

TLP197G

Modem

Fax

PBX

Measurement Instrumentation

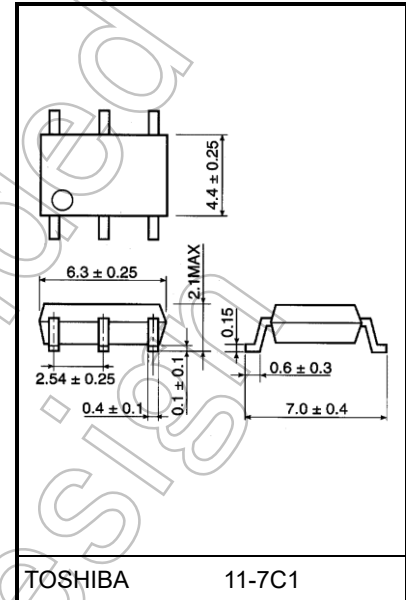
The TOSHIBA mini flat photo relay TLP197G is a small outline photo relay, suitable for surface mount assembly.

The TLP197G consists of an 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.

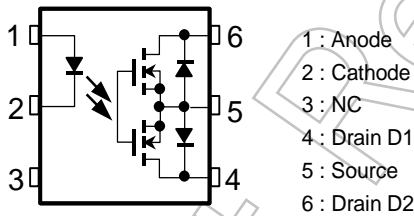
- SOP 6pin(2.54SOP6): 1-form-A
- Peak off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max) (A connection)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 1500 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A File No.E67349

Unit: mm

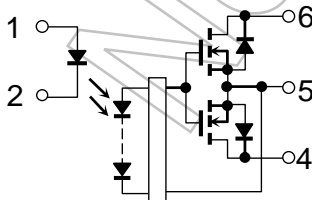


Weight: 0.13g (typ.)

Pin Configuration (top view)



Schematic



Start of commercial production
1996-03

Absolute Maximum Ratings (Ta = 25°C)

| Characteristics | | Symbol | Rating | Unit | |
|---|--|---------------------|----------------------|-------|-------|
| Led | Forward current | I _F | 50 | mA | |
| | Forward current derating (Ta ≥ 25°C) | ΔI _F /°C | -0.5 | mA/°C | |
| | Pulse forward current (100μs pulse, 100pps) | I _{FP} | 1 | A | |
| | Reverse voltage | V _R | 5 | V | |
| | Diode power dissipation | P _D | 50 | mW | |
| | Diode power dissipation derating (Ta > 25°C) | ΔP _D /°C | -0.5 | mW/°C | |
| | Junction temperature | T _j | 125 | °C | |
| Detector | Off-state output terminal voltage | V _{OFF} | 350 | V | |
| | On-state current | A connection | I _{ON} | 120 | mA |
| | | B connection | | | |
| | | C connection | | | |
| | On-state current derating (Ta ≥ 25°C) | A connection | ΔI _{ON} /°C | -1.2 | mA/°C |
| | | B connection | | | |
| | | C connection | | | |
| | Output power dissipation | A connection | P _O | 300 | mW |
| | | B connection | | | |
| | | C connection | | | |
| Output power dissipation derating (Ta ≥ 25°C) | A connection | ΔP _O /°C | -3.0 | mW/°C | |
| | B connection | | | | |
| | C connection | | | | |
| 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) V _S | 1500 | 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).

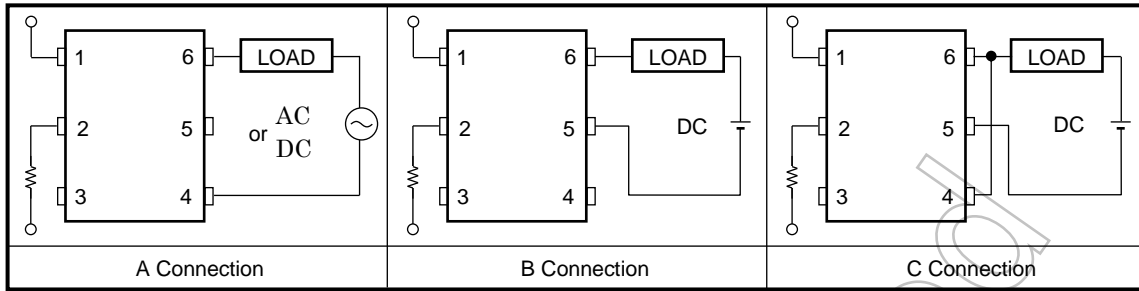
Note 1: Device considered a two-terminal device: Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

| Characteristic | Symbol | Min | Typ. | Max | Unit |
|--------------------------------|------------------|-----|------|-----|------|
| Supply voltage | V _{CC} | — | — | 280 | V |
| Forward current | I _F | 5 | 7.5 | 25 | mA |
| On-state current(A connection) | I _{ON} | — | — | 100 | 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

