

# TLP3122

## Measurement Instruments

## Logic Testers / Memory Testers

## Board Testers / Scanners

## Power Line Control

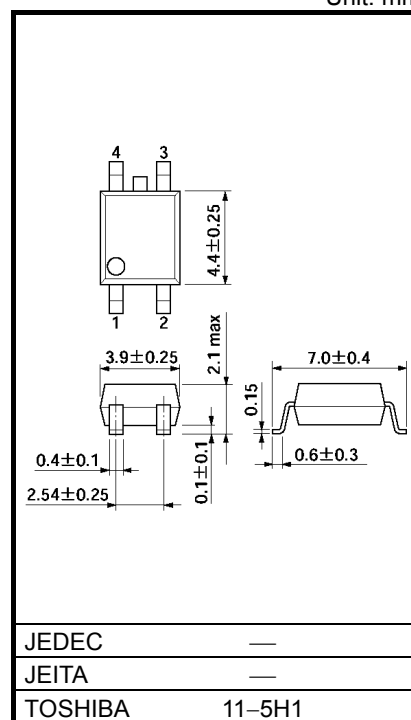
## FA (Factory Automation)

The TOSHIBA TLP3122 consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOS FET in a plastic SOP package. The TLP3122 is a bi-directional switch, which can replace mechanical relays in many applications. And its high on-state current maximum rating is suitable to control a power line.

## Features

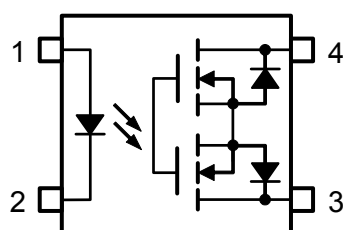
- 4 pin SOP (2.54SOP4) : 2.1 mm high, 2.54 mm pitch
- 1-Form-A
- Peak off-state voltage : 60 V (Min.)
- Trigger LED current : 3 mA (Max.)
- On-State current : 1A (Max.)
- On-state resistance : 0.25  $\Omega$  (Typ.)
- Off-state capacitance : 90 pF (Typ.)
- Off-state current : 100nA (Max.)
- Isolation voltage : 1500 Vrms (Min.)

Unit: mm



Weight: 0.1 g (Typ.)

## Pin configuration (top view)



- 1 : Anode
- 2 : Cathode
- 3 : Drain
- 4 : Drain

**Absolute Maximum Ratings (Ta = 25°C)**

| Characteristic  |                                       | 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     | $V_{OFF}$                      | 60      | V     |
|   | On-state current                      | $I_{ON}$                       | 1       | A     |
|   | On-state current derating (Ta ≥ 50°C) | $\Delta I_{ON}/^\circ\text{C}$ | -13.3   | 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%) (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**

| Characteristic        | Symbol    | Min. | Typ. | Max. | Unit |
|-----------------------|-----------|------|------|------|------|
| Supply voltage        | $V_{DD}$  | —    | —    | 48   | V    |
| Forward current       | $I_F$     | 5    | 10   | 20   | mA   |
| Operating temperature | $T_{opr}$ | 25   | —    | 60   | °C   |

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.

**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   | μA   |
|                | Capacitance       | $C_T$     | $V = 0, f = 1 \text{ MHz}$ | —    | 15   | —    | pF   |
| Detector       | Off-state current | $I_{OFF}$ | $V_{OFF} = 60 \text{ V}$   | —    | 0.2  | 100  | nA   |
|                | Capacitance       | $C_{OFF}$ | $V = 0, f = 1 \text{ MHz}$ | —    | 90   | —    | pF   |

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

| Characteristic      | Symbol   | Test Condition                                | Min. | Typ. | Max. | Unit     |
|---------------------|----------|---|------|------|------|----------|
| Trigger LED current | $I_{FT}$ | $I_{ON} = 100 \text{ mA}$                     | —    | 1    | 3    | mA       |
| Return LED current  | $I_{FC}$ | $I_{OFF} = 100 \text{ } \mu\text{A}$          | 0.1  | 0.8  | —    | mA       |
| On-state resistance | $R_{ON}$ | $I_{ON} = 1 \text{ A}$ , $I_F = 5 \text{ mA}$ |      | 0.25 | 0.7  | $\Omega$ |

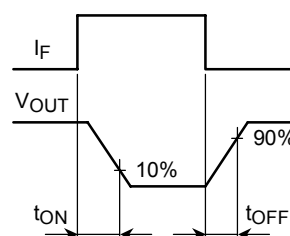
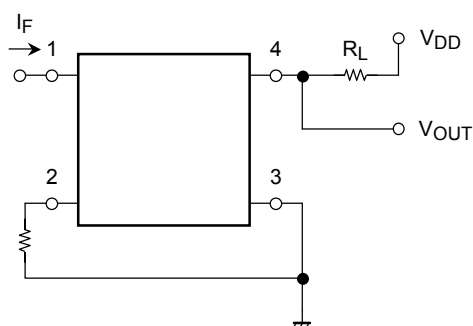
## Isolation Characteristics (Ta = 25°C)

