

TOSHIBA Photocoupler GaAs Ired & Photo-MOS FET

## TLP197G

Modem

Fax

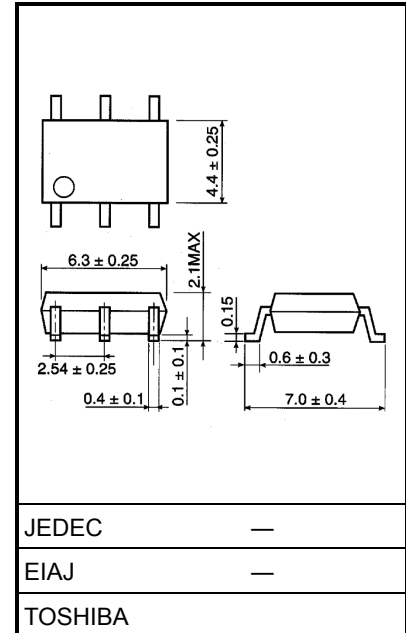
PBX

Measurement Instrumentation

The TOSHIBA mini flat photo relay TLP197G is a small outline photo relay, suitable for surface mount assembly. The TLP197G consists of an gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a six lead 2.1mm height package, which enable TLP197G to be applied in card modems. The TLP197G is a bi-directional switch which can replace mechanical relays in fax machines and modems etc.

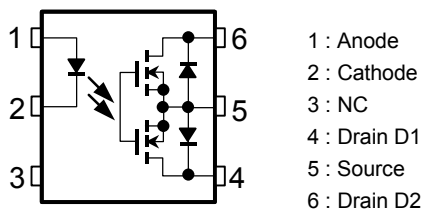
- SOP 6pin(2.54SOP6): 1-form-A
- Peak off-state voltage: 350V (min)
- Trigger LED current: 3mA (max)
- On-state current: 120mA(max)  
(A connection)
- On-state resistance: 35Ω(max)
- Isolation voltage: 1500Vrms (min)
- UL recognized: UL1577, file No./E67349
- BSI approved: BS EN60065: 1994, certificate No.8273  
BS EN60950: 1992, certificate No.8274
- SEMKO approved: SS EN60065  
SS EN60950
- Option(V4)type  
TUV approved: DIN VDE0884 / 06.92,  
certificate no.R9850580

Unit in mm

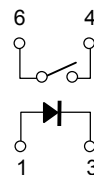


Weight: 0.13g

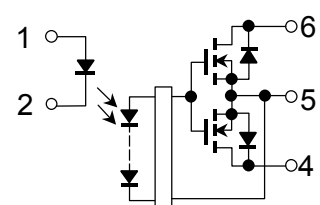
### Pin Configuration (top view)



### 1-Form-a



### Schematic



Maximum Ratings (Ta = 25°C)

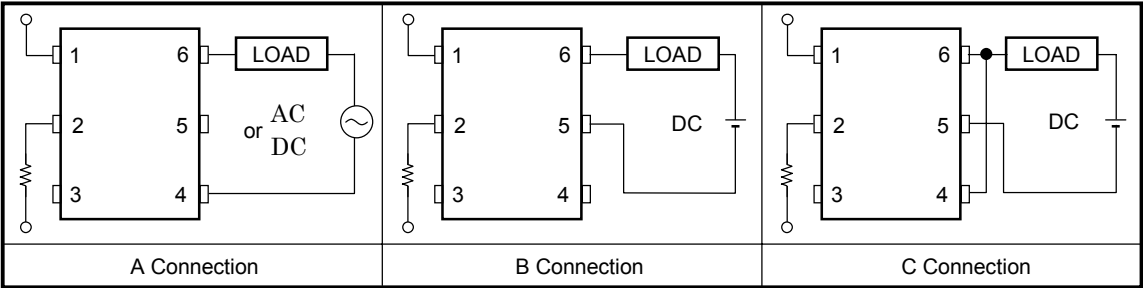
| Characteristics                                 |                                            |                  | Symbol               | Rating | Unit  |
|-------------------------------------------------|--------------------------------------------|------------------|----------------------|--------|-------|
| Led                                             | Forward current                            |                  | I <sub>F</sub>       | 50     | mA    |
|                                                 | Forward current derating (Ta ≥ 25°C)       |                  | ΔI <sub>F</sub> /°C  | −0.5   | mA/°C |
|                                                 | Pulse forward current (100μs pulse,100pps) |                  | 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>     | 350    | V     |
|                                                 | On-state current                           | A connection     | I <sub>ON</sub>      | 120    | mA    |
|                                                 |                                            | B connection     |                      |        |       |
|                                                 |                                            | C connection     |                      |        |       |
|                                                 | On-state current derating (Ta ≥ 25°C)      | A connection     | ΔI <sub>ON</sub> /°C | −1.2   | mA/°C |
|                                                 |                                            | B connection     |                      |        |       |
|                                                 |                                            | C connection     |                      |        |       |
|                                                 | 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.,RH ≤ 60%) (Note 1) |                                            | BV <sub>S</sub>  | 1500                 | Vrms   |       |

(Note 1): Device considered a two-terminal device: Pins1,2 and 3 shorted together and pins 4,5 and 6 shorted together.