Individual Electrical Characteristics (Ta = 25°C)

| Characteristic | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------|-------------------|------------------|---------------------------------|-----|------|-----|------|
| Led | Forward voltage | V _F | I _F = 1.0 mA | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I _R | V _R = 5 V | — | — | 10 | μA |
| | Capacitance | C _T | V _F = 0 V, f = 1 MHz | — | 30 | — | pF |
| Detector | Off-state current | I _{OFF} | V _{OFF} = 350 V | — | — | 1 | μA |
| | Capacitance | C _{OFF} | V = 0 V, f = 1 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 mA | — | 1 | 3 | mA |
| On-state resistance | A connection | R _{ON} | I _{ON} = 120 mA, I _F = 5 mA | — | 22 | 35 | Ω |
| | | | I _{ON} = 20 to 120 mA, I _F = 5 mA | — | 26 | 40 | |

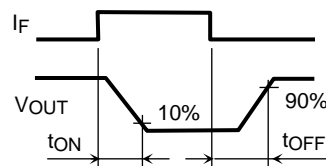
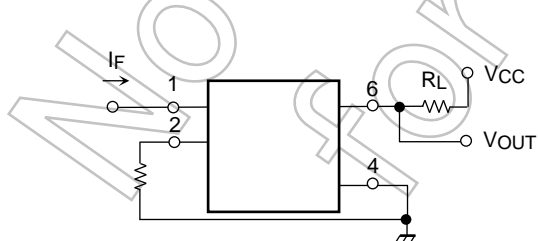
Isolation Characteristics (Ta = 25°C)

