

TOSHIBA Photocoupler Photorelay

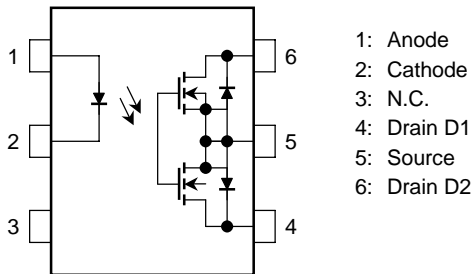
TLP3120

High-Speed Memory Tester
 High-Speed Logic Tester
 High-Frequency Measurement Equipment

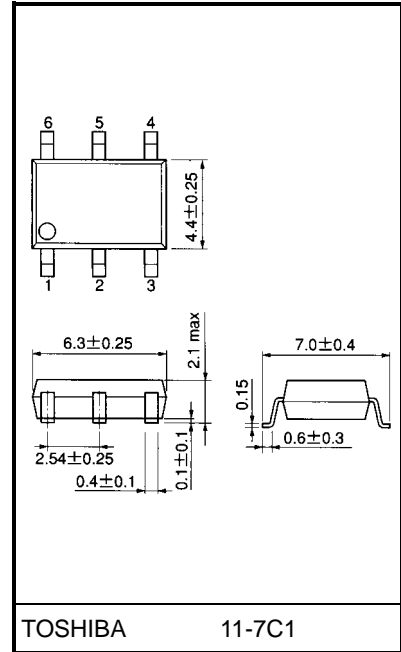
The Toshiba TLP3120 consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

- 6-pin SOP (2.54SOP6): 2.1 mm high, 2.54 mm pitch
- Normally opened (form A) device
- Peak OFF-state voltage: 80 V (min)
- Trigger LED current: 5 mA (max)
- ON-state current: 1.25 A (max)
- ON-state resistance: 0.15 Ω (max)
- Capacitance: 1000 pF (max)
- Isolation voltage: 1500 V_{rms} (min)

Pin Configuration (top view)



Unit: mm



Weight: 0.13 g (typ.)

Maximum Ratings (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 |
| | Reverse voltage | V_R | 5 | V |
| | Junction temperature | T_j | 125 | °C |
| Detector | OFF-state output terminal voltage | V_{OFF} | 80 | V |
| | ON-state current | I_{ON} | 1.25 | A |
| | ON-state current derating (Ta ≥ 25°C) | $\Delta I_{ON}/^\circ\text{C}$ | -12.5 | mA/°C |
| | Junction temperature | T_j | 125 | °C |
| Storage temperature range | | T_{stg} | -40~125 | °C |
| Operating temperature range | | T_{opr} | -20~85 | °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 is considered as a two-terminal device. LED side pins are shorted together and detector side pins are shorted together.

Recommended Operating Conditions

| Characteristics | Symbol | Min | Typ. | Max | Unit |
|-----------------------|-----------|-----|------|------|------|
| Supply voltage | V_{DD} | — | — | 64 | V |
| Forward current | I_F | 5 | — | 30 | mA |
| ON-state current | I_{ON} | — | — | 1.25 | A |
| Operating temperature | T_{opr} | 25 | — | 60 | °C |

Individual Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------|-------------------|-----------|--------------------------------------------------|-----|------|------|------|
| Led | Forward current | 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 | $V = 0, f = 1 \text{ MHz}$ | — | 15 | — | pF |
| Detector | OFF-state current | I_{OFF} | $V_{OFF} = 20 \text{ V}, T_a = 50^\circ\text{C}$ | — | 1200 | 1500 | pA |
| | Capacitance | C_{OFF} | $V = 0, f = 100 \text{ MHz}$ | — | 460 | 1000 | pF |

Coupled Electrical Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---------------------|----------|-----------------------------------------------|-----|------|------|----------|
| Trigger LED current | I_{FT} | $I_{ON} = 1.25 \text{ A}$ | — | 2 | 5 | mA |
| Return LED current | I_{FC} | $I_{OFF} = 10 \mu\text{A}$ | 0.2 | — | — | mA |
| ON-state resistance | R_{ON} | $I_{ON} = 1.25 \text{ A}, I_F = 5 \text{ mA}$ | — | 0.11 | 0.15 | Ω |

