

TLP597G

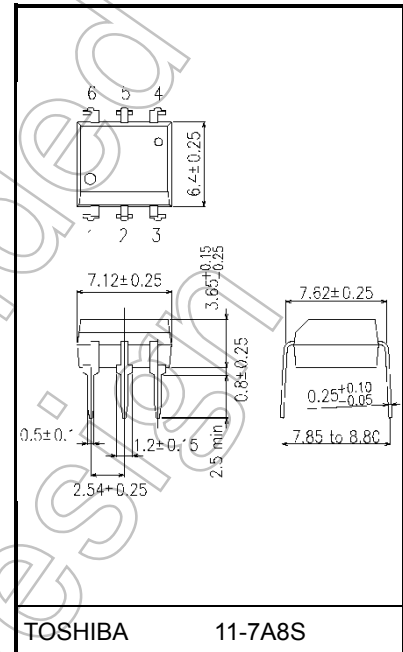
Cordless Telephone
PBX
Modem

The TOSHIBA TLP597G consists of an infrared emitting diode optically coupled to a photo-MOSFET in a six lead plastic DIP package (DIP6). The TLP597G is a bi-directional switch which can replace mechanical relay in many applications.

- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max) (A connection)
- On-state resistance: 35 Ω (max) (A connection)
- Isolation voltage: 2500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- VDE-approved: EN 60747-5-5 (Note 1)

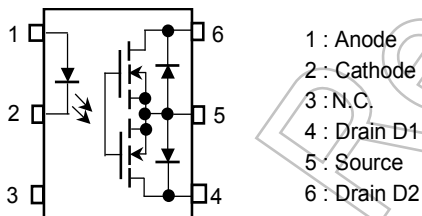
Note 1: When a VDE approved type is needed, please designate the **Option(D4)**.

Unit: mm

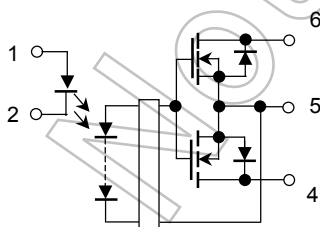


Weight: 0.4 g (typ.)

Pin Configuration (top view)



Schematic



Start of commercial production
1995-06

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 | |
| | Input power dissipation | PD | 50 | mW | |
| | Input power dissipation derating (Ta ≥ 25°C) | $PD/^\circ\text{C}$ | -0.5 | mW/°C | |
| | Junction temperature | T_j | 125 | °C | |
| Detector | Off-state output terminal voltage | V_{OFF} | 350 | V | |
| | On-state RMS current | A connection | I_{ON} | 120 | mA |
| | | B connection | | 120 | |
| | | C connection | | 160 | |
| | On-state current derating (Ta ≥ 25°C) | A connection | $\Delta I_{ON} / ^\circ\text{C}$ | -1.2 | mA / °C |
| | | B connection | | -1.2 | |
| | | C connection | | -1.6 | |
| | Output power dissipation | A connection | P_o | 454 | mW |
| | | B connection | | 331 | |
| | | C connection | | 307 | |
| | Output power dissipation derating (Ta ≥ 25°C) | A connection | $P_o/^\circ\text{C}$ | -4.54 | mW/°C |
| | | B connection | | -3.31 | |
| | | C connection | | -3.07 | |
| Junction temperature | T_j | 125 | °C | | |
| Storage temperature range | T_{stg} | -55 to 125 | °C | | |
| Operating temperature range | T_{opr} | -40 to 85 | °C | | |
| Lead soldering temperature (10 s) | T_{sol} | 260 | °C | | |
| Isolation voltage (AC, 60 s, R.H. ≤ 60 %) (Note 1) | BV_S | 2500 | V_{rms} | | |

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).

