

TOSHIBA PHOTOCOUPLER PHOTO RELAY

TLP3121

MEASUREMENT INSTRUMENTS

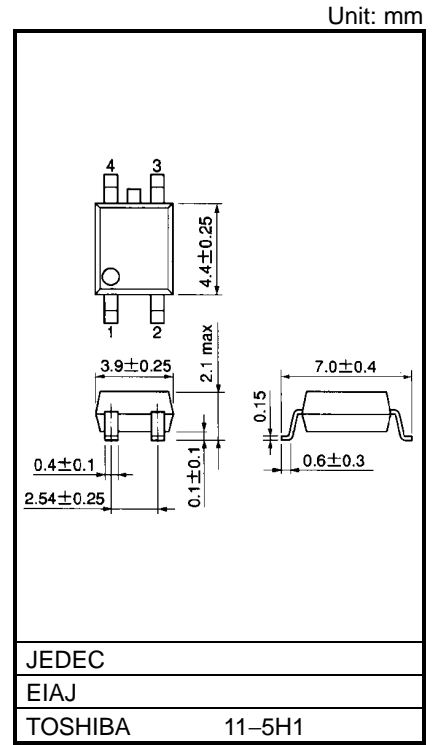
LOGIC IC TESTERS / MEMORY TESTERS

BOARD TESTERS / SCANNERS

The TOSHIBA TLP3121 Mini-flat photorelay is a small-outline photorelay, suitable for surface-mount assembly. The TLP3121 consists of a GaAs infrared-emitting diode optically coupled to a photo-MOS FET and housed in a 4-pin package. Its characteristics include low OFF-state current and low output pin capacitance.

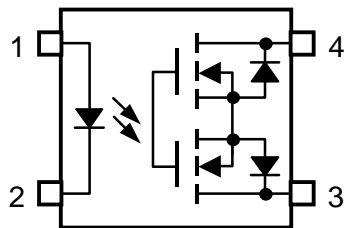
FEATURES

- 4 pin SOP (2.54SOP4) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak Off-State Voltage : 80 V (MIN.)
- Trigger LED Current : 4 mA (MAX.)
- On-State Current : 350 mA (MAX.)
- On-State Resistance : 1.2 Ω (MAX.)
- Output Capacitance : 40 pF (MAX.)
- Isolation Voltage : 1500 Vrms (MIN.)



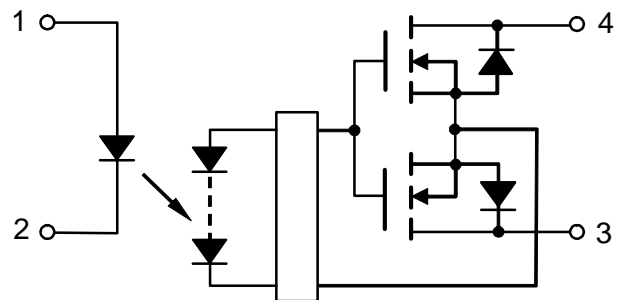
Weight: 0.1 g

PIN CONFIGURATION (TOP VIEW)



1 : ANODE
2 : CATHODE
3 : DRAIN
4 : DRAIN

SCHEMATIC



MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|---------------------------------------|----------------------|---------|------------------|
| LED | Forward Current | I _F | 50 | mA |
| | Forward Current Derating (Ta ≥ 25°C) | ΔI _F /°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} | 350 | mA |
| | On-State Current Derating (Ta ≥ 25°C) | ΔI _{ON} /°C | -3.5 | 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 minute, R.H. ≤ 60%) (NOTE1) | | BV _S | 1500 | V _{rms} |

(NOTE1) : Device considered a two-terminal device : Pins 1 and, 2 shorted together, and pins 3 and 4 shorted together.

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|------------------|------|------|------|------|
| Supply Voltage | V _{DD} | — | — | 64 | V |
| Forward Current | I _F | 5 | — | 30 | mA |
| On-State Current | I _{ON} | — | — | 350 | mA |
| Operating Temperature | T _{opr} | 25 | — | 60 | °C |

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|-------------------|------------------|------------------------------------|------|------|------|------|
| LED | Forward Voltage | V _F | I _F = 10 mA | 1.0 | 1.15 | 1.3 | V |
| | Reverse Current | I _R | V _R = 5 V | — | — | 10 | μA |
| | Capacitance | C _T | V = 0, f = 1 MHz | — | 15 | — | pF |
| DETECTOR | Off-State Current | I _{OFF} | V _{OFF} = 30 V, Ta = 50°C | — | 200 | 1000 | pA |
| | Capacitance | C _{OFF} | V = 0, f = 100 MHz | — | 30 | 40 | pF |