Recommended Operating Conditions

| Characteristic                 | Symbol | Min. | Typ. | Max. | Unit |
|--------------------------------|--------|------|------|------|------|
| Supply voltage                 | VOFF   | —    | —    | 280  | V    |
| Forward current                | IF     | 5    | 7.5  | 25   | mA   |
| On-state current(A connection) | ION    | —    | —    | 100  | mA   |
| Operating temperature          | Topr   | -20  | —    | 65   | °C   |

Circuit Connections



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

| Characteristic |                   | Symbol    | Test Condition        | Min. | Typ. | Max. | Unit          |
|----------------|-------------------|-----------|-----------------------|------|------|------|---------------|
| Led            | Forward voltage   | $V_F$     | $I_F=10\text{mA}$     | 1.0  | 1.15 | 1.3  | V             |
|                | Reverse current   | $I_R$     | $V_R=5\text{V}$       | —    | —    | 10   | $\mu\text{A}$ |
|                | Capacitance       | $C_T$     | $V=0, f=1\text{MHz}$  | —    | 30   | —    | pF            |
| Detector       | Off-state current | $I_{OFF}$ | $V_{OFF}=350\text{V}$ | —    | —    | 1    | $\mu\text{A}$ |
|                | Capacitance       | $C_{OFF}$ | $V=0, f=1\text{MHz}$  | —    | 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   | $\Omega$ |
|                     |              |          | $I_{ON}=20\sim120\text{mA}, I_F=5\text{mA}$ | —    | 26   | 40   |          |

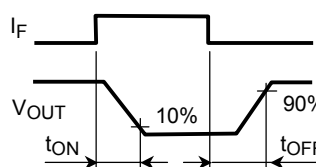
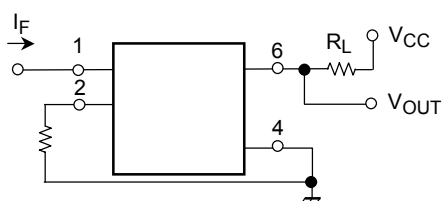
## Isolation Characteristics (Ta = 25°C)