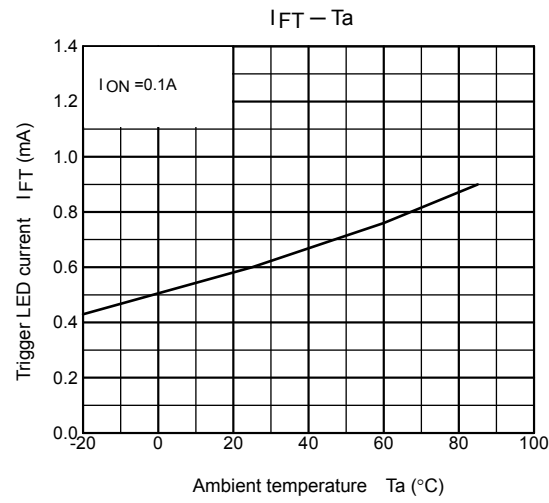
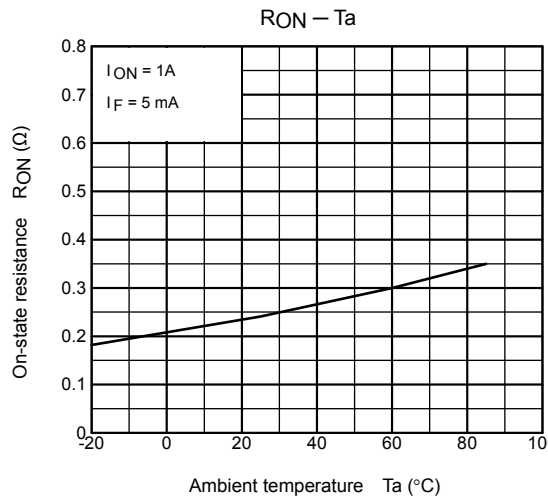
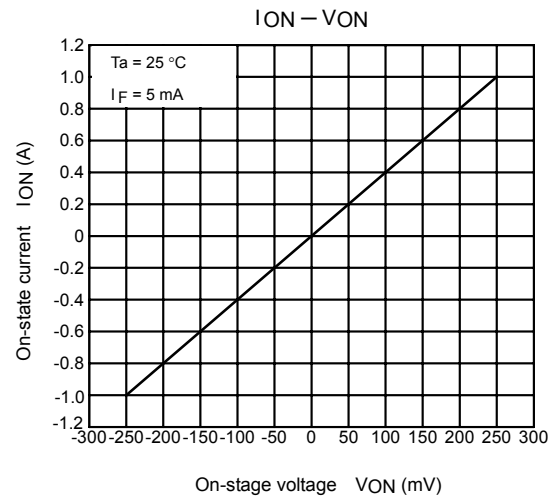
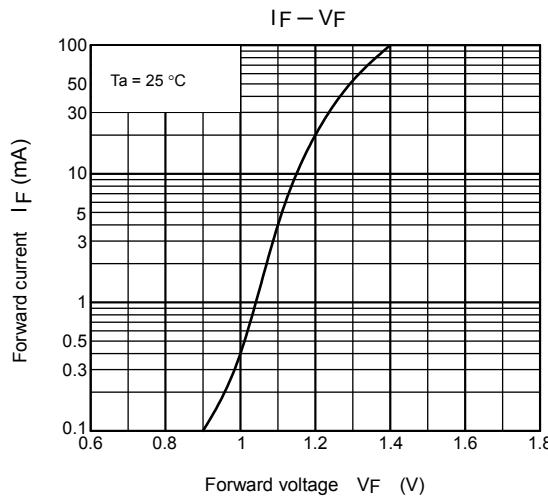
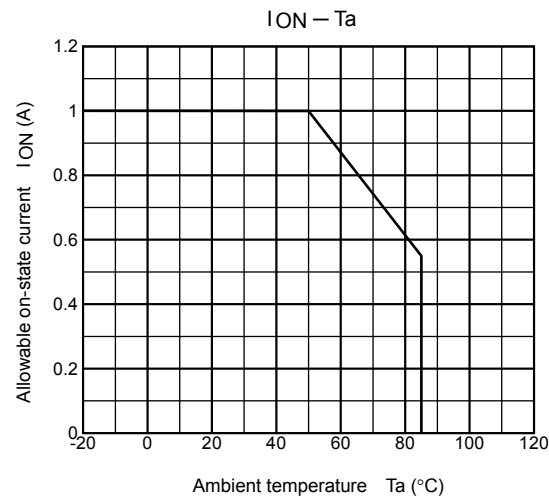
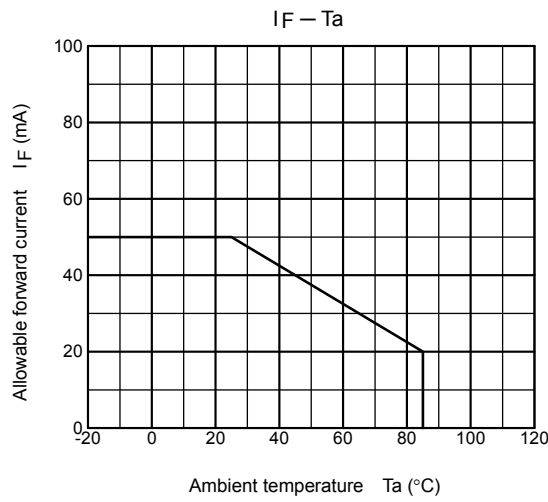
| Characteristic              | Symbol | Test Condition                            | Min.               | Typ.      | Max. | Unit     |
|-----------------------------|--------|---|--------------------|-----------|------|----------|
| Capacitance input to output | $C_S$  | $V_S = 0 \text{ V}$ , $f = 1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

