

TOSHIBA Photocoupler Photorelay

TLP174GA

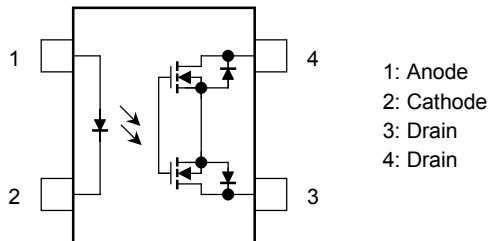
Modem-Fax Cards, Modems in PC
 Telecommunications
 PBX
 Measurement Equipment

The Toshiba TLP174GA consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

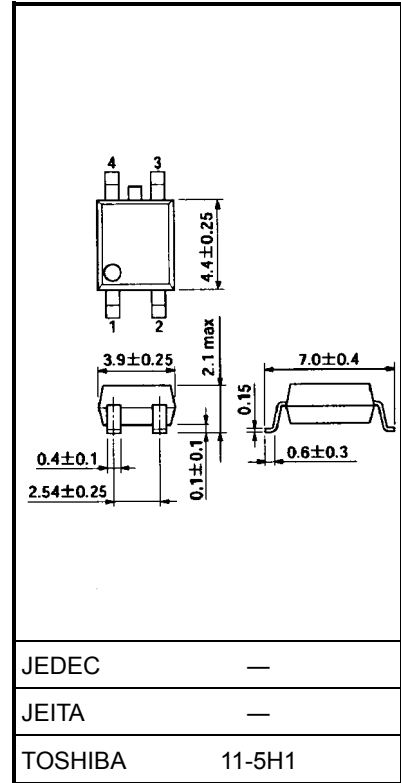
The TLP174GA is suitable for the modem applications which require space savings.

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, Pitch = 2.54 mm
- 1-Form-A
- Peak Off-state voltage: 400 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 120 mA (max)
- Limit current: 150 mA~300 mA (t = 5 ms)
- On-state resistance: 35 Ω (max)
- Isolation voltage: 1500 Vrms (min)

Pin Configuration (top view)



Unit: mm



Weight: 0.1 g (typ.)

Maximum Rating (Ta = 25°C)

| Characteristics | | 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} | 400 | V |
| | On-state current | I_{ON} | 120 | mA |
| | On-state current derating (Ta ≥ 25°C) | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Junction temperature | T_j | 125 | °C |
| Storage temperature range | | T_{stg} | -55~125 | °C |
| Operating temperature range | | T_{opr} | -40~85 | °C |
| Lead soldering temperature (10 s) | | T_{sol} | 260 | °C |
| Isolation voltage (AC, 1 min, R.H. ≤ 60%) (Note 1) | | BV_S | 1500 | Vrms |

Note 1: Device considered a two-terminal device: LED side pins shorted together, and detector side pins shorted together.

Recommended Operating Conditions

| Characteristics | Symbol | Min | Typ. | Max | Unit |
|-----------------------|-----------|-----|------|-----|------|
| Supply voltage | V_{DD} | — | — | 320 | V |
| Forward current | I_F | 5 | 7.5 | 25 | mA |
| On-state current | I_{ON} | — | — | 120 | mA |
| Operating temperature | T_{opr} | -20 | — | 65 | °C |

Electrical Characteristics (Ta = 25°C)

| Characteristics | | 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} | $V_{OFF} = 400 \text{ V}$ | — | — | 1 | μA |
| | Capacitance | C_{OFF} | $V = 0, f = 1 \text{ MHz}$ | — | 70 | — | pF |

Coupled Electrical Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------|-----------|---|-----|------|-----|----------|
| Trigger LED current | I_{FT} | $I_{ON} = 120 \text{ mA}$ | — | 1 | 3 | mA |
| Close LED current | I_{FC} | $I_{OFF} = 100 \mu\text{A}$ | 0.1 | — | — | mA |
| Load current limiting | I_{LIM} | $I_{ON} = 5 \text{ mA}$, $V_{DD} = 5 \text{ V}$, $t < 5 \text{ ms}$ | 150 | — | 300 | Ω |
| On-state resistance | R_{ON} | $I_{ON} = 120 \text{ mA}$, $I_F = 5 \text{ mA}$ | — | 17 | 35 | |

