

TLP598G

Telecommunication  
Data Acquisition  
Measurement Instrumentation

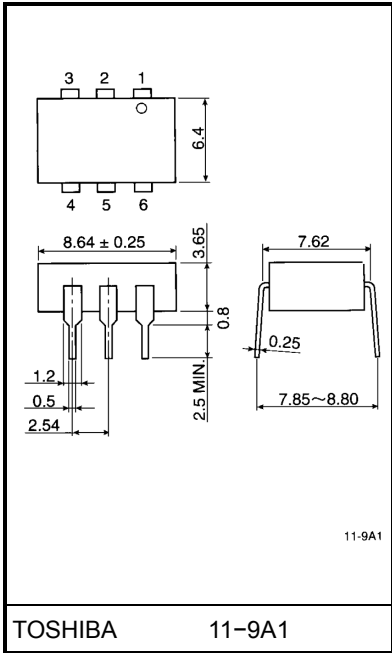
The TOSHIBA TLP598G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead plastic DIP package (DIP6).  
The TLP598G is a bi-directional switch which can replace mechanical relays in many applications.

- Peak off-state voltage: 400 V (min.)
- On-state current: 150 mA (max.) (A connection)
- On-state resistance: 12 Ω (max.) (A connection)
- Isolation voltage: 2500 Vrms (min.) (A connection)
- UL recognized: UL1577, file no. E67349
- Trigger LED current (Ta = 25°C)

| Classification<br>(Note 1) | Trigger LED Current<br>(mA) |      | Marking Of<br>Classification |
|----------------------------|-----------------------------|------|------------------------------|
|                            | @I <sub>ON</sub> = 150 mA   |      |                              |
|                            | Min.                        | Max. |                              |
| (IFT2)                     | —                           | 2    | T2                           |
| Standard                   | —                           | 5    | T2, blank                    |

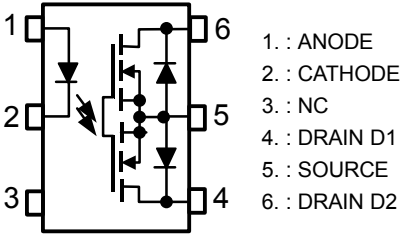
(Note 1): Application type name for certification test,  
please use standard product type name, i.e.  
TLP598G (IFT2): TLP598G

Unit in mm

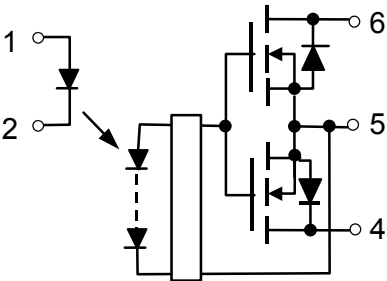


Weight: 0.49 g

Pin Configuration (top view)



Schematic



## Maximum Ratings (Ta = 25°C)

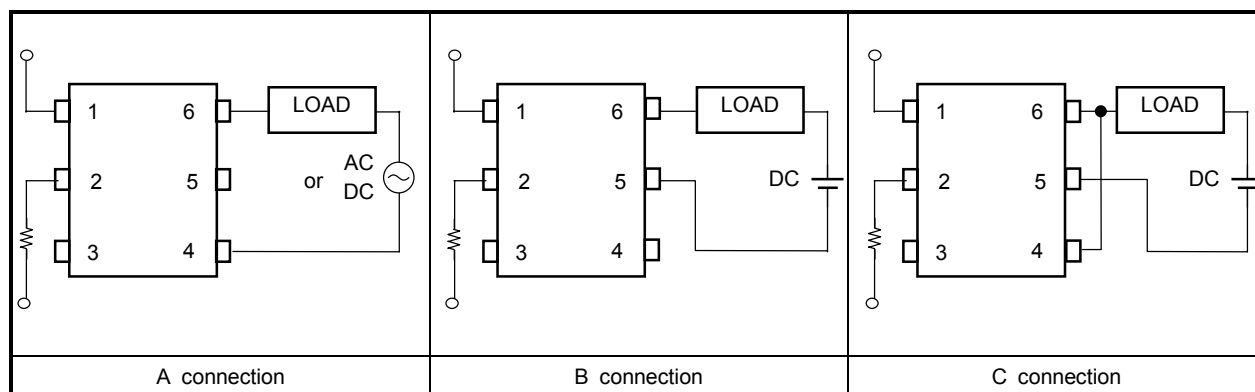
| Characteristic                                      |  |                  | Symbol                | Rating           | Unit    |
|---|--|------------------|-----------------------|------------------|---------|
| LED   | Forward current                              |                  | I <sub>F</sub>        | 30               | mA      |
|   | Forward current derating (Ta ≥ 25°C)         |                  | ΔI <sub>F</sub> / °C  | −0.3             | mA / °C |
|   | Peak forward current (100 μs pulse, 100 pps) |                  | I <sub>FP</sub>       | 1                | A       |
|   | Reverse voltage                              |                  | V <sub>R</sub>        | 5                | V       |
|   | Junction temperature                         |                  | T <sub>j</sub>        | 125              | °C      |
| Detector  | Off-state output terminal voltage            |                  | V <sub>OFF</sub>      | 400              | V       |
|   | On-state RMS current                         | A connection     | I <sub>ON</sub>       | 150              | mA      |
|   |  | B connection     |                       | 200              |         |
|   |  | C connection     |                       | 300              |         |
|   | On-state current derating (Ta ≥ 25°C)        | A connection     | ΔI <sub>ON</sub> / °C | −1.5             | mA / °C |
|   |  | B connection     |                       | −2.0             |         |
|   |  | C connection     |                       | −3.0             |         |
|   | Junction temperature                         |                  | T <sub>j</sub>        | 125              | °C      |
| Storage temperature range                           |  | T <sub>stg</sub> | −55~125               | °C               |         |
| Operating temperature range                         |  | T <sub>opr</sub> | −40~85                | °C               |         |
| Lead soldering temperature (10 s)                   |  | T <sub>sol</sub> | 260                   | °C               |         |
| Isolation voltage (AC, 1 min., R.H. ≤ 60%) (Note 2) |  | BV <sub>S</sub>  | 2500                  | V <sub>rms</sub> |         |