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------|----------|---|------|------|------|----------|
| Trigger LED Current | I_{FT} | $I_{ON} = 350 \text{ mA}$ | — | 1 | 4 | mA |
| Return LED Current | I_{FC} | $I_{OFF} = 10 \text{ } \mu\text{A}$ | 0.2 | 0.75 | — | mA |
| On-State Resistance | R_{ON} | $I_{ON} = 350 \text{ mA}, I_F = 5 \text{ mA}$ | — | 1.0 | 1.2 | Ω |

ISOLATION CHARACTERISTICS (Ta = 25°C)

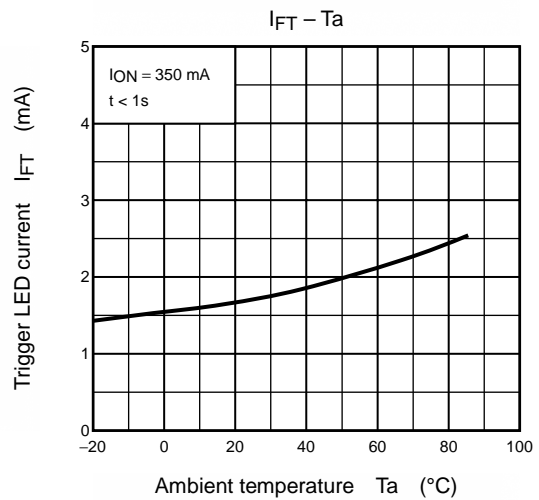
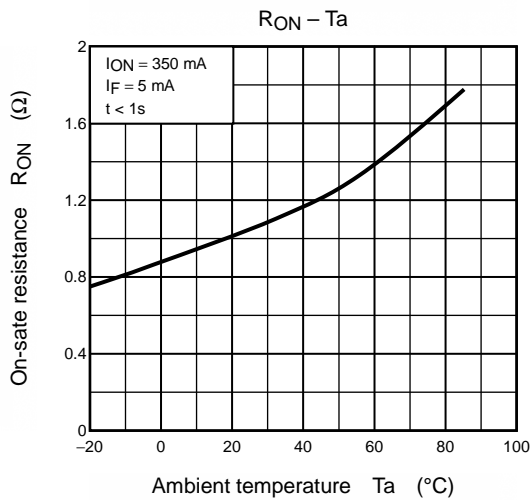
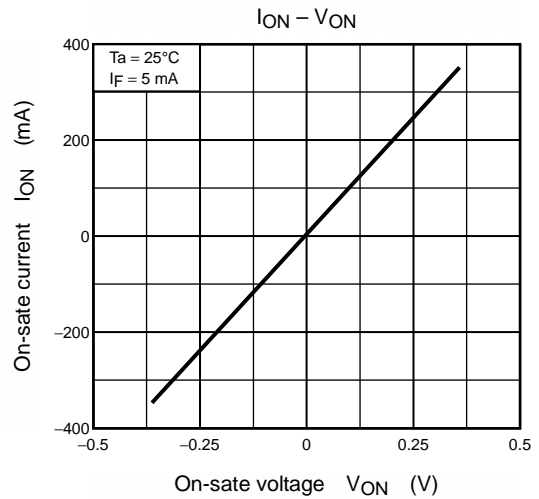
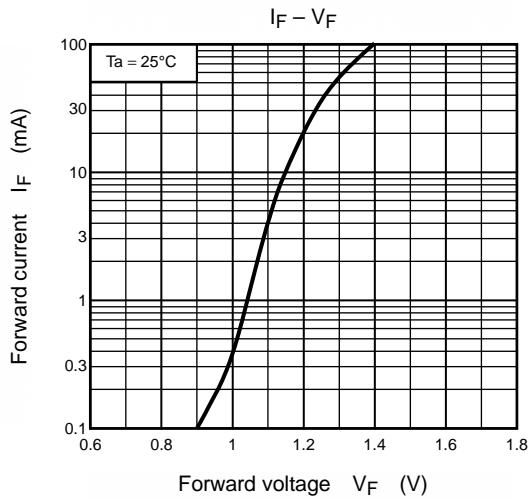
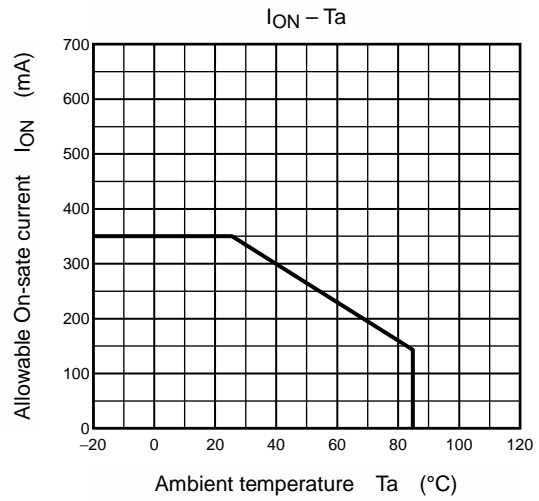
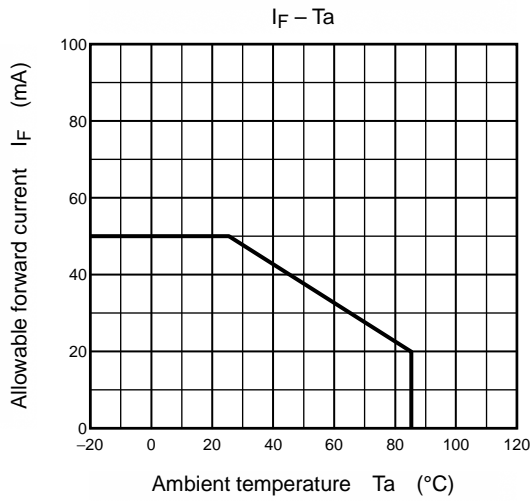
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|--------|--|--------------------|-----------|------|----------|
| Capacitance Input to Output | C_S | $V_S = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 0.8 | — | pF |
| Isolation Resistance | R_S | $V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$ | 5×10^{10} | 10^{14} | — | Ω |
| Isolation Voltage | BV_S | AC, 1 minute | 1500 | — | — | Vrms |
| | | AC, 1 second (in oil) | — | 3000 | — | |
| | | DC, 1 minute (in oil) | — | 3000 | — | Vdc |