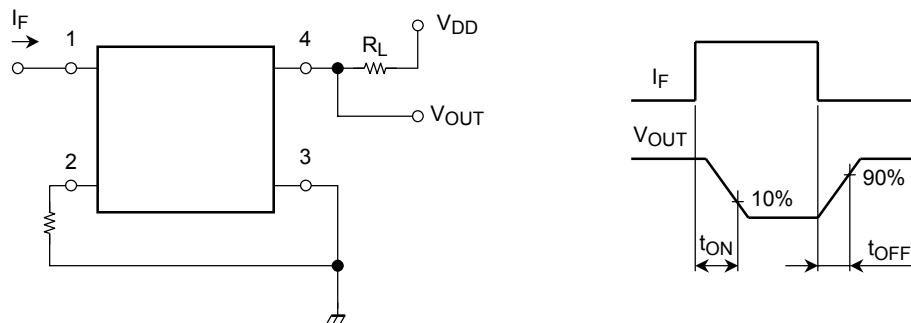
Isolation Characteristics (Ta = 25°C)

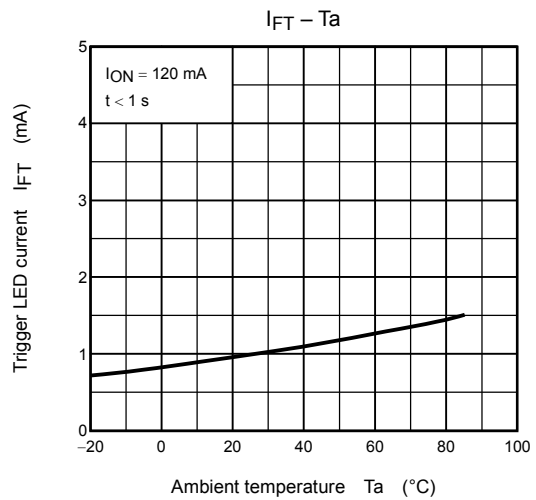
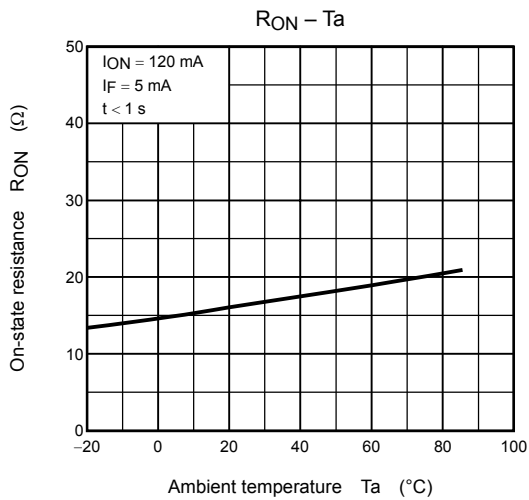
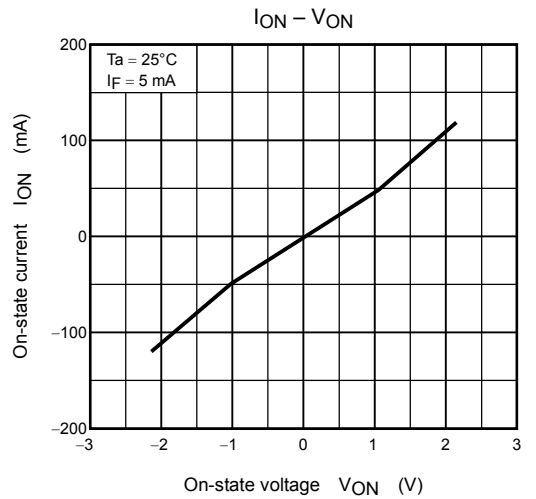
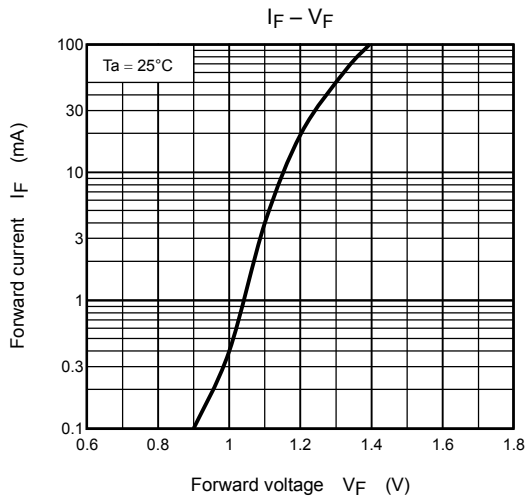
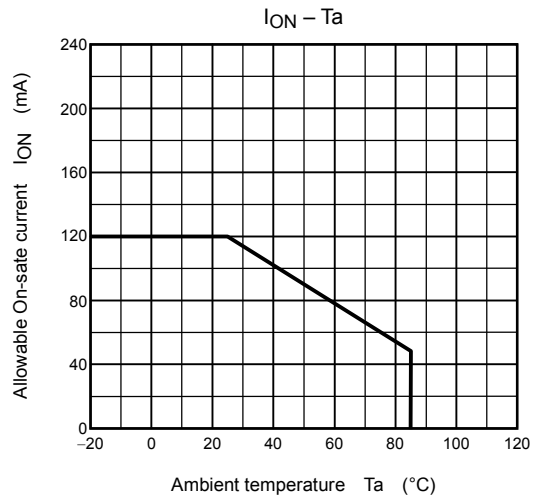
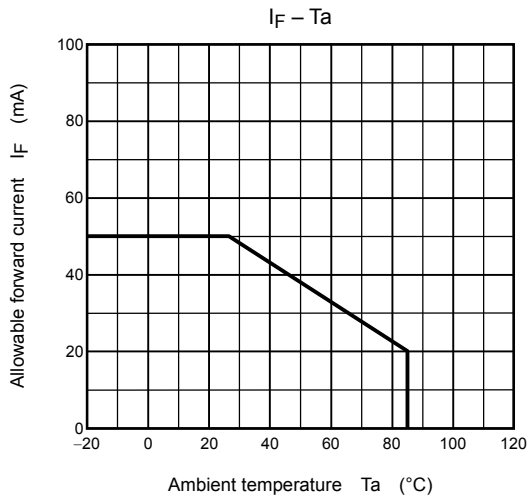
| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------------|--------|---|--------------------|-----------|-----|----------|
| Capacitance input to output | C_S | $V_S = 0 \text{ V}$, $f = 1 \text{ MHz}$ | — | 0.8 | — | pF |
| Isolation resistance | R_S | $V_S = 500 \text{ V}$, R.H. $\leq 60\%$ | 5×10^{10} | 10^{14} | — | Ω |
| Isolation voltage | BV_S | AC, 1 min | 1500 | — | — | Vrms |
| | | AC, 1 s, in oil | — | 3000 | — | Vrms |
| | | DC, 1 min, in oil | — | 3000 | — | Vdc |

