Unit in mm

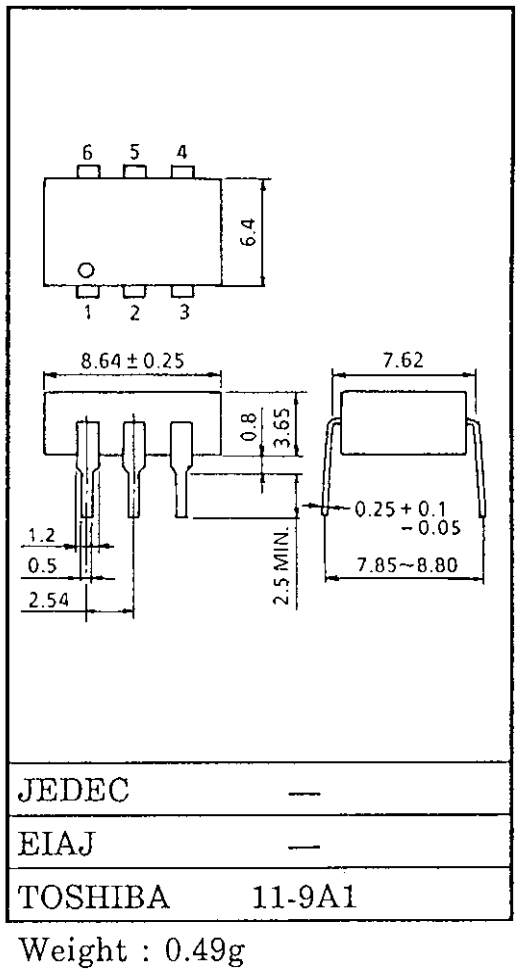
## Telecommunication

## Data Acquisition

## Measurement Instrumentation

The Toshiba TLP595G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a six lead plastic DIP package. The TLP595G is a bi-directional switch which can replace mechanical relays in many applications.

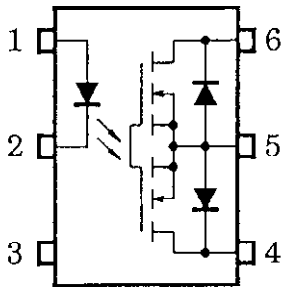
- Peak Off-State Voltage : 400V (Min.)
- On-State Current : 150mA (Max.) (A Connection)
- On-State Resistance : 12Ω (Max.) (A Connection)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349
- Trigger LED Current (Ta = 25°C)




Weight : 0.49g

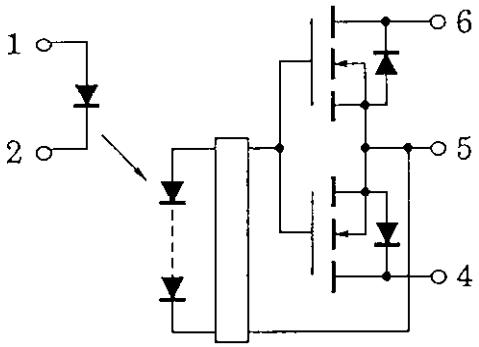
| Supplementary Information | Page (s) |
|---|---|
| Lead Form Options | 31-32 |
| Tape and Reel | 39-40 |

## Pin Configuration (Top View)




1. : ANODE
2. : CATHODE
3. : NC
4. : DRAIN D1
5. : SOURCE
6. : DRAIN D2

## Schematic



| CLASSIFICATION (Note 1) | TRIGGER LED CURRENT (mA) @$I_{ON}$ = 150mA | | MARKING OF CLASSIFICATION |
|---|---|---|---|
| | MIN. | MAX. | |
| (IFT2) | – | 2 | T2 |
| Standard | – | 5 | T2, Blank |

Note 1: Application type name for certification test, please use standard product type name, i.e., TLP595G (IFT2): TLP595G

