TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRIAC

# TLP3507

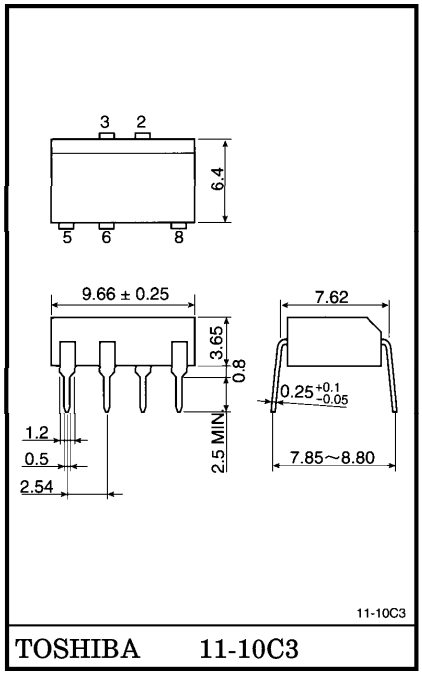
TRIAC DRIVER

PROGRAMMABLE CONTROLLERS

AC-OUTPUT MODULE

SOLID STATE RELAY

Unit in mm



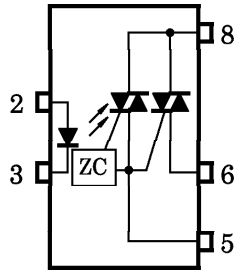

TOSHIBA 11-10C3

Weight : 0.52g

The TOSHIBA TLP3507 consists of a zero voltage crossing turn-on photo-triac optically coupled to a gallium arsenide infrared emitting diode in a 8 lead plastic DIP package.

- Peak Off-State Voltage : 600V (MIN.)
- Trigger LED Current : 10mA (MAX.)
- On-State Current : $0.5A_{rms}$ (MAX.)
- Isolation Voltage : $2500V_{rms}$ (MIN.)
- Zero Crossing Fanction
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)




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

MAXIMUM RATINGS (Ta = 25°C)

| | CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|---|
| LED | Forward Current | | $I_F$ | 50 | mA |
| | Forward Current Derating (Ta ≧ 53°C) | | $\Delta I_F$ / °C | −0.7 | mA / °C |
| | Peak Forward Current (100 μs pulse, 100pps) | | $I_{FP}$ | 1 | A |
| | Reverse Voltage | | $V_R$ | 5 | V |
| | Junction Temperature | | $T_j$ | 125 | °C |
| DETECTOR | Off-State Output Terminal Voltage | | $V_{DRM}$ | 600 | V |
| | On-State RMS Current | Ta = 40°C | $I_{T\,(RMS)}$ | 0.5 | A |
| | | Ta = 60°C | | 0.35 | |
| | On-State Current Derating (Ta ≧ 40°C) | | $\Delta I_T$ / °C | −7.2 | mA / °C |
| | Peak Current from Snubber Circuit (100 μs pulse, 120pps) | | $I_{SP}$ | 2 | A |
| | Peak Nonrepetitive Surge Current (50Hz, Peak) | | $I_{TSM}$ | 5 | A |
| | Junction Temperature | | $T_j$ | 110 | °C |
| Storage Temperature Range | | | $T_{stg}$ | −40~125 | °C |
| Operating Temperature Range | | | $T_{opr}$ | −20~80 | °C |
| Lead Soldering Temperature (10s) | | | $T_{sol}$ | 260 | °C |
| Isolation Voltage (AC, 1 min., R.H. ≦ 60%) (Note) | | | $BV_S$ | 2500 | $V_{rms}$ |

(Note) Device considereded a two-terminal device : Pins 2 and 3 shorted together, and pins 5, 6 and 8 shorted together.

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|
| Supply Voltage | $V_{AC}$ | — | — | 240 | $V_{ac}$ |
| Forward Current | $I_F$ | 15 | 20 | 25 | mA |
| Peak Current from Snubber Circuit | $I_{SP}$ | — | — | 1 | A |
| Operating Temperature | $T_{opr}$ | −20 | — | 80 | °C |