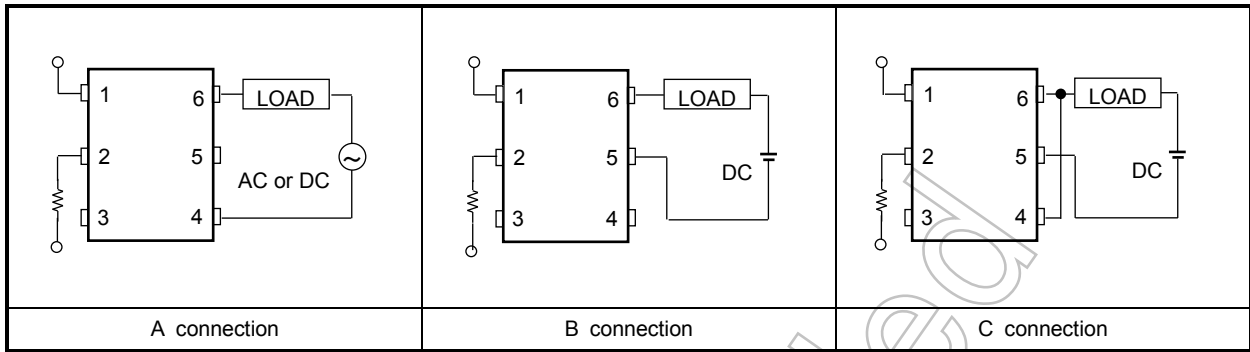
(Note 1): Device considered a two-terminal device: Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

| Characteristic | Symbol | Min | Typ. | Max | Unit |
|-----------------------|-----------|-----|------|-----|------|
| Supply voltage | V_{DD} | — | — | 280 | V |
| Forward current | I_F | 5 | 7.5 | 25 | mA |
| On-state current | I_{ON} | — | — | 120 | 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



Not Recommended for New Design

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 | $V = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 30 | — | pF |
| Detector | Off-state current | I_{OFF} | $V_{OFF} = 350 \text{ V}$ | — | — | 1 | μA |
| | Capacitance | C_{OFF} | $V = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 40 | — | pF |

Coupled Electrical Characteristics (Ta = 25°C)

| Characteristic | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---------------------|--------------|----------|--|-----|------|-----|----------|
| Trigger LED current | | I_{FT} | $I_{ON} = 120 \text{ mA}$ | — | 1 | 3 | mA |
| On-state Resistance | A connection | R_{ON} | $I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}$ | — | 22 | 35 | Ω |
| | | | $I_{ON} = 20 \text{ to } 120 \text{ mA}, I_F = 5 \text{ mA}$ | — | 26 | 40 | Ω |
| | B connection | | $I_{ON} = 120 \text{ mA}, I_F = 5 \text{ mA}$ | — | 13 | 20 | Ω |
| | C connection | | $I_{ON} = 160 \text{ mA}, I_F = 5 \text{ mA}$ | — | 7 | 10 | Ω |

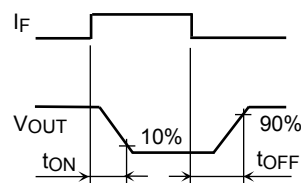
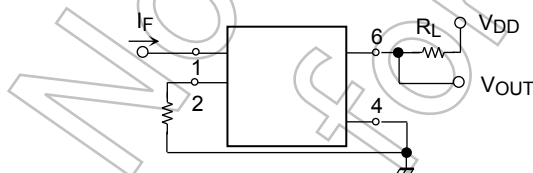
Isolation Characteristics (Ta = 25°C)