## Maximum Ratings (Ta = 25°C)

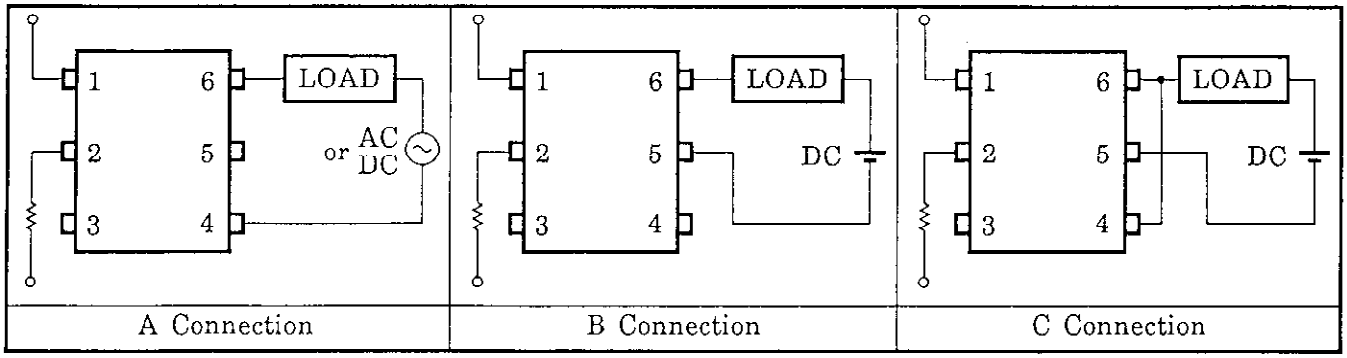
| CHARACTERISTIC | | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|---|
| LED | Forward Current | | $I_F$ | 30 | mA |
| | Forward Current Derating (Ta ≥ 25°C) | | $\Delta I_F$/°C | -0.3 | mA/°C |
| | Peak Forward Current (100μs pulse, 100pps) | | $I_{FP}$ | 1 | A |
| | Reverse Voltage | | $V_R$ | 5 | V |
| | Junction Temperature | | $T_j$ | 125 | °C |
| DETECTOR | Off-State Output Terminal Voltage | | $V_{OFF}$ | 400 | V |
| | On-State RMS Current | A Connection | $I_{ON}$ | 150 | mA |
| | | B Connection | | 200 | |
| | | C Connection | | 300 | |
| | On-State Current Derating (Ta ≥ 25°C) | A Connection | $\Delta I_{ON}$/°C | -1.5 | mA/°C |
| | | B Connection | | -2.0 | |
| | | C Connection | | -3.0 | |
| | Junction Temperature | | $t_j$ | 125 | °C |
| Storage Temperature Range | | | $T_{stg}$ | -55~100 | °C |
| Operating Temperature Range | | | $T_{opr}$ | -20~85 | °C |
| Lead Soldering Temperature (10s) | | | $T_{sol}$ | 260 | °C |
| Isolation Voltage (AC, 1 min., R.H. ≤ 60%) | | (Note 2) | $BV_S$ | 2500 | $V_{rms}$ |

Note 1:Device considered a two terminal device: pins 1, 2 and 3 shorted together, and pins 4, 5 and 8 shorted together.

### Recommended Operating Conditions

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MX. | UNIT |
|---|---|---|---|---|---|
| Supply Voltage | $V_D$ | – | – | 320 | V |
| Forward Current | $I_F$ | 10 | 15 | 20 | mA |
| On-State Current | $I_{ON}$ | – | – | 150 | mA |
| Operating Temperature | $T_{opr}$ | -20 | – | 80 | °C |

