

TLP597A

TELECOMMUNICATION
 DATA ACQUISITION
 MEASUREMENT INSTRUMENTATION

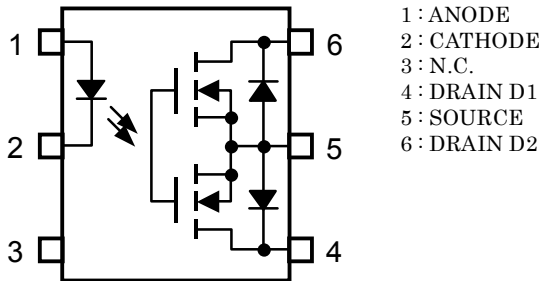
The TOSHIBA TLP597A consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).

The TLP597A is a bi-directional switch can replace mechanical relays in many applications.

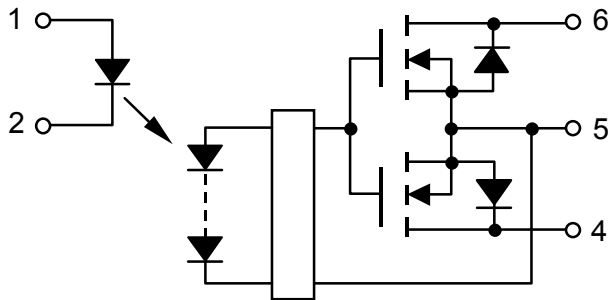
Features

- 6 pin DIP (DIP6)
- 1-Form-A
- Peak Off-State Voltage : 60 V (MIN.)
- Trigger LED Current : 3 mA (MAX.)
- On-State Current : 500 mA (MAX.)
- On-State Resistance : 2 Ω (MAX.)
- Isolation Voltage : 2500 Vrms (MIN.)
- UL Recognized : UL1577, File No. E67349

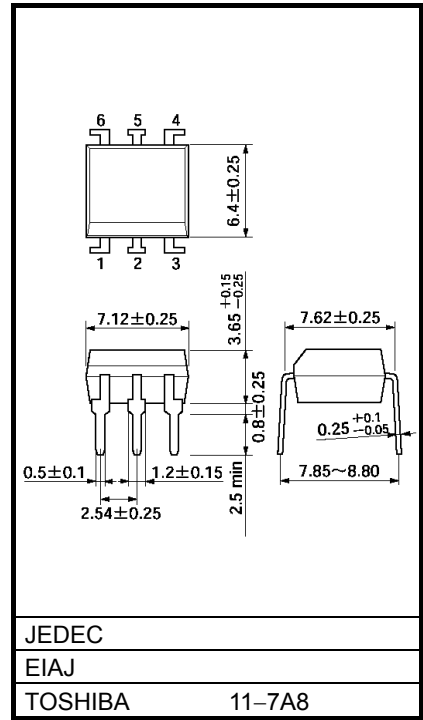
Pin Configuration (top view)



Schematic



Unit: mm



Weight: 0.4 g

Absolute Maximum Ratings (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT | |
|--|--|-----------------------------|--------------------------------|-------|-------|
| LED | Forward Current | I_F | 50 | mA | |
| | Forward Current Derating (Ta ≥ 25°C) | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C | |
| | Peak Forward Current (100 μs pulse, 100 pps) | I_{FP} | 1 | A | |
| | Reverse Voltage | V_R | 5 | V | |
| | Junction Temperature | T_j | 125 | °C | |
| DETECTOR | Off-State Output Terminal Voltage | V_{OFF} | 60 | V | |
| | On-State RMS Current | A Connection | I_{ON} | 500 | mA |
| | | B Connection | | 500 | |
| | | C Connection | | 1000 | |
| | On-State Current Derating (Ta ≥ 25°C) | A Connection | $\Delta I_{ON}/^\circ\text{C}$ | -5.0 | mA/°C |
| | | B Connection | | -5.0 | |
| | | C Connection | | -10.0 | |
| Junction Temperature | T_j | 125 | °C | | |
| Operating Temperature Range | T_{opr} | -40~85 | °C | | |
| Storage Temperature Range | T_{stg} | -55~125 | °C | | |
| Lead Soldering Temperature (10 s) | T_{sol} | 260 | °C | | |
| Isolation Voltage (AC, 1 minute, R.H. ≤ 60%) (NOTE1) | BV_S | 2500 | Vrms | | |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

