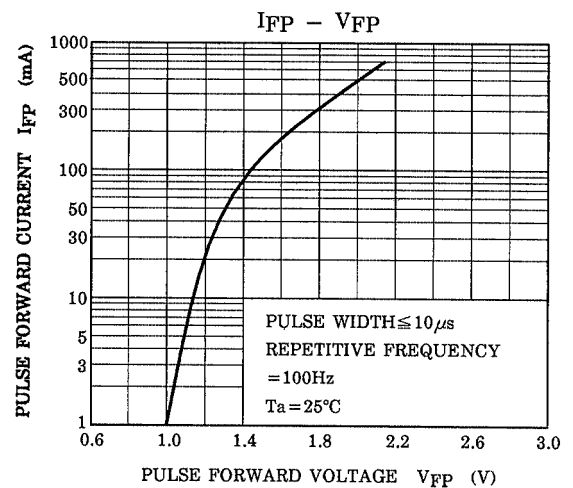
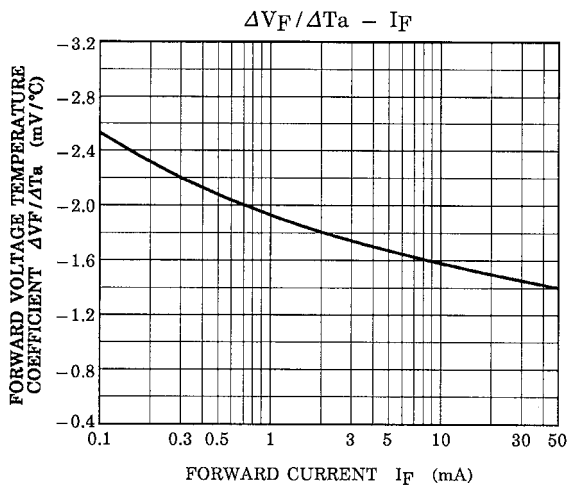
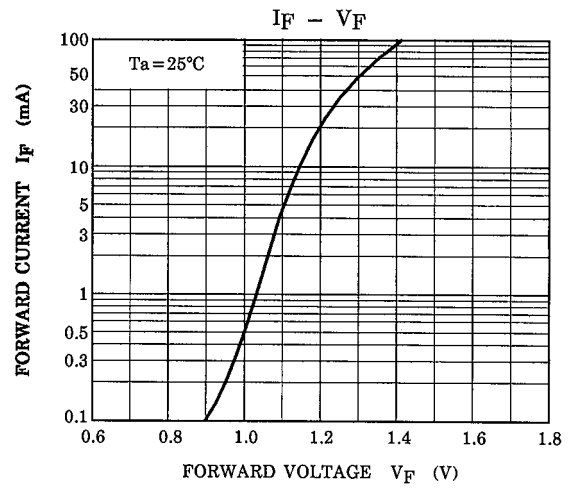
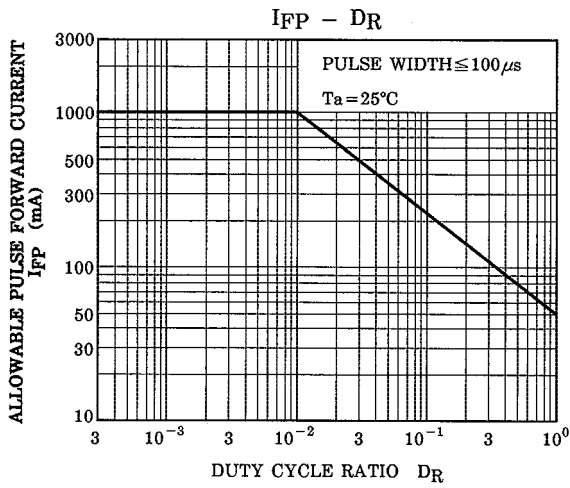
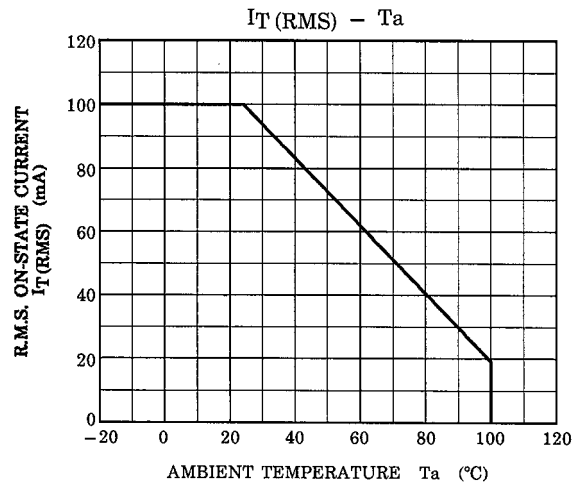
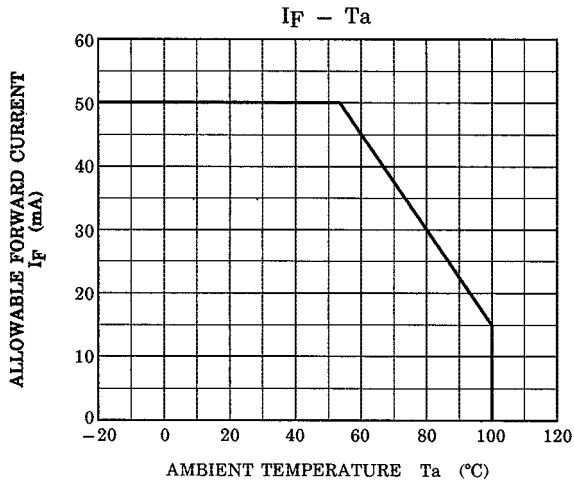
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN | TYP. | MAX | UNIT |
|----------------|--|--------------|---|-----|------|-----|--------------------------|
| LED | Forward Voltage | V_F | $I_F = 10\text{mA}$ | 1.0 | 1.15 | 1.3 | V |
| | Reverse Current | I_R | $V_R = 5\text{V}$ | — | — | 10 | μA |
| | Capacitance | C_T | $V = 0, f = 1\text{MHz}$ | — | 10 | — | pF |
| DETECTOR | Peak Off-State Current | I_{DRM} | $V_{DRM} = 400\text{V}$ | — | 10 | 100 | nA |
| | Peak On-Stage Voltage | V_{TM} | $I_{TM} = 100\text{mA}$ | — | 1.7 | 3.0 | V |