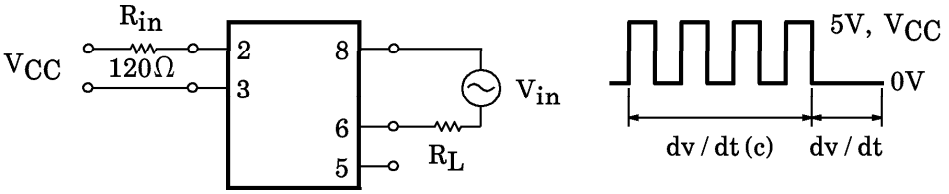
INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| | CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| LED | Forward Voltage | $V_F$ | $I_F$ = 10mA | 1.0 | 1.15 | 1.3 | V |
| | Reverse Current | $I_R$ | $V_R$ = 5V | — | — | 10 | μA |
| | Capacitance | $C_T$ | V = 0, f = 1MHz | — | 30 | — | pF |
| DETECTOR | Peak Off-State Current | $I_{DRM}$ | $V_{DRM}$ = 600V, Ta = 110°C | — | — | 100 | μA |
| | Peak On-State Voltage | $V_{TM}$ | $I_{TM}$ = 0.75A | — | — | 3.0 | V |
| | Holding Current | $I_H$ | $R_L$ = 100Ω | — | — | 25 | mA |
| | Critical Rate of Rise of Off-State Voltage | dv / dt | $V_{in}$ = 240$V_{rms}$ (Fig.1) | — | 500 | — | V / μs |
| | Critical Rate of Rise of Commutating Voltage | dv / dt (c) | $V_{in}$ = 240$V_{rms}$, $I_T$ = 0.5$A_{rms}$ (Fig.1) | — | 5 | — | V / μs |

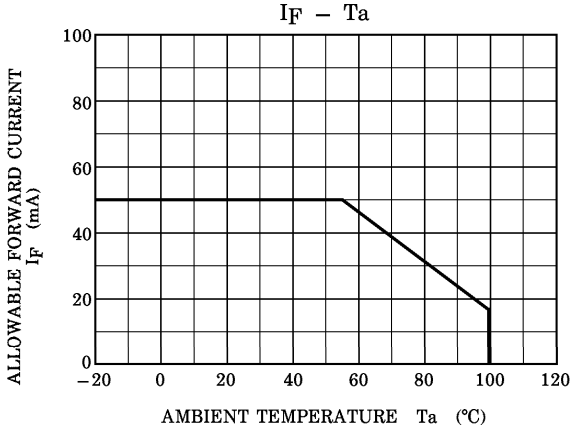
COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Trigger LED Current | $I_{FT}$ | $V_T$ = 6V | — | — | 10 | mA |
| Inhibit Voltage | $V_{IH}$ | $I_F$ = Rated $I_{FT}$ | — | — | 50 | V |
| Leakage in Inhibited State | $I_{IH}$ | $I_F$ = Rated $I_{FT}$<br>$V_T$ = Rated $V_{DRM}$ | — | 200 | — | μA |
| Capacitance (Input to Output) | $C_S$ | $V_S$ = 0, f = 1MHz | — | 1.5 | — | pF |
| Isolation Resistance | $R_S$ | $V_S$ = 500V, R.H. ≦ 60% | $5\times10^{10}$ | $10^{14}$ | — | Ω |
| Isolation Voltage | $BV_S$ | AC, 1 minute | 2500 | — | — | Vrms |
| | | AC, 1 second, in oil | — | 5000 | — | |
| | | DC, 1 minute, in oil | — | 5000 | — | $V_{dc}$ |