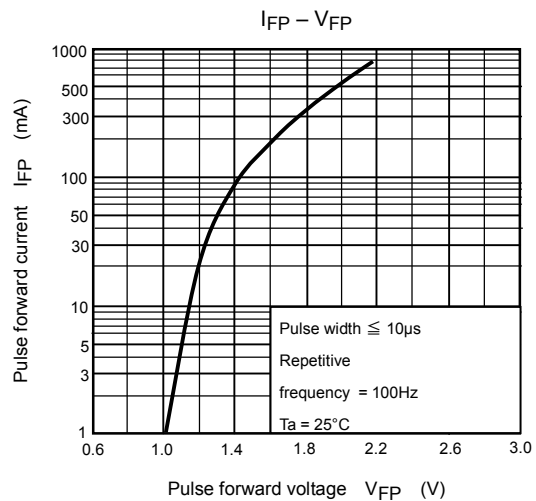
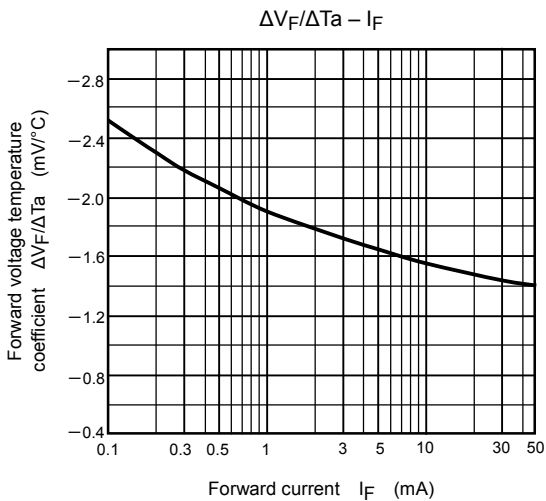
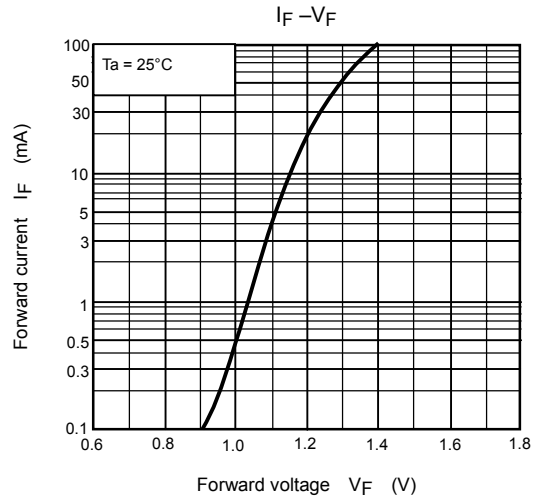
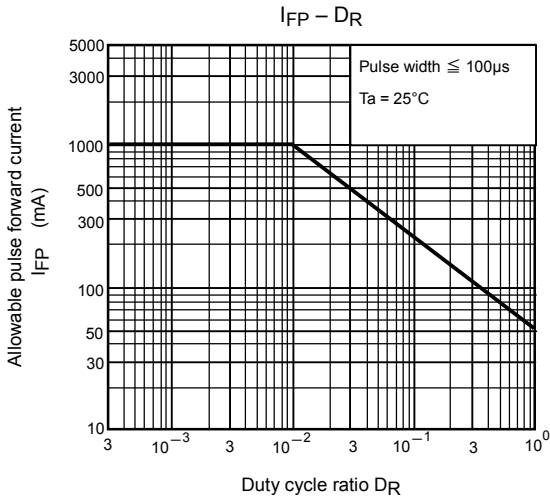
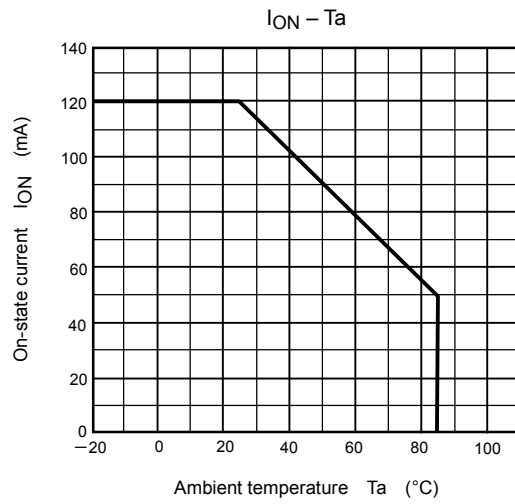
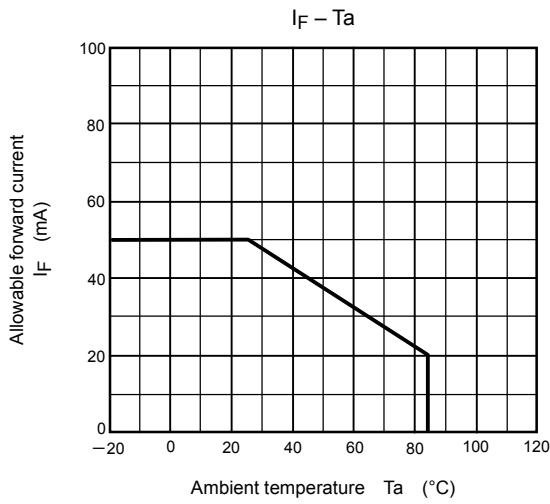
| Characteristic              | Symbol | Test Condition                    | Min.               | Typ.      | Max. | Unit      |
|-----------------------------|--------|-----------------------------------|--------------------|-----------|------|-----------|
| Capacitance input to output | $C_S$  | $V_S=0, f=1\text{MHz}$            | —                  | 0.8       | —    | pF        |
| Isolation resistance        | $R_S$  | $V_S=500\text{V}, R.H. \leq 60\%$ | $5 \times 10^{10}$ | $10^{14}$ | —    | $\Omega$  |
| Isolation voltage           | $BV_S$ | AC, 1minute                       | 1500               | —         | —    | $V_{rms}$ |
|                             |        | AC, 1second (in oil)              | —                  | 3000      | —    |           |
|                             |        | DC, 1minute (in oil)              | —                  | 3000      | —    | $V_{dc}$  |