(Note 2): 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        | $V_{DD}$  | —    | —    | 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. | Max. | Unit          |
|----------------|-------------------|-----------|----------------------------|------|------|------|---------------|
| LED            | Forward voltage   | $V_F$     | $I_F = 10 \text{ mA}$      | 1.2  | 1.4  | 1.7  | V             |
|                | Reverse current   | $I_R$     | $V_R = 3 \text{ V}$        | —    | —    | 10   | $\mu\text{A}$ |
|                | Capacitance       | $C_T$     | $V = 0, f = 1 \text{ MHz}$ | —    | 30   | —    | pF            |
| Detector       | Off-state current | $I_{OFF}$ | $V_{OFF} = 400 \text{ V}$  | —    | —    | 1    | $\mu\text{A}$ |
|                | Capacitance       | $C_{OFF}$ | $V = 0, f = 1 \text{ MHz}$ | —    | —    | —    | pF            |

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

| Characteristic      |              | Symbol   | Test Condition                                 | Min. | Typ. | Max. | Unit     |
|---------------------|--------------|----------|--|------|------|------|----------|
| Trigger LED current |              | $I_{FT}$ | $I_{ON} = 150 \text{ mA}$                      | —    | 1    | 5    | mA       |
| On-state resistance | A connection | $R_{ON}$ | $I_{ON} = 150 \text{ mA}, I_F = 10 \text{ mA}$ | —    | 8    | 12   | $\Omega$ |
|                     | B connection |          | $I_{ON} = 200 \text{ mA}, I_F = 10 \text{ mA}$ | —    | 4    | 6    |          |
|                     | C connection |          | $I_{ON} = 300 \text{ mA}, I_F = 10 \text{ mA}$ | —    | 2    | 3    |          |

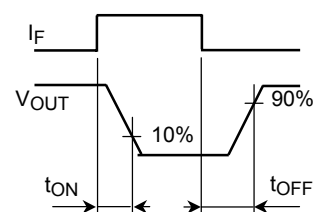
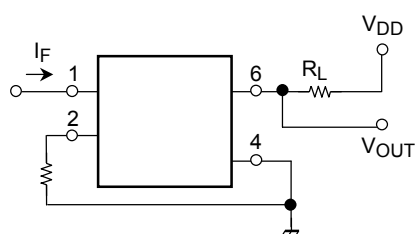
## Isolation Characteristics (Ta = 25°C)