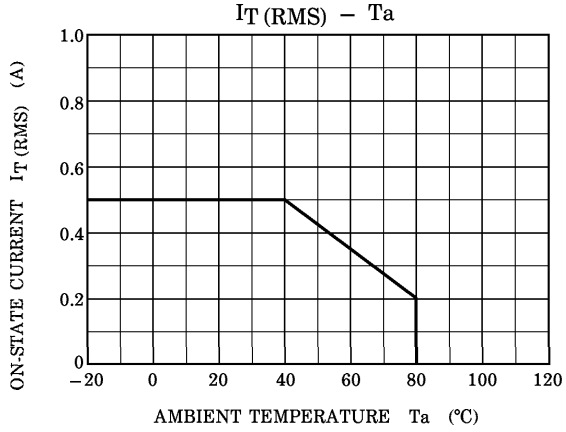
Fig.1 : dv / dt TEST CIRCUIT



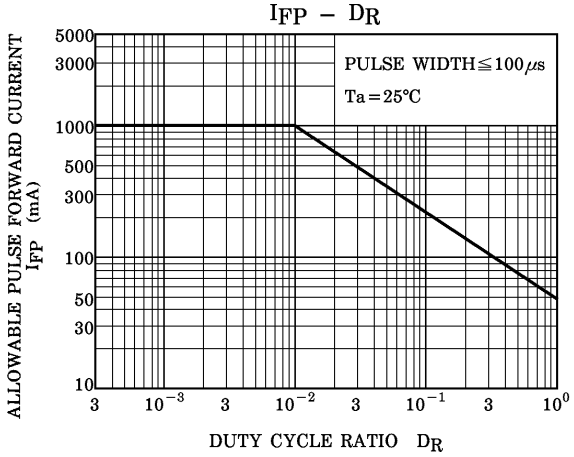
$I_F$ – Ta



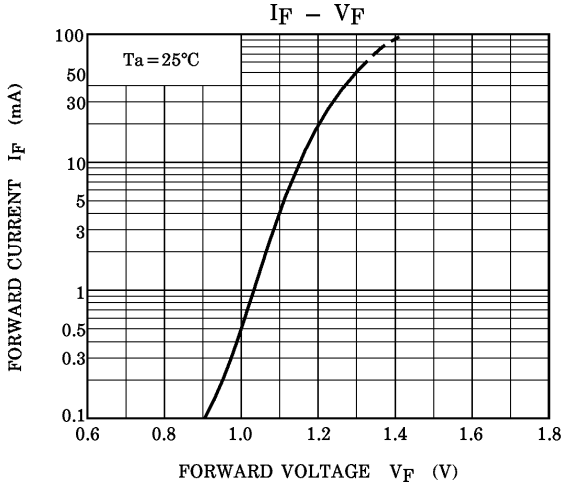

$I_{T\,(RMS)}$ – Ta



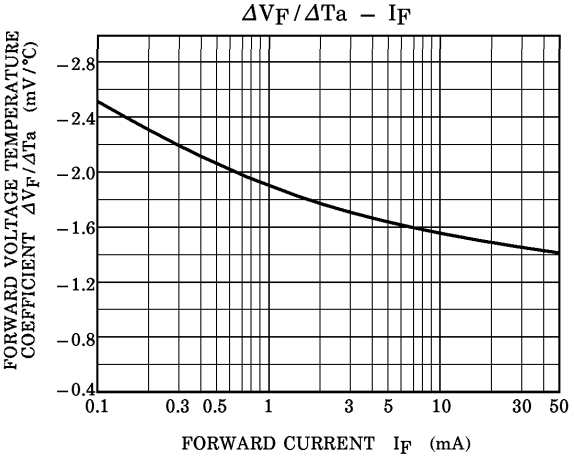

$I_{FP}$ – $D_R$



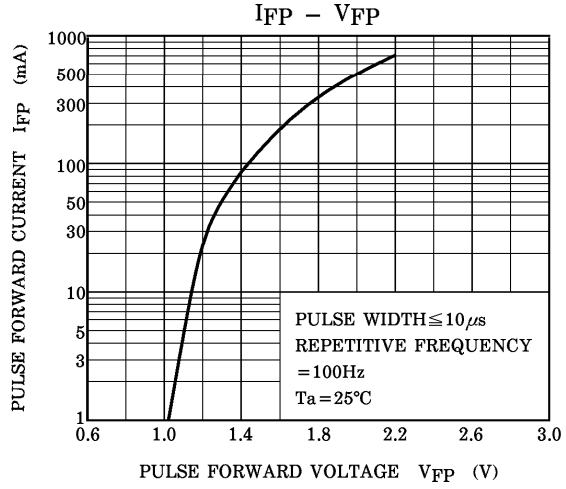

$I_F$ – $V_F$



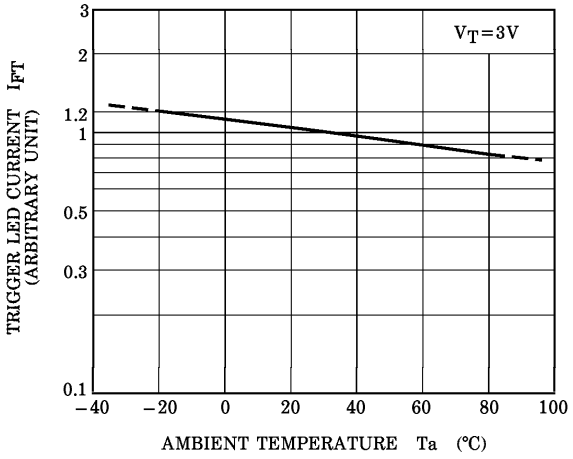

$\Delta V_F / \Delta Ta$ – $I_F$



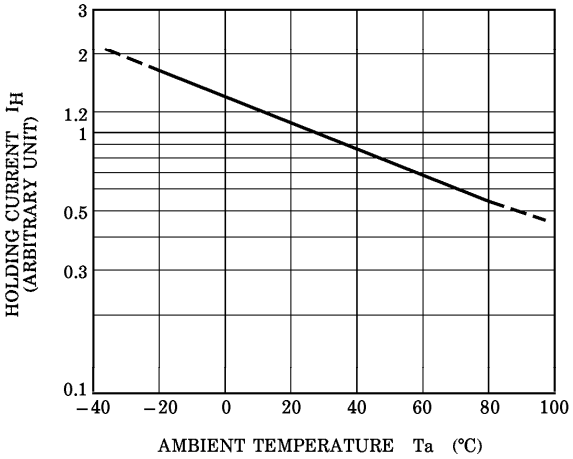