### Circuit Connections




### Individual Electrical Characteristics (Ta = -25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP.* | MX. | UNIT |
|---|---|---|---|---|---|---|---|
| LED | Forward Voltage | $V_F$ | $I_F$ = 10mA | 1.2 | 1.4 | 1.7 | V |
| | Reverse Current | $I_R$ | $V_R$ = 3V | – | – | 10 | μA |
| | Capacitance | $C_T$ | V = 0, f = 1MHz | – | 15 | – | pF |
| DETECTOR | Off-State Current | $I_{OFF}$ | $V_{OFF}$ = 400V | – | – | 1 | μA |
| | Capacitance | $C_{OFF}$ | V = 0, f = 1MHz | – | – | – | pF |

### Coupled Electrical Characteristics (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MX. | UNIT |
|---|---|---|---|---|---|---|---|
| Trigger LED Current | | $I_{FT}$ | $I_{ON}$ = 150mA | – | 1 | 5 | mA |
| On-State Resistance | A Connection | $R_{ON}$ | $I_{ON}$ = 150mA, $I_F$ = 10mA | – | 8 | 12 | Ω |
| | B Connection | | $I_{ON}$ = 200mA, $I_F$ = 10mA | – | 4 | 6 | |
| | C Connection | | $I_{ON}$ = 300mA, $I_F$ = 10mA | – | 2 | 3 | |

## Isolation Characteristics (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MX. | UNIT |
|---|---|---|---|---|---|---|
| Capacitance Input to Output | $C_S$ | $V_S$ = 0, f = 1MHz | – | 0.8 | – | pF |
| Isolation Resistance | $R_S$ | $V_S$ = 500V, R.H. ≤ 60% | $5 \times 10^{10}$ | $10^{14}$ | – | Ω |
| Isolation Voltage | $BV_S$ | AC, 1 minute | 2500 | – | – | $V_{rms}$ |
| | | AC, 1 second in oil | – | 5000 | – | |
| | | DC, 1 minute in oil | – | 5000 | – | $V_{dc}$ |

## Switching Characteristics (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MX. | UNIT |
|---|---|---|---|---|---|---|
| Turn-on Time | $t_{on}$ | $V_{DD}$ = 20mA, $R_L$ = 200Ω<br>$I_F$ = 10mA (Note 3) | – | 0.3 | 1.0 | ms |
| Turn-off Time | $t_{off}$ | | – | 0.2 | 1.0 | |