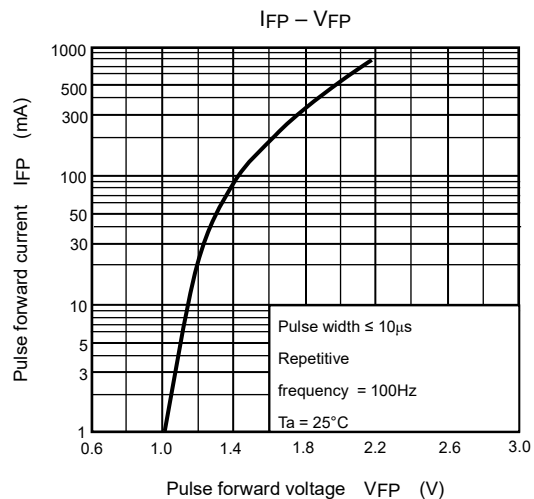
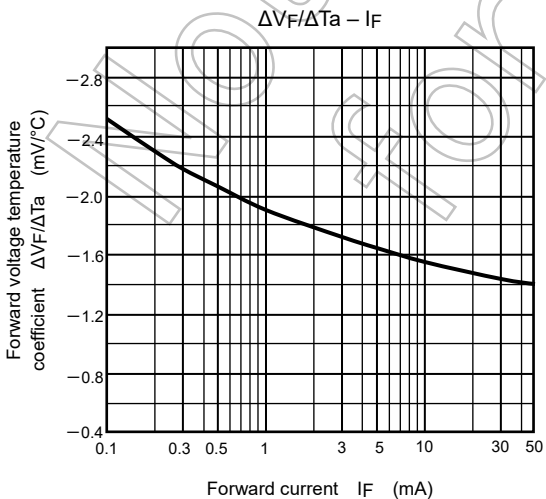
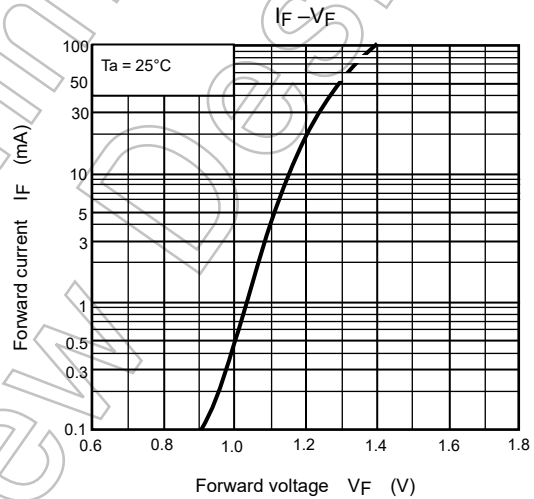
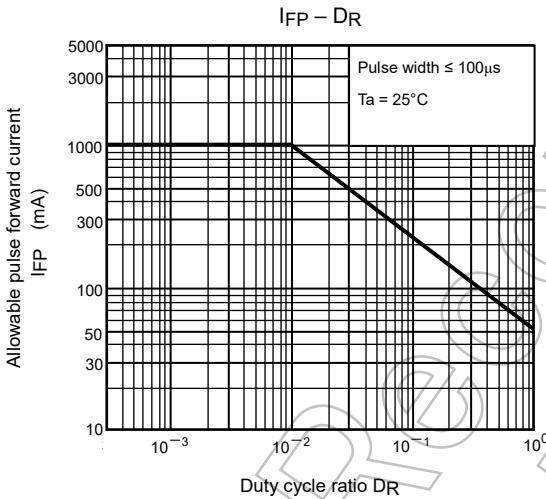
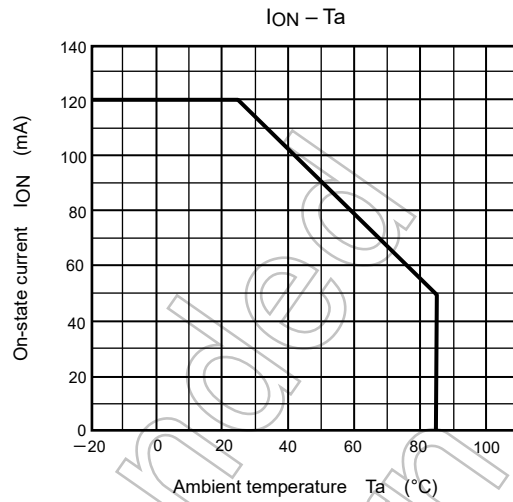
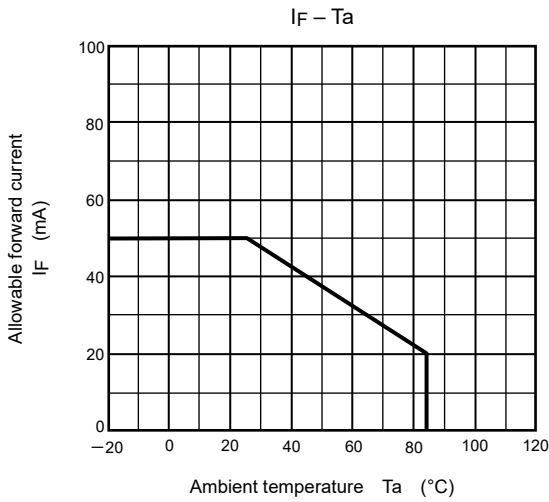
| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------------|-----------------|-------------------------------------|--------------------|------------------|-----|------------------|
| Capacitance input to output | C _S | V _S = 0 V, f = 1 MHz | — | 0.8 | — | pF |
| Isolation resistance | R _S | V _S = 500 V, R.H. ≤ 60 % | 5×10 ¹⁰ | 10 ¹⁴ | — | Ω |
| Isolation voltage | BV _S | AC, 60 s | 1500 | — | — | V _{rms} |

Switching Characteristics (Ta = 25°C)