$I_{FP}$ – $V_{FP}$



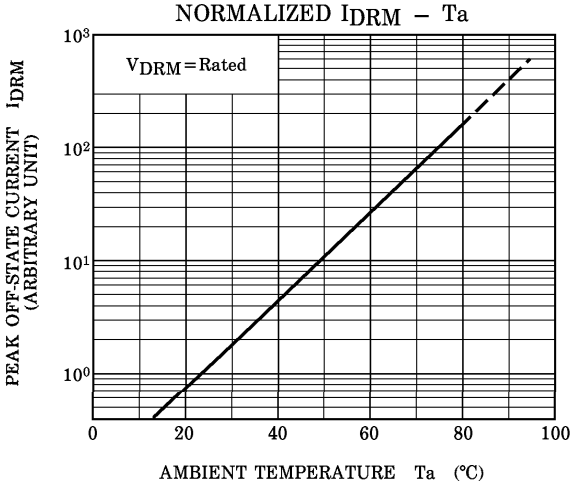
NORMALIZED $I_{FT}$ – Ta



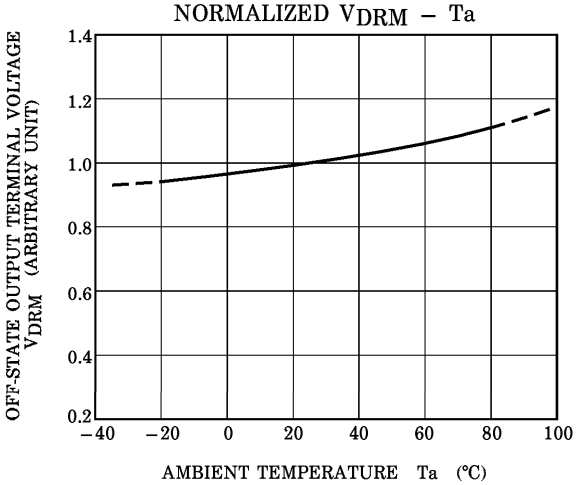

NORMALIZED $I_H$ – Ta



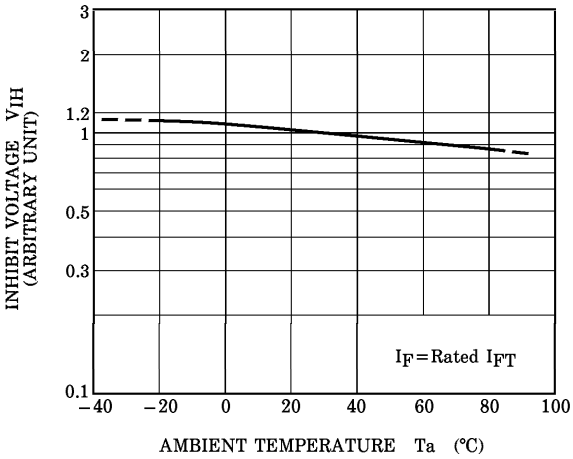

NORMALIZED $I_{DRM}$ – Ta



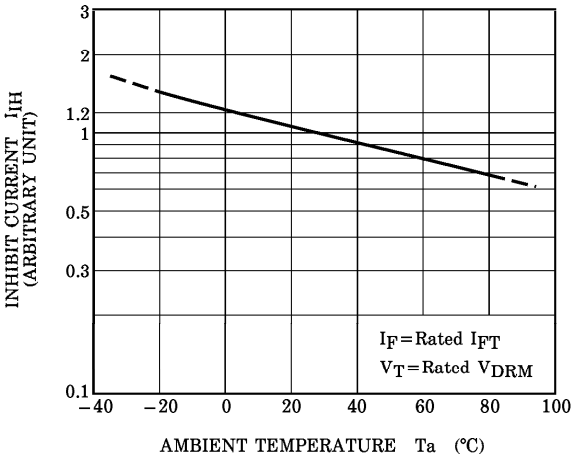

NORMALIZED $V_{DRM}$ – Ta




NORMALIZED $V_{IH}$ – Ta




NORMALIZED $I_{IH}$ – Ta



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