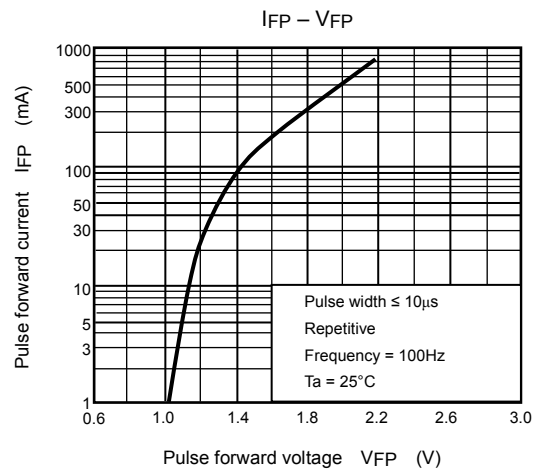
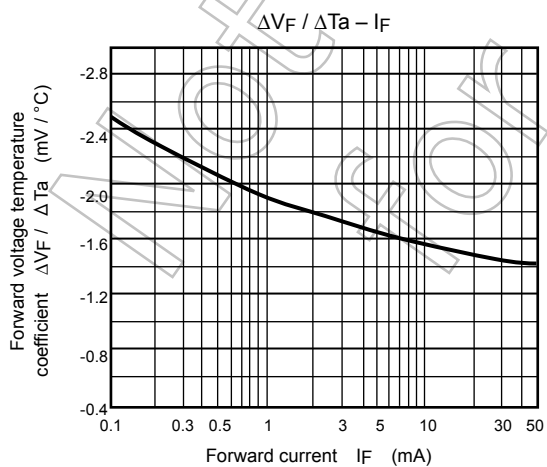
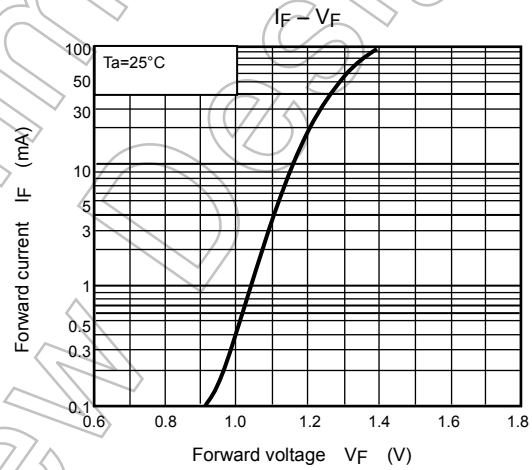
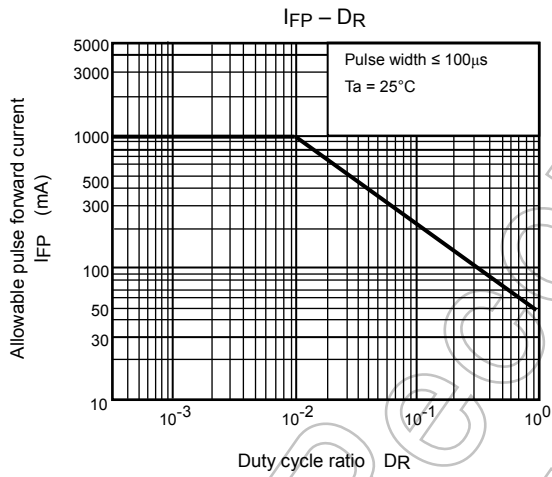
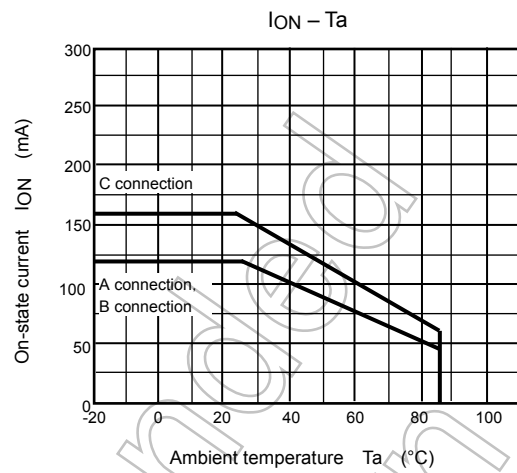
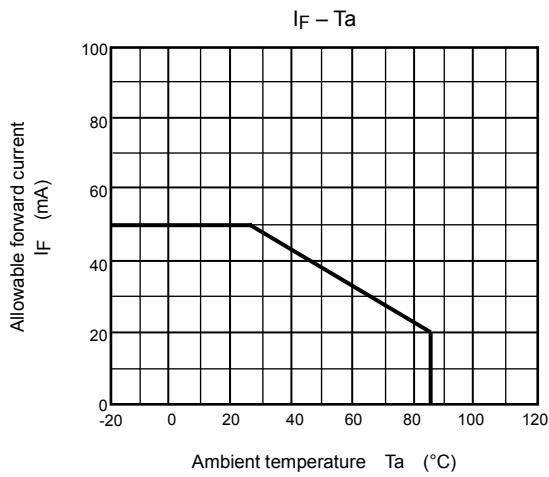
| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------------|--------|--|--------------------|-----------|-----|-----------|
| Capacitance input to output | C_S | $V_S = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 0.8 | — | pF |
| Isolation resistance | R_S | $V_S = 500 \text{ V}, R.H. \leq 60 \%$ | 5×10^{10} | 10^{14} | — | Ω |
| Isolation voltage | BV_S | AC, 60 s | 2500 | — | — | V_{rms} |