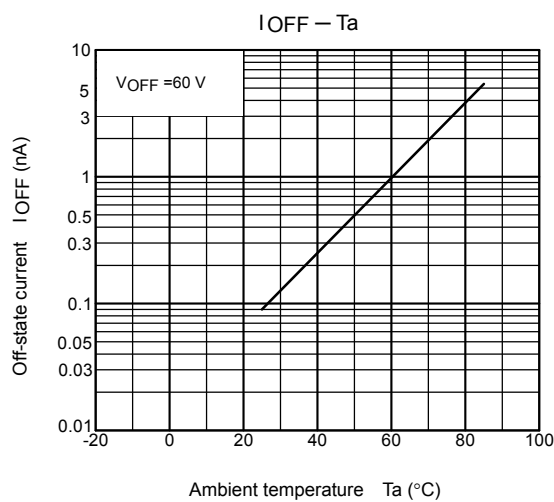
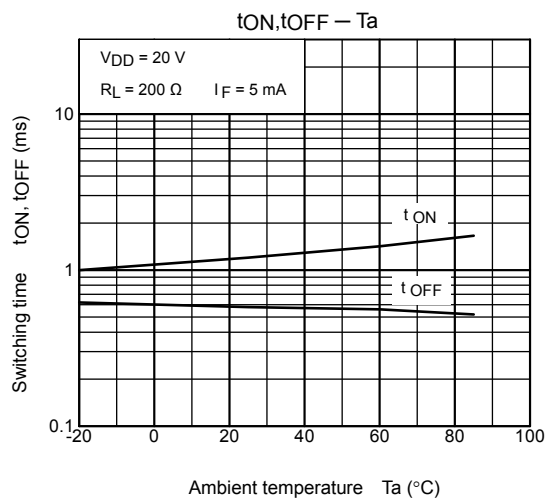
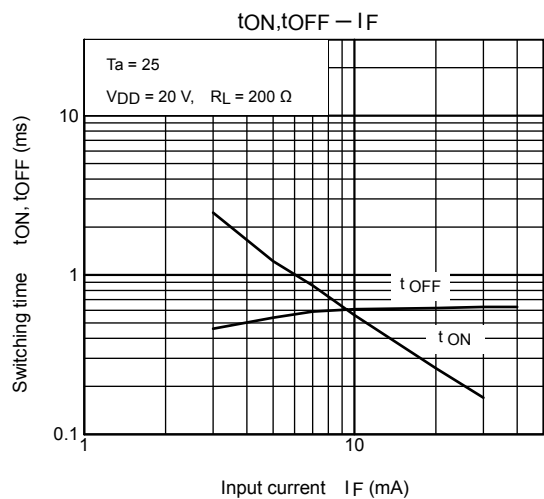
## Switching Characteristics (Ta = 25°C)

| Characteristic | Symbol    | Test Condition   | Min. | Typ. | Max. | Unit |
|----------------|-----------|--|------|------|------|------|
| Turn-on time   | $t_{ON}$  | $R_L = 200 \text{ } \Omega$ (Note 2)<br>$V_{DD} = 20 \text{ V}$ , $I_F = 5 \text{ mA}$ | —    | 1.4  | 3    | ms   |
| Turn-off time  | $t_{OFF}$ |  | —    | 0.6  | 1    |      |

(Note 2) : switching time test circuit







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