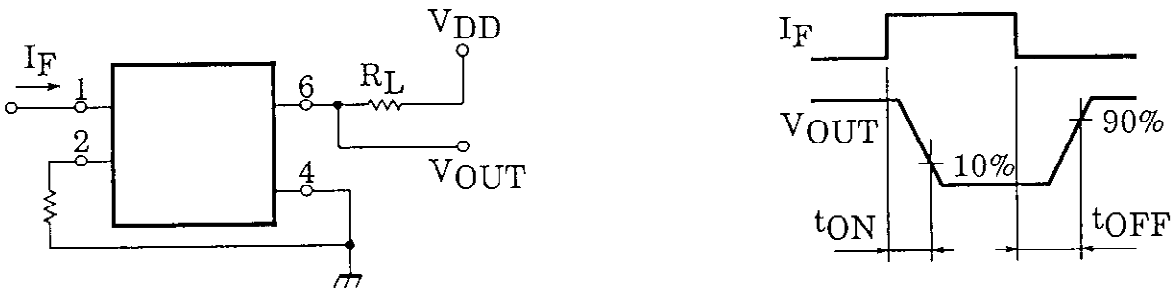
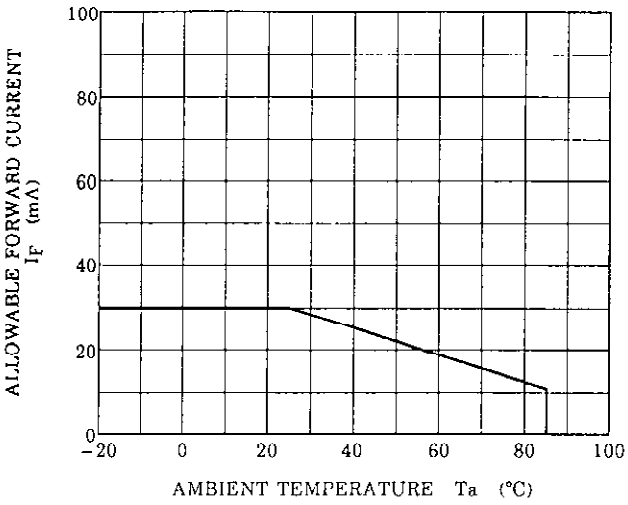
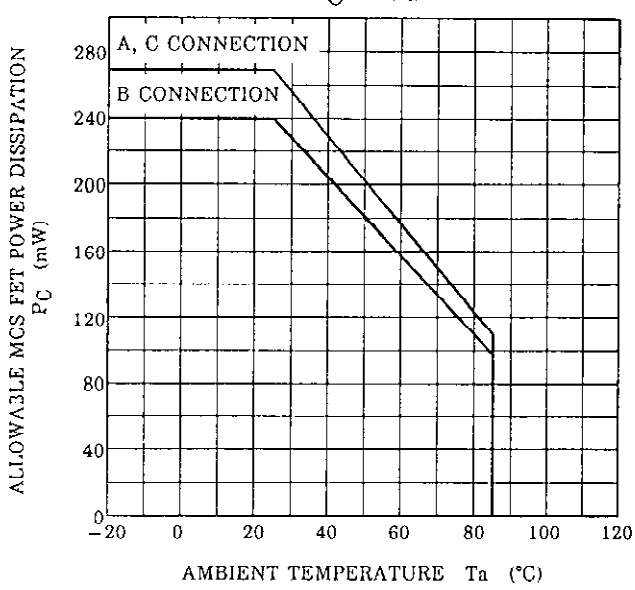