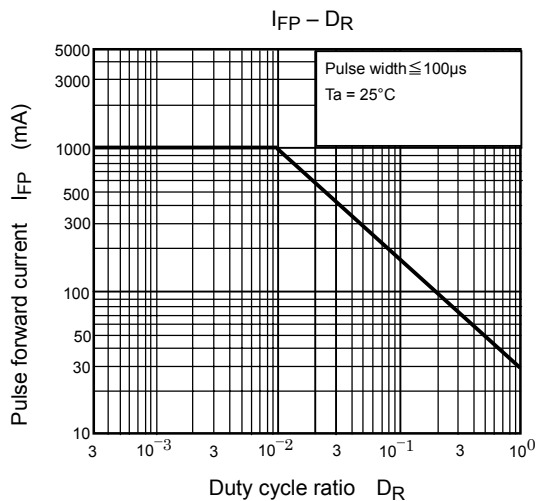
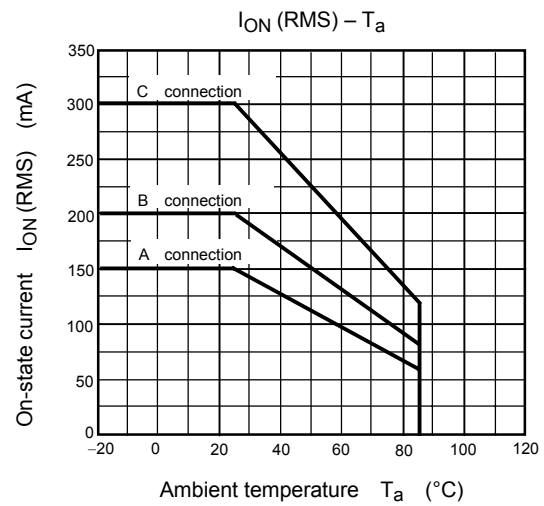
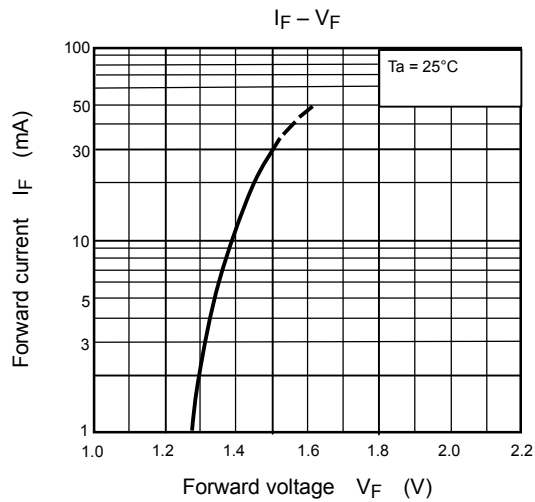
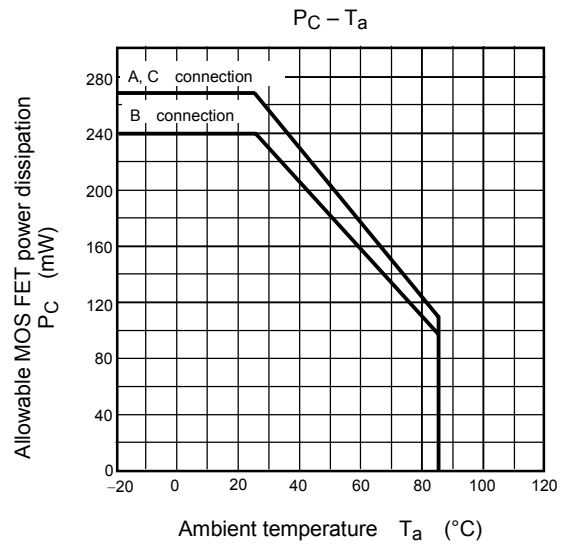
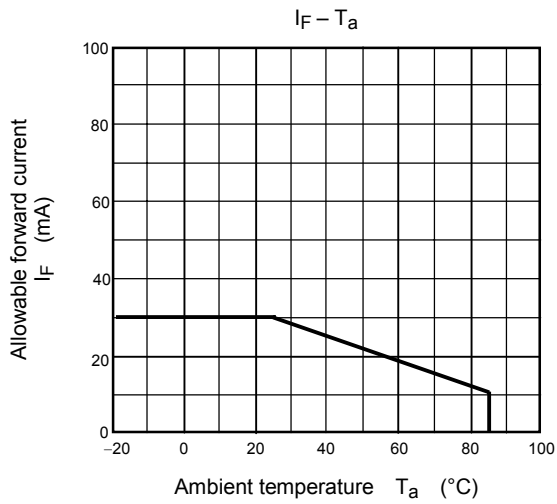
| Characteristic              | Symbol | Test Condition                               | Min.               | Typ.      | Max. | Unit     |
|-----------------------------|--------|--|--------------------|-----------|------|----------|
| Capacitance input to output | $C_S$  | $V_S = 0, f = 1 \text{ MHz}$                 | —                  | 0.8       | —    | pF       |
| Isolation resistance        | $R_S$  | $V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$ | $5 \times 10^{10}$ | $10^{14}$ | —    | $\Omega$ |
| Isolation voltage           | $BV_S$ | AC, 1 minute                                 | 2500               | —         | —    | Vrms     |
|                             |        | AC, 1 second (in oil)                        | —                  | 5000      | —    |          |
|                             |        | DC, 1 minute (in oil)                        | —                  | 5000      | —    | VDC      |