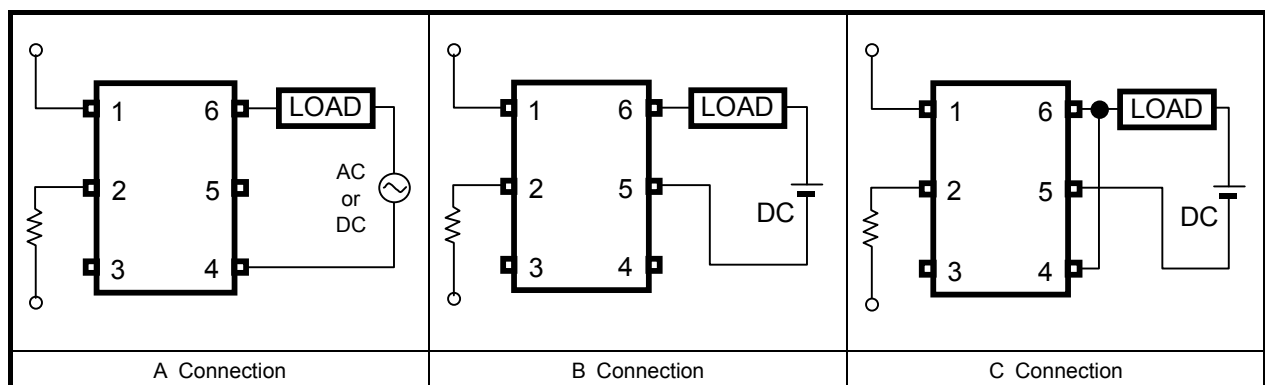
(NOTE1): Device considered a two-terminal device : Pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|-----------|------|------|------|------|
| Supply Voltage | V_{DD} | — | — | 48 | V |
| Forward Current | I_F | 5 | 7.5 | 25 | mA |
| On-State Current | I_{ON} | — | — | 400 | mA |
| Operating Temperature | T_{opr} | -20 | — | 65 | °C |

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Circuit Connections



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 | $V = 0, f = 1 \text{ MHz}$ | — | 30 | — | pF |
| DETECTOR | Off-State Current | I_{OFF} | $V_{OFF} = 60 \text{ V}$ | — | — | 1 | μA |
| | Capacitance | C_{OFF} | $V = 0, f = 1 \text{ MHz}$ | — | 130 | — | pF |

Coupled Electrical Characteristics (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------|--------------|----------|--|------|------|------|----------|
| Trigger LED Current | | I_{FT} | $I_{ON} = 500 \text{ mA}$ | — | — | 3 | mA |
| Close LED Current | | I_{FC} | $I_{OFF} = 100 \mu\text{A}$ | 0.1 | — | — | mA |
| On-State Resistance | A Connection | R_{ON} | $I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$ | — | 1 | 2 | Ω |
| | B Connection | | $I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$ | — | 0.5 | 1 | |
| | C Connection | | $I_{ON} = 1000 \text{ mA}, I_F = 5 \text{ mA}$ | — | 0.25 | — | |

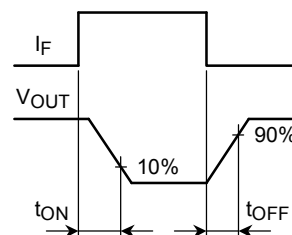
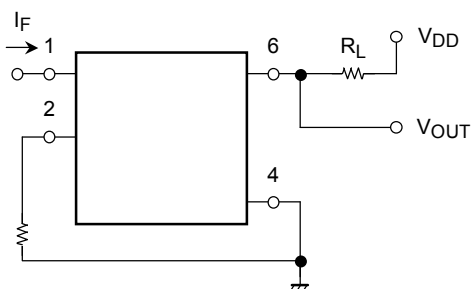
Isolation Characteristics (Ta = 25°C)