**Figure 1. Switching Time Test Circuit**

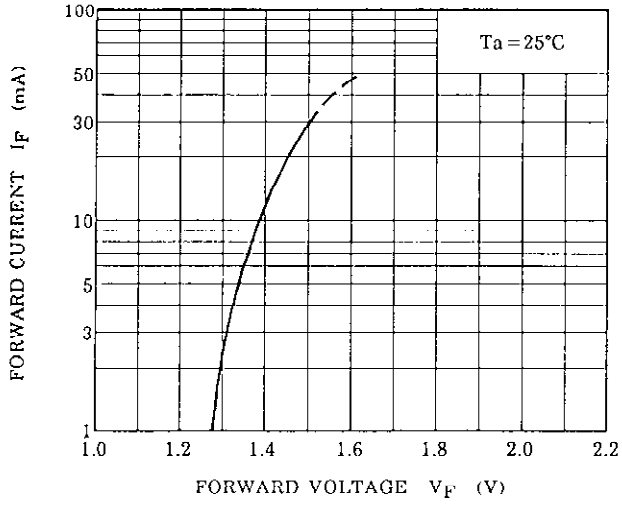
$I_F$ – Ta



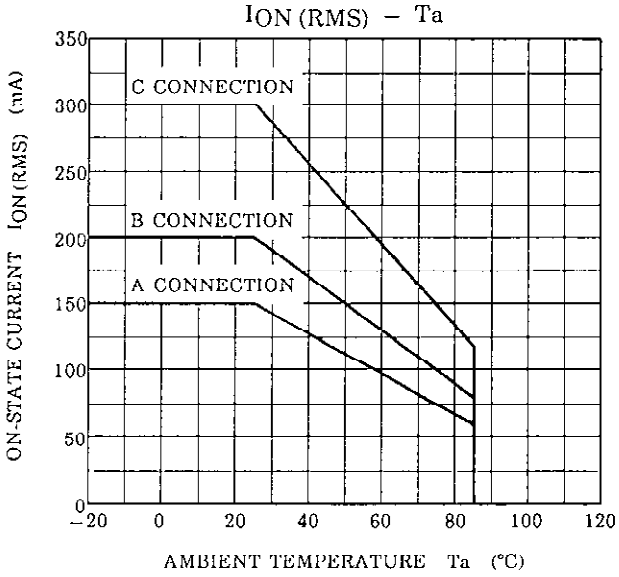

$P_C$ – Ta



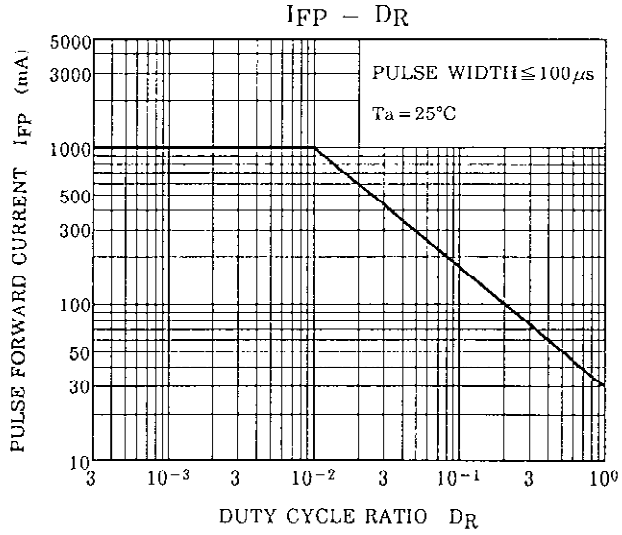

$I_F$ – $V_F$



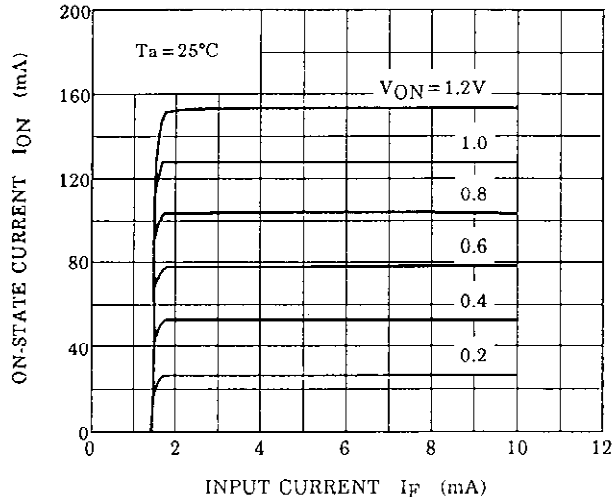

$I_{ON}$ (RMS) – Ta