Switching Characteristics (Ta = 25°C)

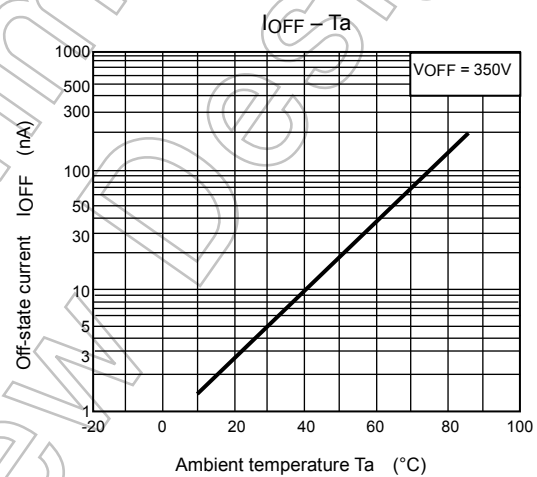
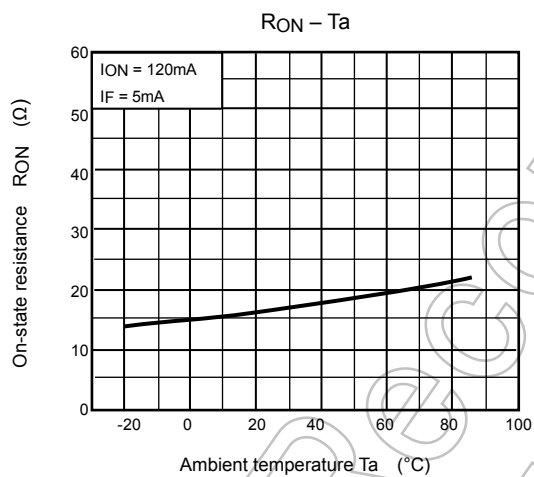
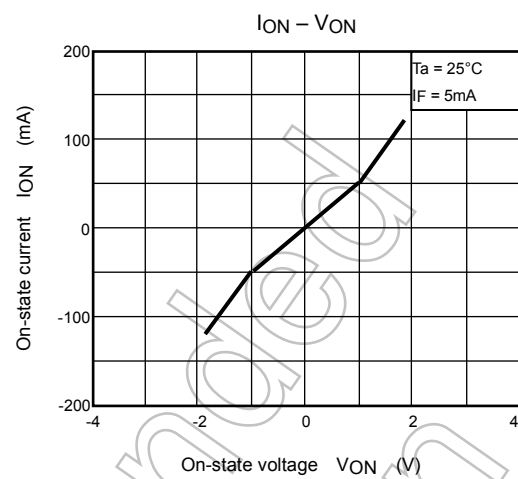
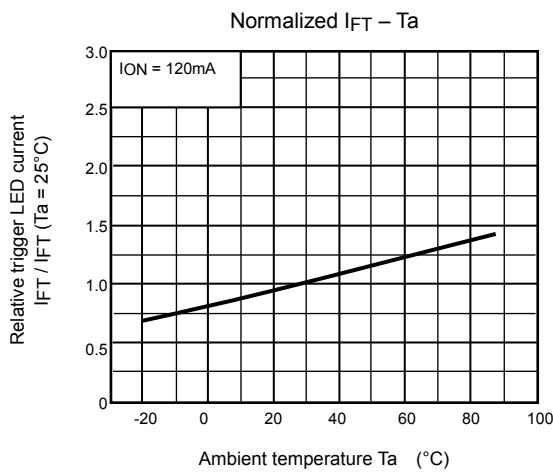
| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------|-----------|--|-----|------|-----|------|
| Turn-on time | t_{ON} | $R_L = 200 \Omega$ (Note 2) $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ | — | 0.3 | 1 | ms |
| Turn-off time | t_{OFF} | | — | 0.1 | 1 | |

Note 2: Switching time test circuit





NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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