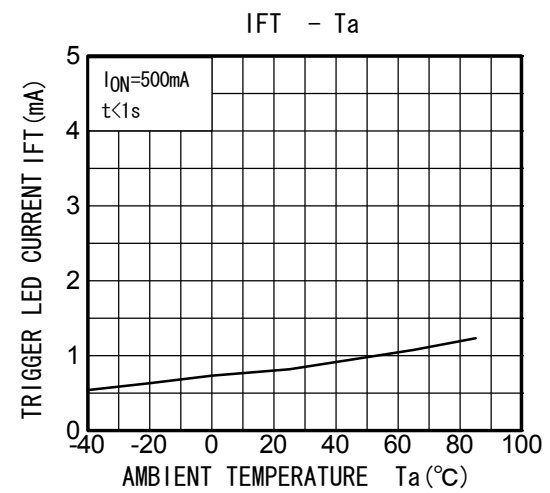
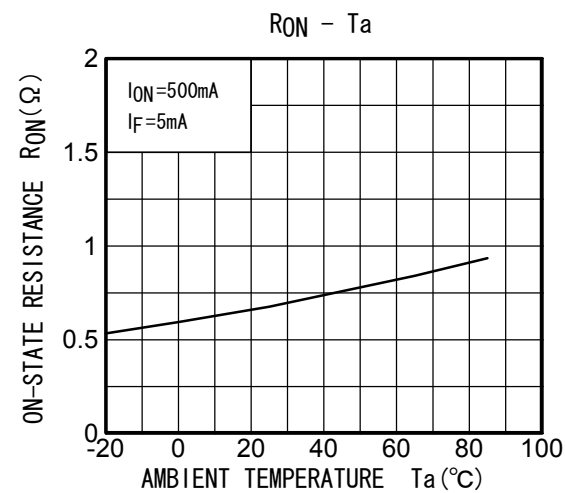
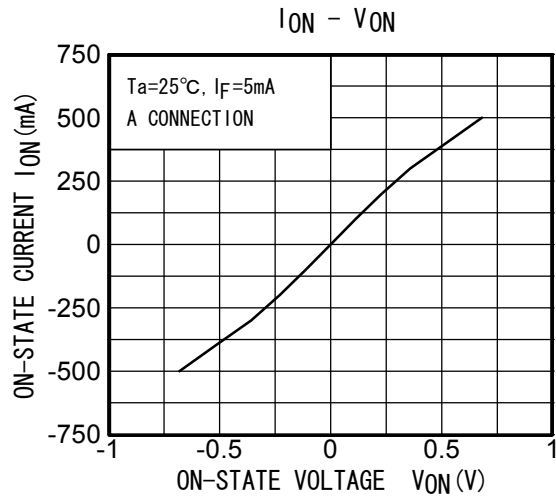
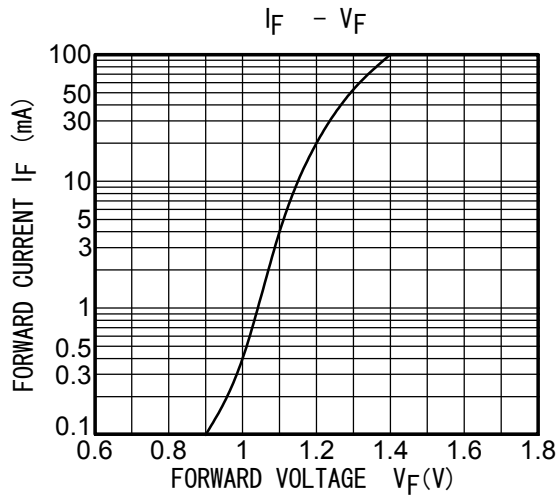
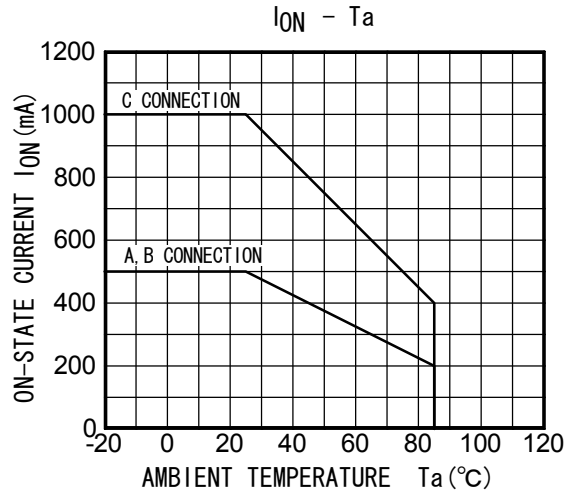
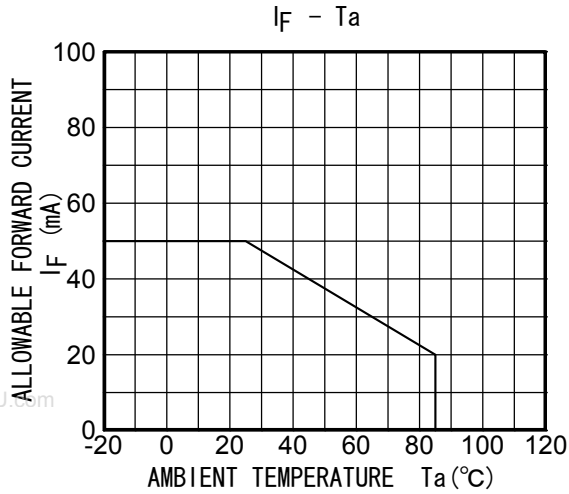
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|--------|--|--------------------|-----------|------|----------|
| Capacitance Input to Output | C_S | $V_S = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 0.8 | — | pF |
| Isolation Resistance | R_S | $V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$ | 5×10^{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 | — | — |