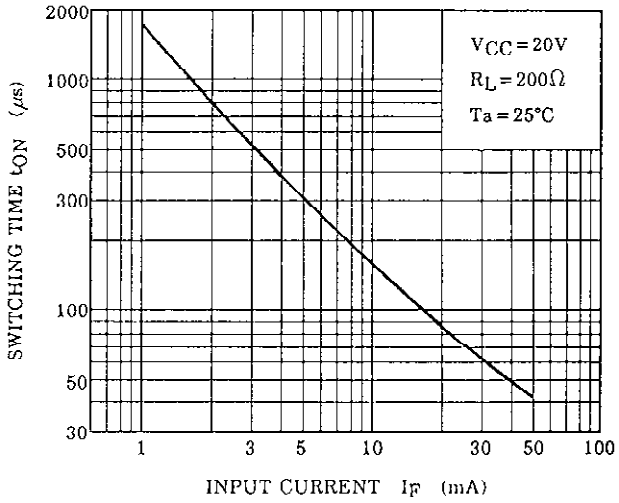

$I_{FP}$ – $D_R$



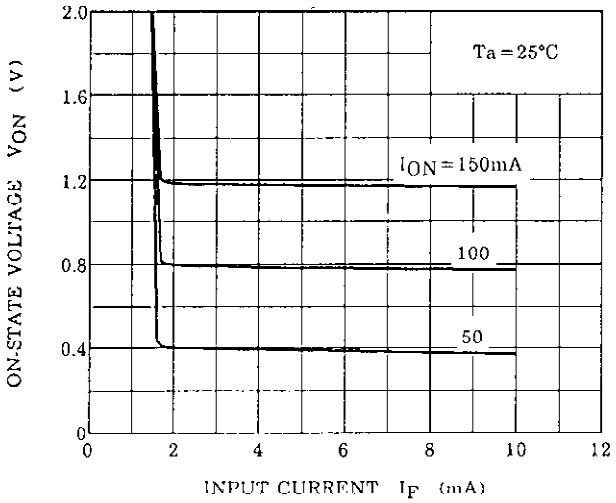
$I_{ON}$ – $I_F$ (A CONNECTION)



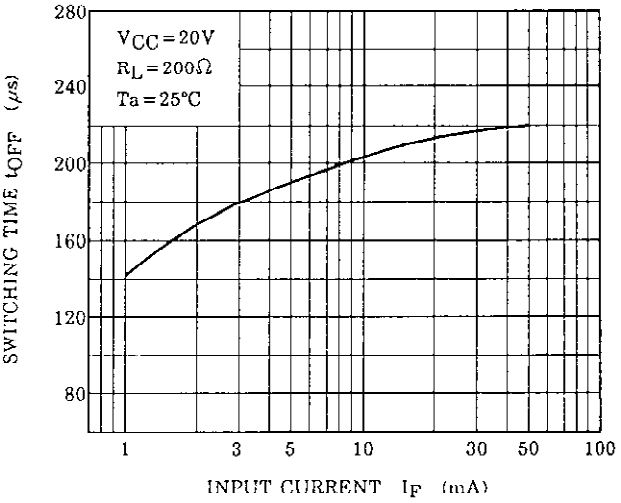

$t_{ON}$ – $I_F$



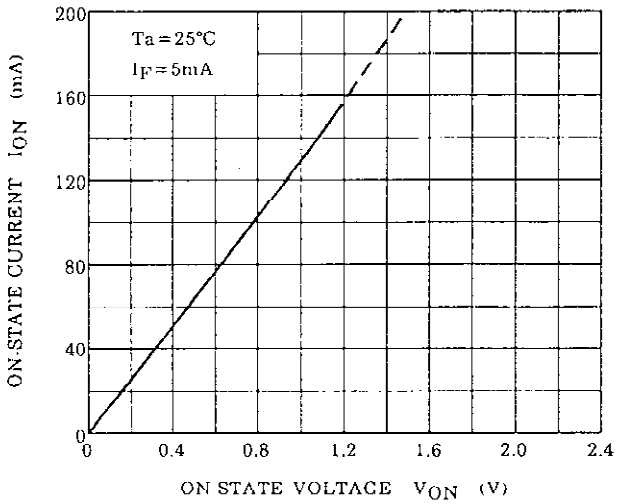

$V_{ON}$ – $I_F$ (A CONNECTION)