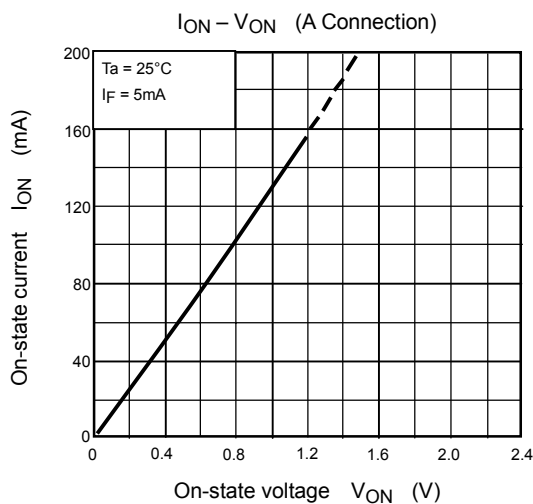
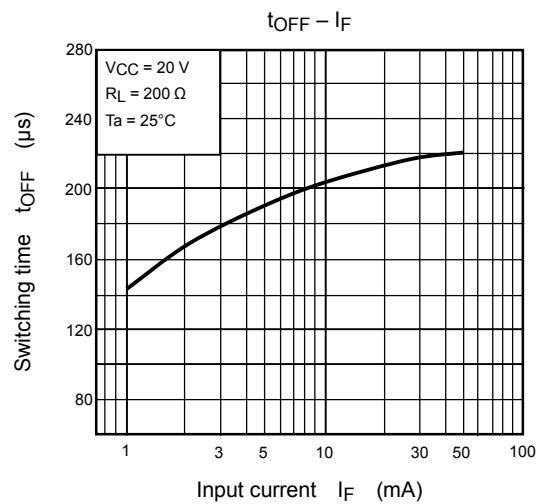
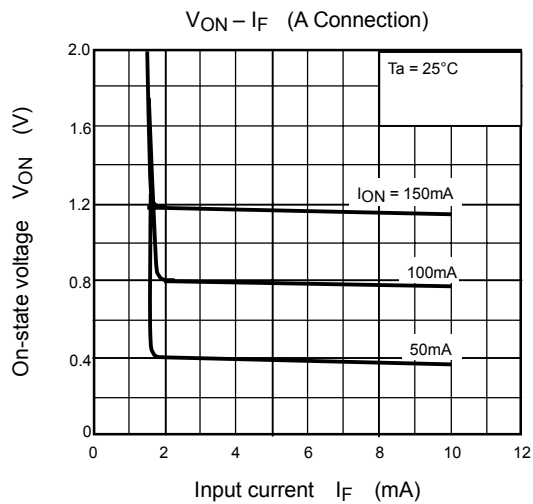
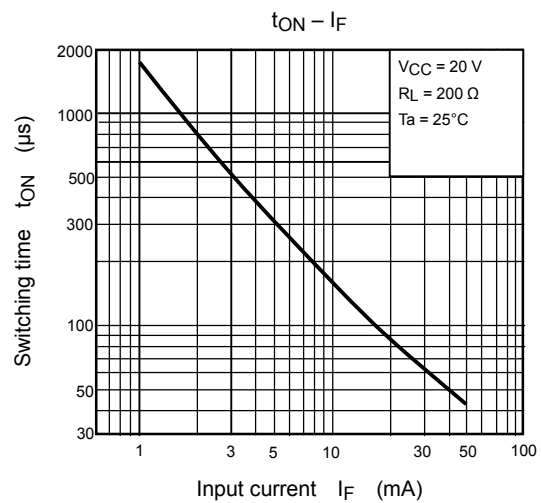
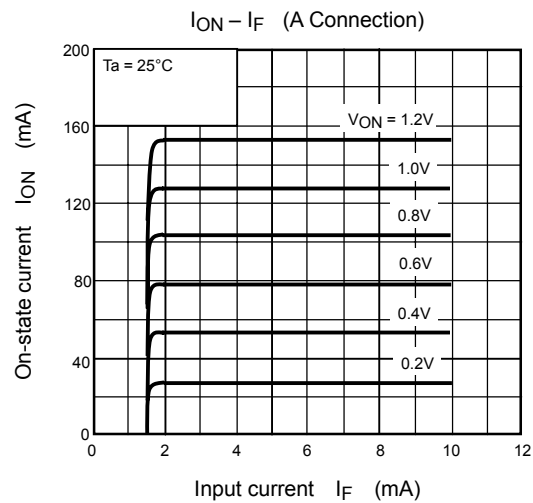
## Switching Characteristics (Ta = 25°C)