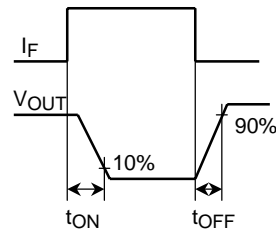
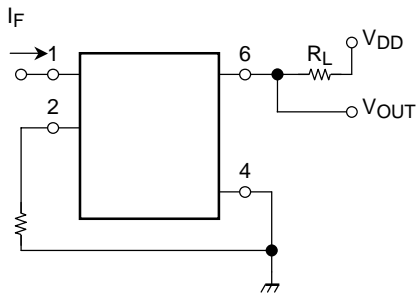
Isolation Characteristics (Ta = 25°C)

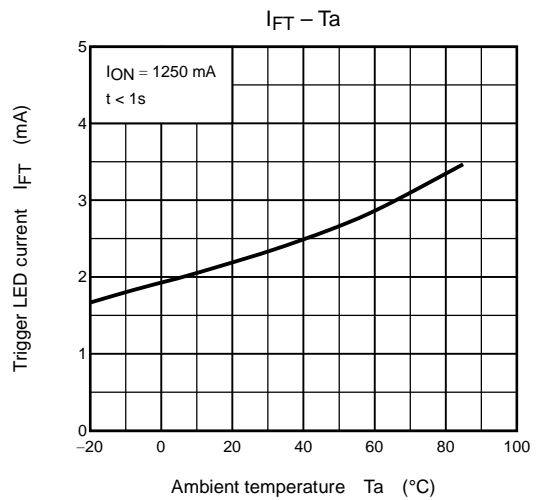
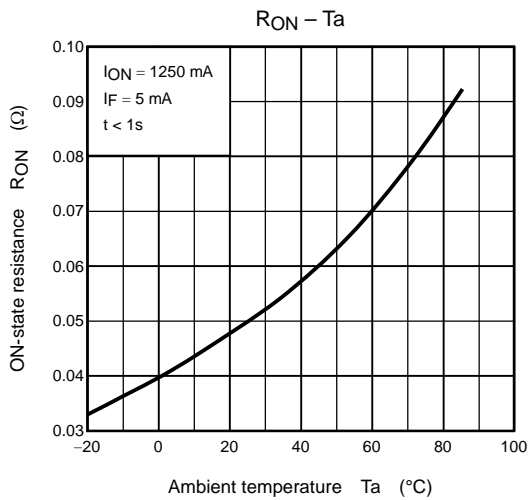
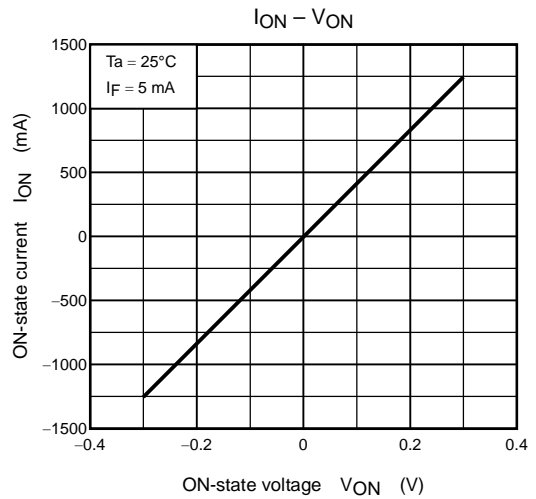
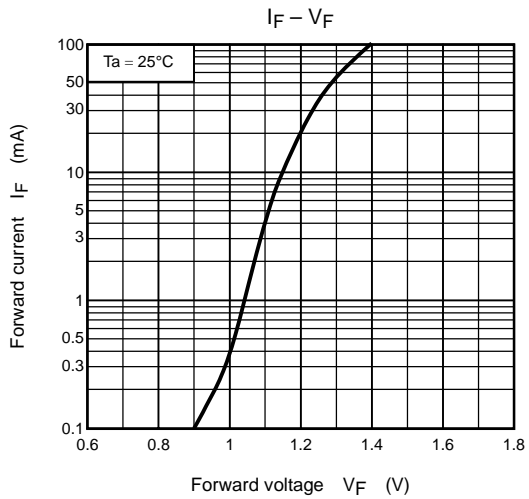
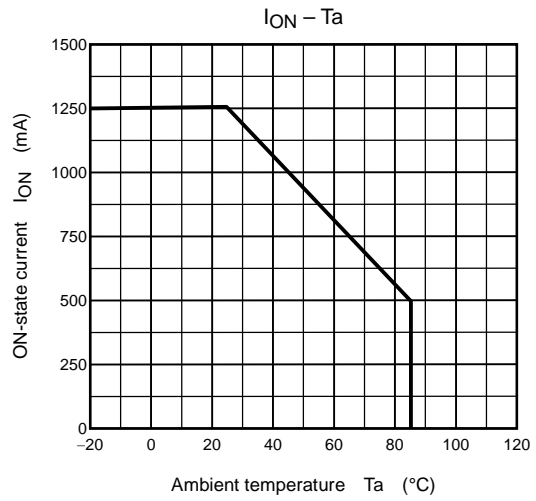
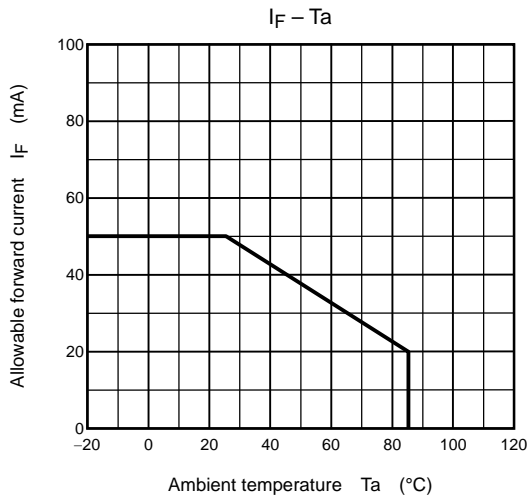
| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------------|--------|----------------------------------------------|--------------------|-----------|-----|----------|
| Capacitance input to output | C_S | $V_S = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 0.8 | —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