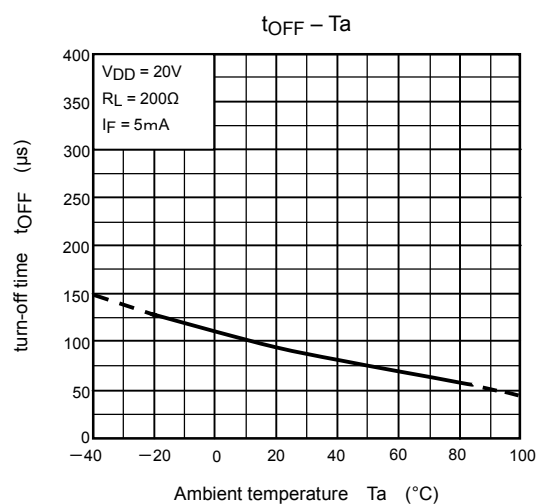
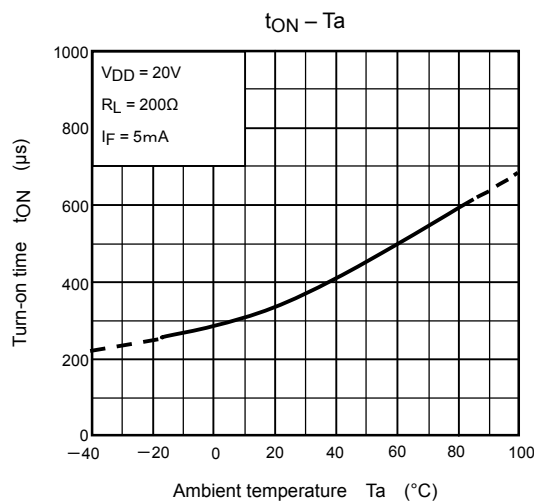
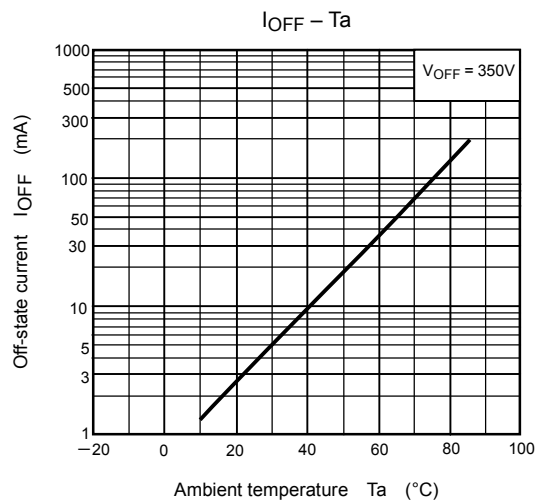
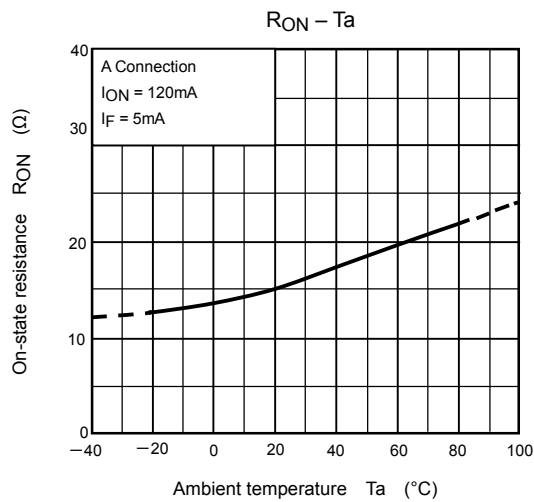
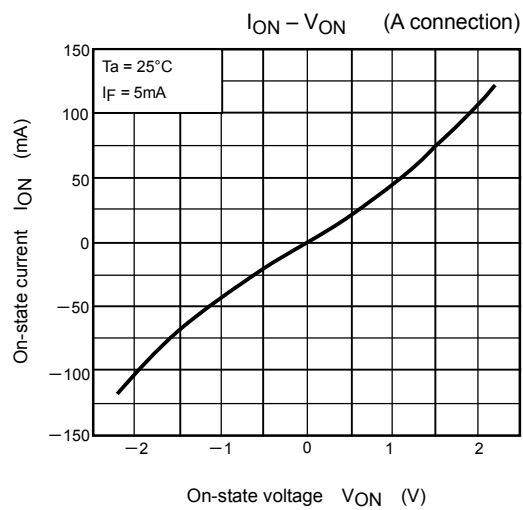
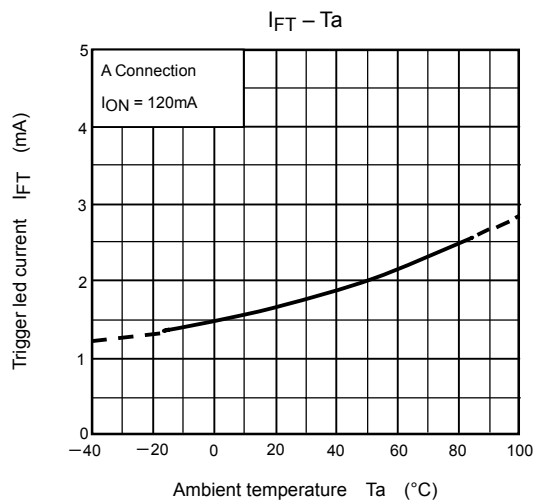
## Switching Characteristics (Ta = 25°C)

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

(Note2): Switching time test circuit







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