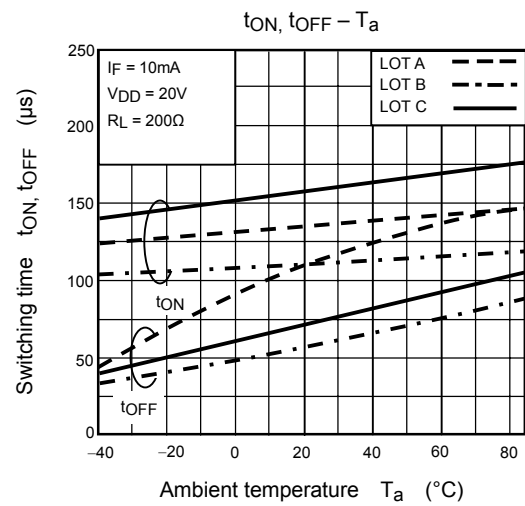
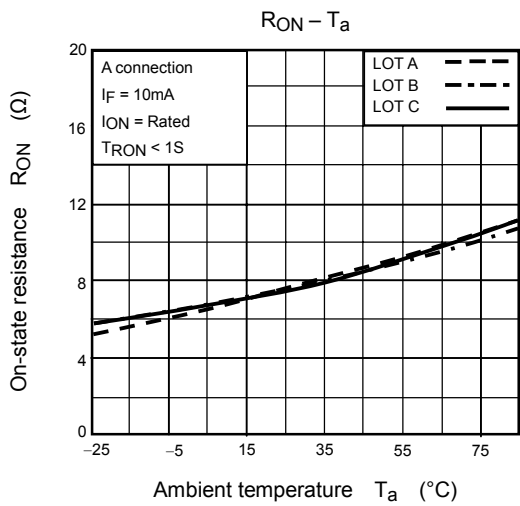
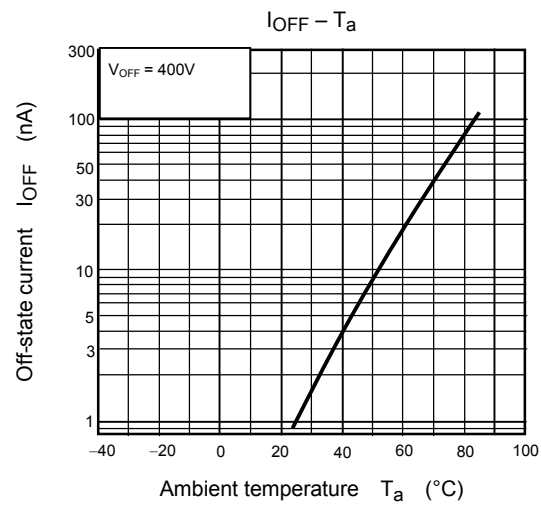
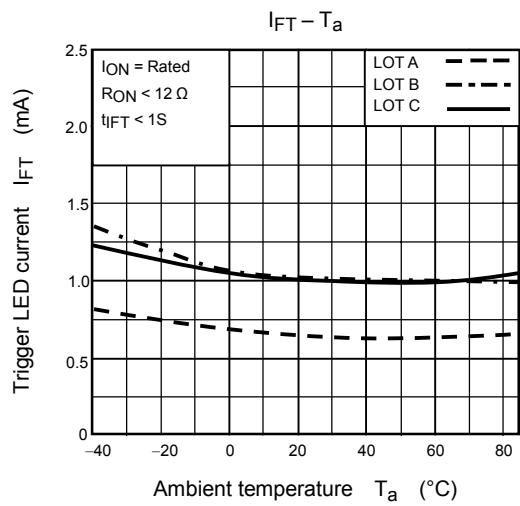
| Characteristic | Symbol    | Test Condition  | Min. | Typ. | Max. | Unit |
|----------------|-----------|---|------|------|------|------|
| Turn-on time   | $t_{ON}$  | $V_{DD} = 20 \text{ V}, R_L = 200 \Omega$<br>$I_F = 10 \text{ mA}$ (Note 3) | —    | 0.3  | 1.0  | ms   |
| Turn-off time  | $t_{OFF}$ |   | —    | 0.2  | 1.0  |      |

(Note 3): Switching time test circuit









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000707EBC

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