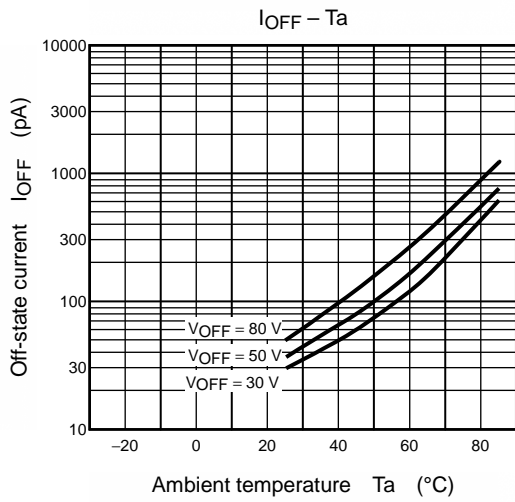
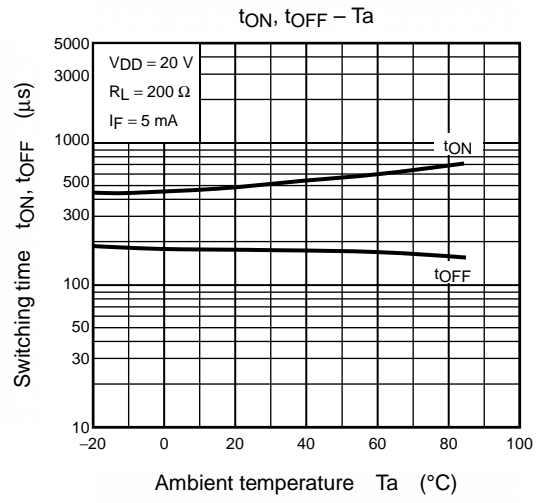
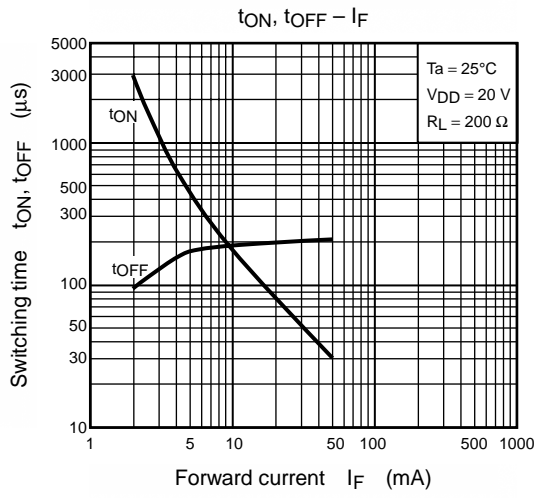
SWITCHING CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|-----------|---|------|------|------|---------------|
| Turn-on Time | t_{ON} | $R_L = 200 \text{ } \Omega$ (NOTE 2) $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ | — | 300 | 500 | μs |
| Turn-off Time | t_{OFF} | | — | 300 | 500 | |

(NOTE 2) : SWITCHING TIME TEST CIRCUIT

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