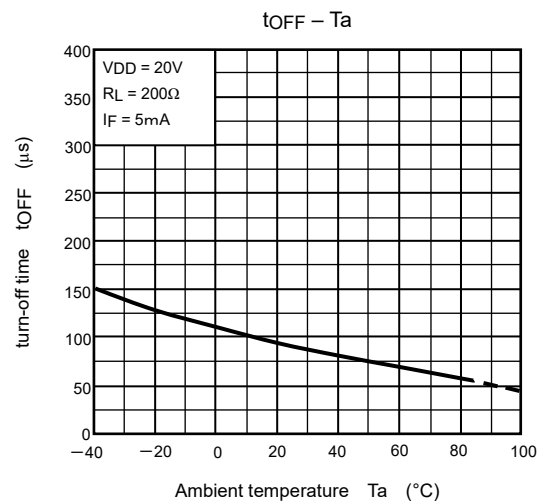
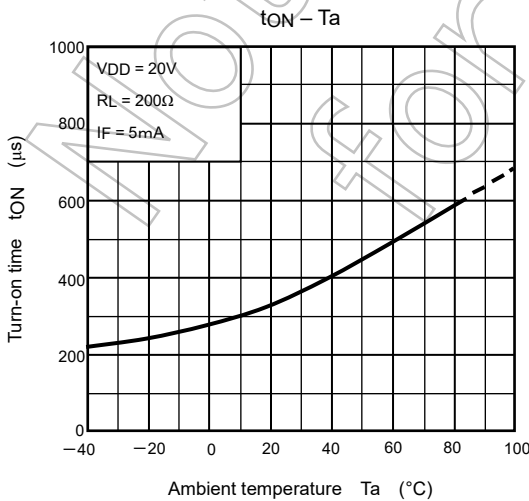
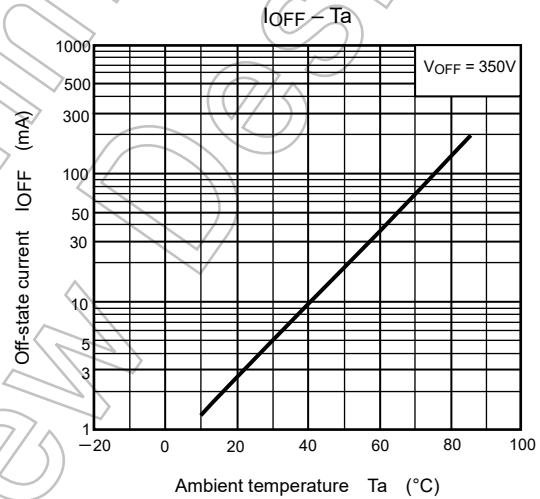
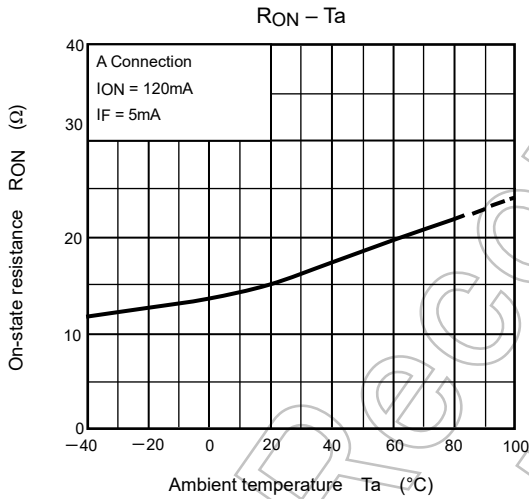
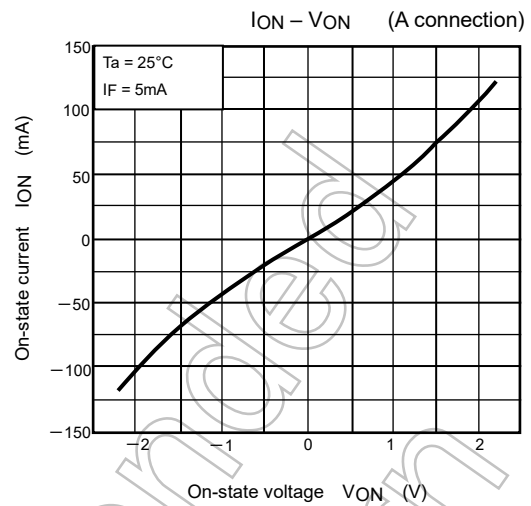
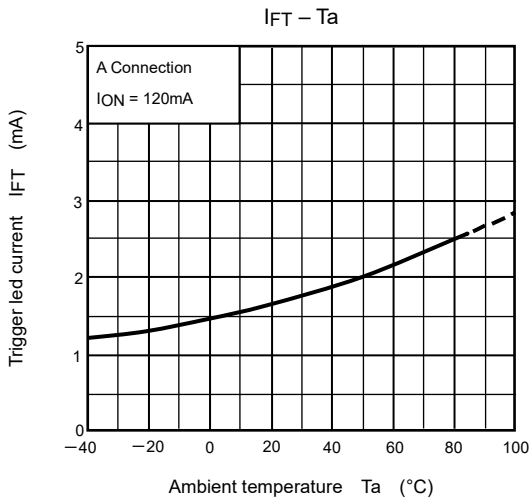
| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------|------------------|---|-----|------|-----|------|
| Turn-on time | t _{ON} | R _L = 200 Ω (Note 2) | — | 0.3 | 1 | ms |
| Turn-off time | t _{OFF} | V _{CC} = 20 V, I _F = 5 mA | — | 0.1 | 1 | |

Note2: 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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