| | Holding Current | I_H | — | — | 0.6 | — | mA |
| | Critical Rate of Rise of Off-State Voltage | dv / dt | $V_{in} = 120\text{Vrms}, T_a = 85^\circ\text{C}$ (Fig.1) | 200 | 500 | — | $\text{V} / \mu\text{s}$ |
| | Critical Rate of Rise of Commutating Voltage | $dv / dt(c)$ | $V_{in} = 30\text{Vrms}, I_T = 15\text{mA}$ (Fig.1) | — | 0.2 | — | $\text{V} / \mu\text{s}$ |

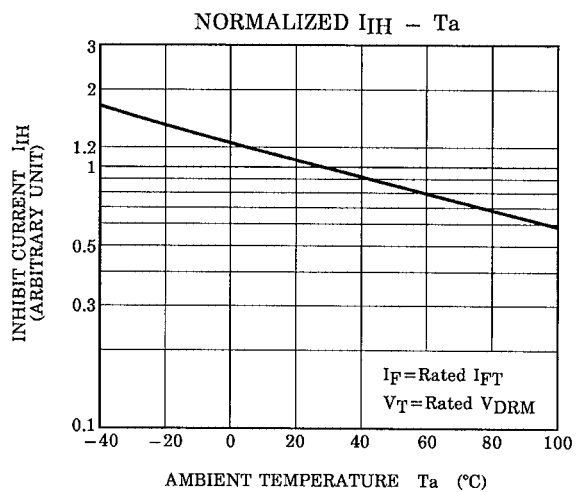
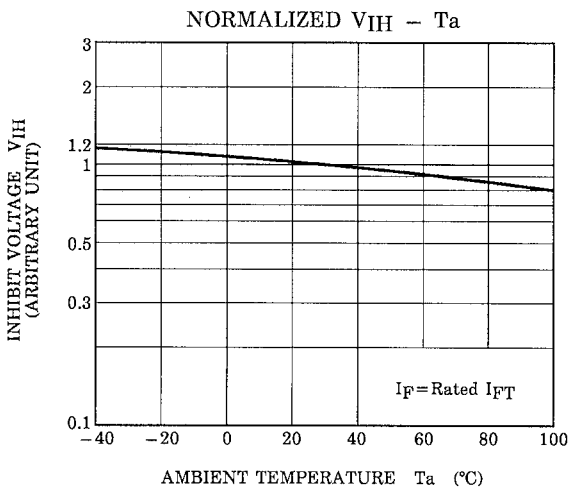
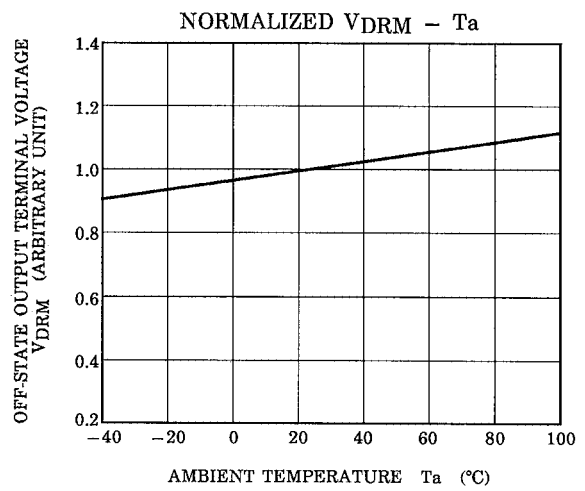
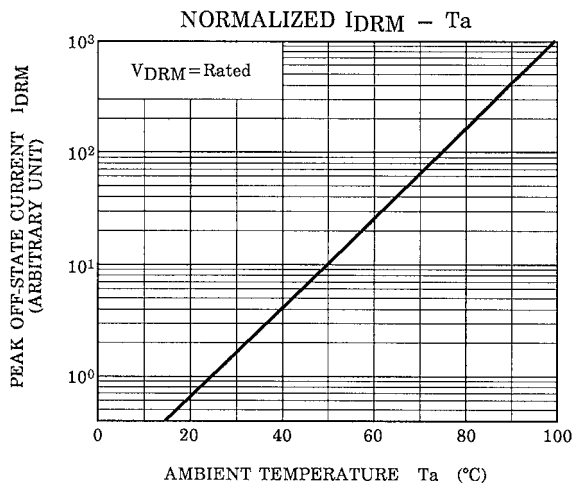
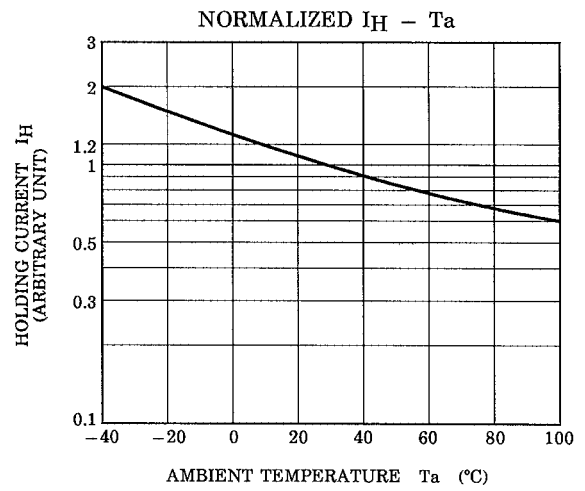
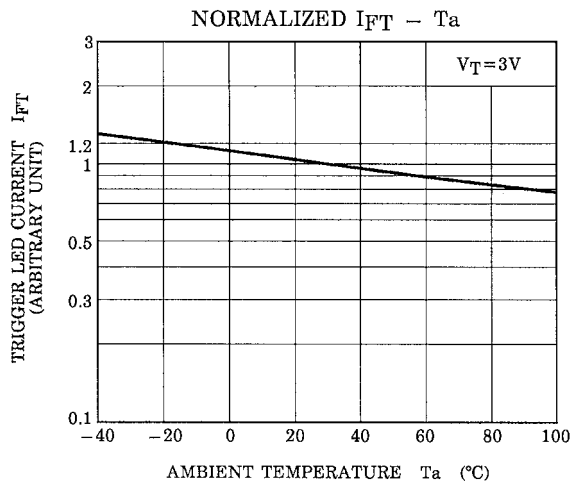
COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN | TYP. | MAX | UNIT |
|-----------------------------|----------|---|--------------------|-----------|------|---------------|------|
| Trigger LED Current | TLP3041 | I_{FT} | $V_T = 3\text{V}$ | — | — | 15 | mA |
| | TLP3042 | | | — | 5 | 10 | |
| | TLP3043 | | | — | — | 5 | |
| Inhibit Voltage | V_{IH} | $I_F = \text{Rated } I_{FT}$ | — | — | 40 | V | |
| Leakage in Inhibited State | I_{IH} | $I_F = \text{Rated } I_{FT}$ $V_T = \text{Rated } V_{DRM}$ | — | 100 | 300 | μA | |
| Capacitance Input to Output | C_S | $V_S = 0, f = 1\text{MHz}$ | — | 0.8 | — | pF | |
| Isolation Resistance | R_S | $V_S = 500\text{V}$ (R.H. $\leq 60\%$) | 5×10^{10} | 10^{14} | — | Ω | |
| Isolation Voltage | BV_S | AC, 1 minute | 5000 | — | — | Vrms | |
| | | AC, 1 second (in oil) | — | 10000 | — | | |
| | | DC, 1 minute (in oil) | — | 10000 | — | Vdc | |

Fig. 1 dv / dt TEST CIRCUIT







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