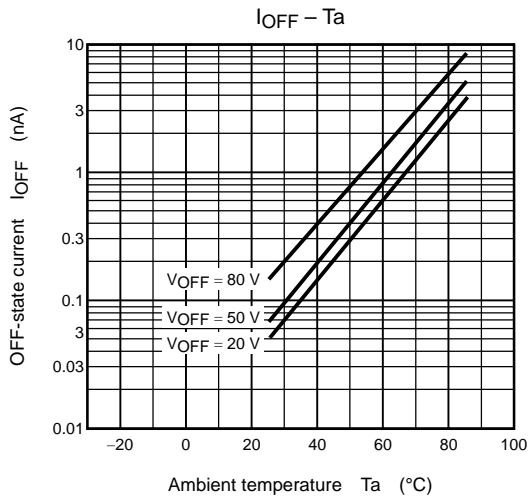
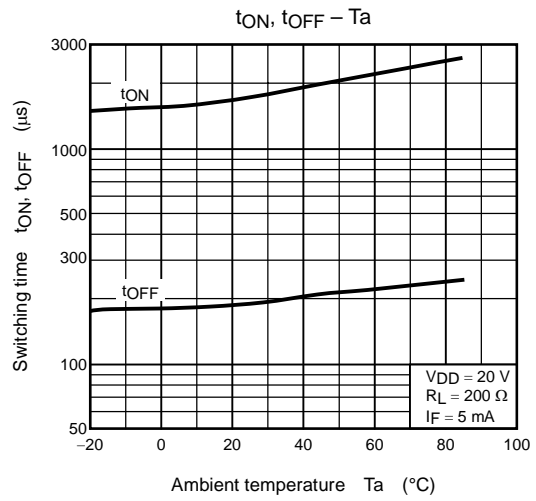
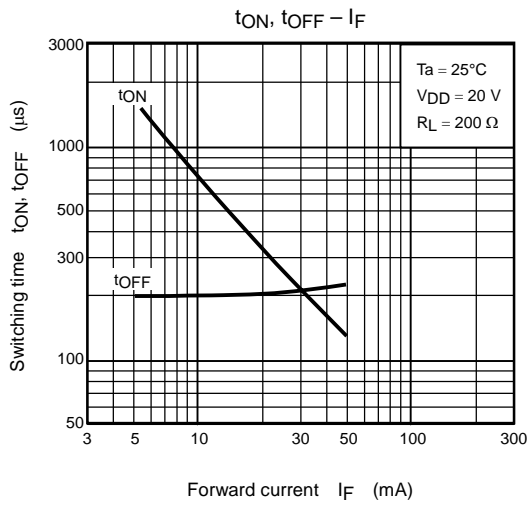
Switching Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------|-----------|------------------------------------------------------|-----|------|-----|------|
| Turn-ON time | t_{ON} | $R_L = 200 \Omega$ | — | 2.0 | 3.0 | ms |
| Turn-OFF time | t_{OFF} | $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ (Note 2) | — | 0.7 | 1.0 | |

Note 2: Switching time test circuit







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