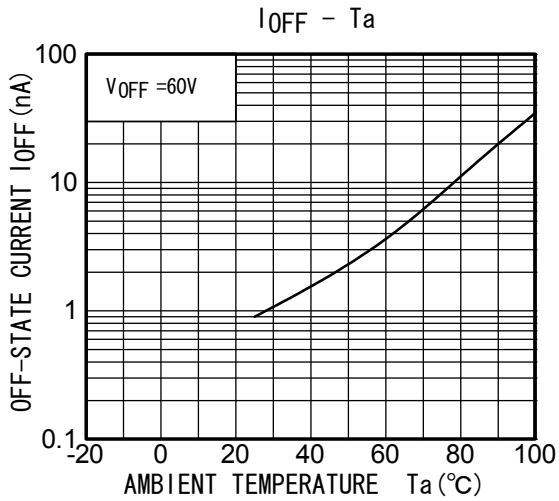
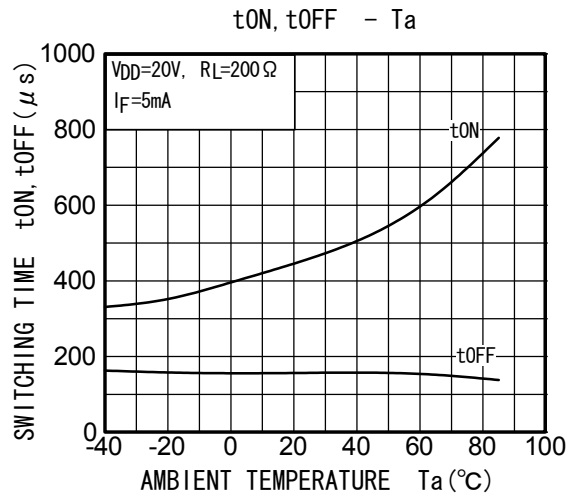
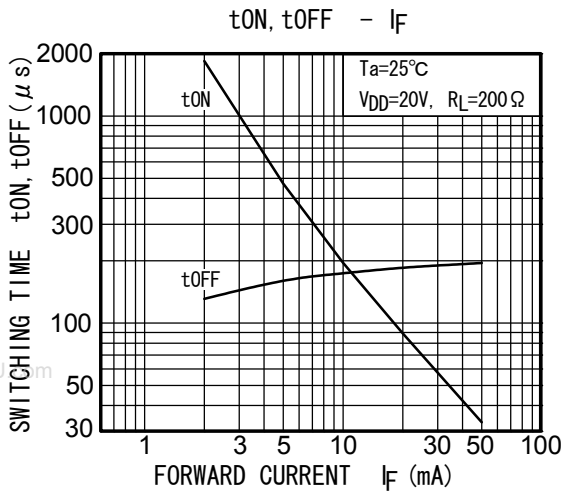
Switching Characteristics (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|-----------|---|------|------|------|------|
| Turn-on Time | t_{ON} | $R_L = 200 \Omega$ (NOTE 2) $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ | — | 0.6 | 2 | ms |
| Turn-off Time | t_{OFF} | | — | 0.1 | 1 | |
| Turn-on Time | t_{ON} | $R_L = 200 \Omega$ (NOTE 2) $V_{DD} = 20 \text{ V}, I_F = 10 \text{ mA}$ | — | 0.3 | 1 | ms |
| Turn-off Time | t_{OFF} | | — | 0.1 | 1 | |

(NOTE 2) : SWITCHING TIME TEST CIRCUIT







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20070701-EN

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