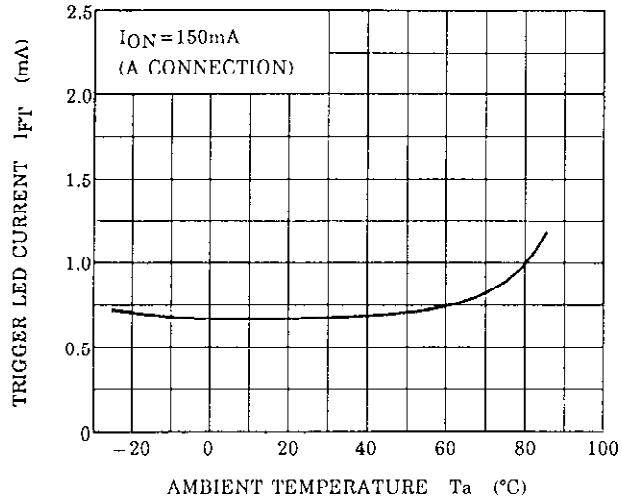

$t_{OFF}$ – $I_F$



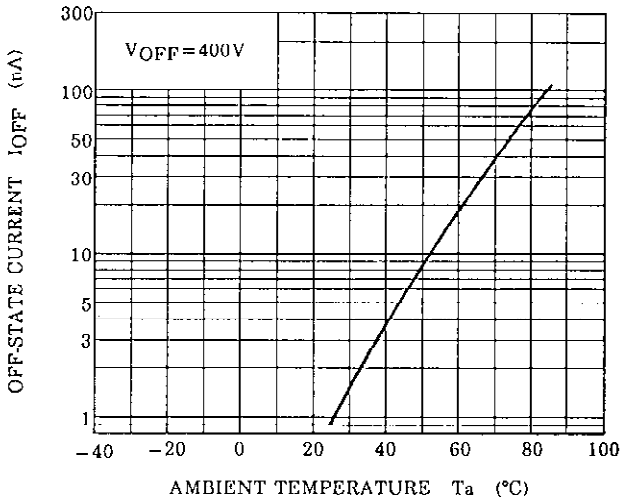

$I_{ON}$ – $V_{ON}$ (A CONNECTION)



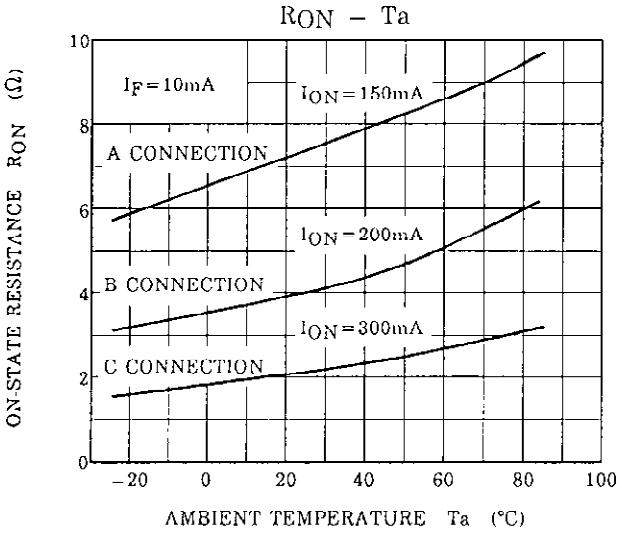
$I_{FT}$ – Ta



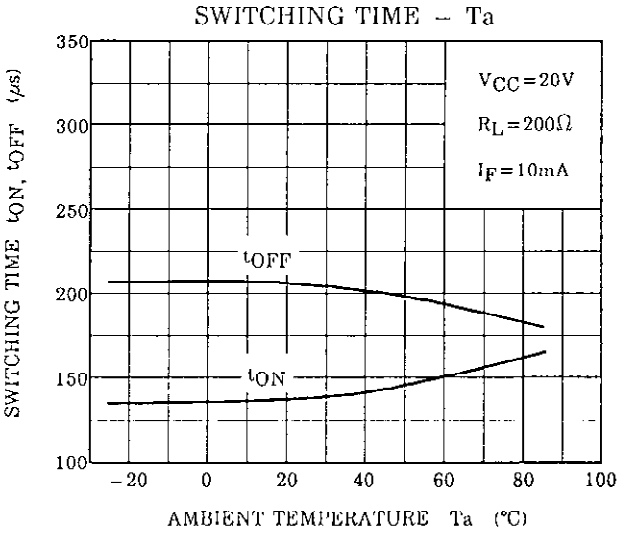

$I_{OFF}$ – Ta




$R_{ON}$ – Ta




SWITCHING TIME – Ta



**Notes**