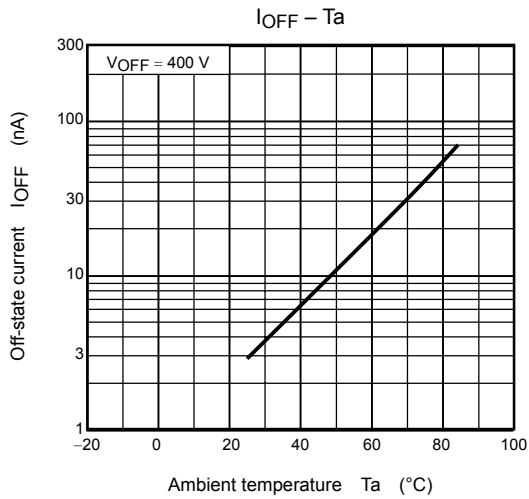
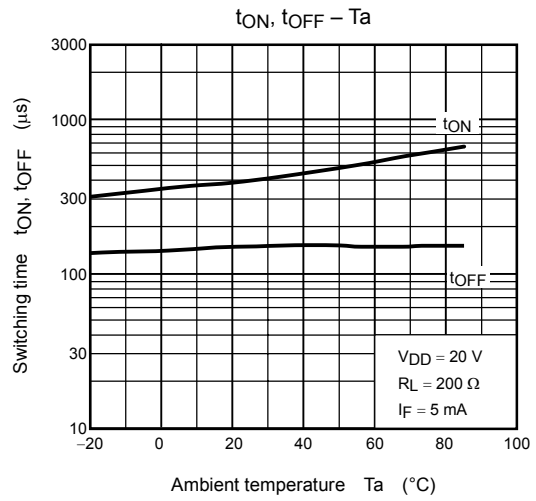
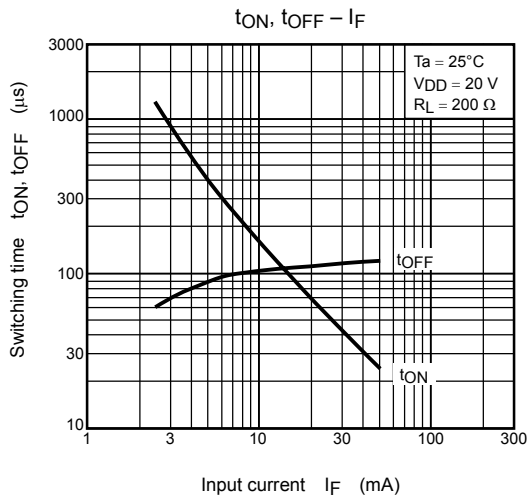
Switching Characteristics (Ta = 25°C)

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

Note 2: Switching time test circuit







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