

TOSHIBA Photocoupler Photorelay

TLP592A

Telecommunications

Measurement and Control Equipment

Data Acquisition System

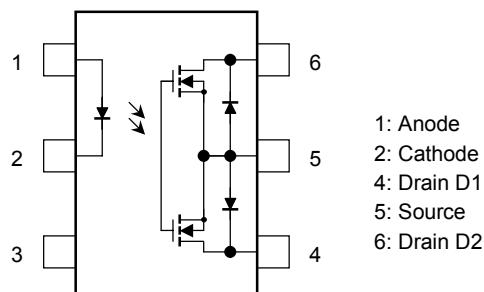
Measurement Equipment

Unit: mm

The Toshiba TLP592A consists of a gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a 6-pin DIP package. This photorelay has higher output current rating than phototransistor-type photocoupler; hence, it is suitable for use as On/Off control for high current.

- Normally open (1-form-A) device
- Peak off-state voltage: 60 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 500 mA (max)
- On-state resistance: 2 Ω (max)
- Isolation voltage: 2500 Vrms (min)
- UL recognized: UL1557, File No. E67349

Pin Configuration (top view)



Technical drawing of a TO-220 package showing dimensions and lead numbers. The drawing includes a top view with lead numbers 1 through 6, and three side views showing height, lead spacing, and lead thickness. Dimensions are given with tolerances.

Top View Dimensions:

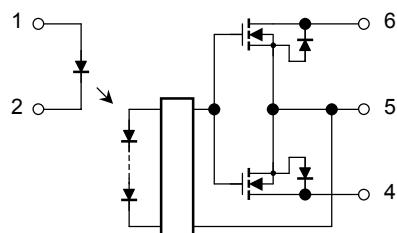
- Width: 6.4 ± 0.25
- Lead 1: 1 ± 0.1
- Lead 2: 2 ± 0.1
- Lead 3: 3 ± 0.1
- Lead 4: 4 ± 0.1
- Lead 5: 5 ± 0.1
- Lead 6: 6 ± 0.1

Side View Dimensions:

- Height: 7.12 ± 0.25
- Lead Spacing: 2.54 ± 0.25
- Lead Thickness: 0.5 ± 0.1
- Lead Width: 1.2 ± 0.15
- Lead Angle: 3.65 ± 0.15
- Lead Thickness: 0.8 ± 0.25
- Lead Angle: 7.62 ± 0.25
- Lead Angle: $7.85 \sim 8.80$
- Lead Angle: 0.25 ± 0.05

Weight: 0.4 g (typ.)

Schematic



最大定格 ($T_a = 25^\circ\text{C}$)

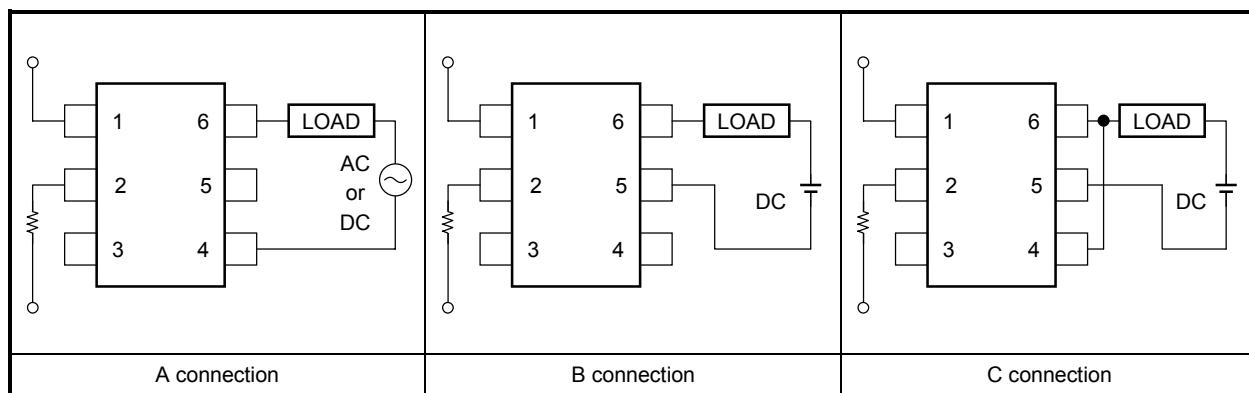
| Characteristics | | Symbol | Rating | Unit |
|--|--|----------------------------------|------------|----------------------|
| LED | Forward current | I_F | 50 | mA |
| | Forward current derating ($T_a \geq 25^\circ\text{C}$) | $\Delta I_F / ^\circ\text{C}$ | -0.5 | mA/ $^\circ\text{C}$ |
| | Peak forward current (100 μs pulse, 100 pps) | I_{FP} | 1 | A |
| | Reverse voltage | V_R | 5 | V |
| | Junction temperature | T_j | 125 | $^\circ\text{C}$ |
| Detector | Off-state output terminal voltage | V_{OFF} | 60 | V |
| | On-state current | I_{ON} | 500 | mA |
| | | | 500 | |
| | | | 1000 | |
| | Forward current derating ($T_a \geq 25^\circ\text{C}$) | $\Delta I_{ON} / ^\circ\text{C}$ | -5.0 | mA/ $^\circ\text{C}$ |
| | | | -5.0 | |
| | | | -10.0 | |
| | Junction temperature | T_j | 125 | $^\circ\text{C}$ |
| | Storage temperature | T_{stg} | -55 to 125 | $^\circ\text{C}$ |
| | Operating temperature | T_{opr} | -40 to 85 | $^\circ\text{C}$ |
| Lead soldering temperature (10 s) | | T_{sol} | 260 | $^\circ\text{C}$ |
| Isolation voltage (AC, 1 min, R.H. $\leq 60\%$) (Note 1) | | BV_S | 2500 | Vrms |

Note 1: LED pins are shorted together. Detector pins are also shorted together.

Recommended Operating Conditions

| Characteristics | Symbol | Min | Typ. | Max | Unit |
|-----------------------|-----------|-----|------|-----|------------------|
| Supply voltage | V_{DD} | — | — | 48 | V |
| Forward current | I_F | 5 | 7.5 | 25 | mA |
| On-state current | I_{ON} | — | — | 500 | mA |
| Operating temperature | T_{opr} | -20 | — | 65 | $^\circ\text{C}$ |

Circuit Connections



Electrical Characteristics $T_a = 25^\circ\text{C}$)

| 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 voltage | 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} | $V_{OFF} = 60 \text{ V}$ | — | — | 1 | μA |
| | Capacitance | C_{OFF} | $V = 0, f = 1 \text{ MHz}$ | — | 130 | — | pF |

Coupled Electrical Characteristics ($T_a = 25^\circ\text{C}$)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---------------------|--------------|----------|--|-----|------|-----|----------|
| Trigger LED current | | I_{FT} | $I_{ON} = 500 \text{ mA}$ | — | 1.6 | 3 | mA |
| Return LED current | | I_{FC} | $I_{OFF} = 100 \mu\text{A}$ | 0.1 | — | — | mA |
| On-state resistance | A connection | R_{ON} | $I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$ | — | 1 | 2 | Ω |
| | B connection | | $I_{ON} = 500 \text{ mA}, I_F = 5 \text{ mA}$ | — | 0.5 | 1 | |
| | C connection | | $I_{ON} = 1000 \text{ mA}, I_F = 5 \text{ mA}$ | — | 0.25 | — | |

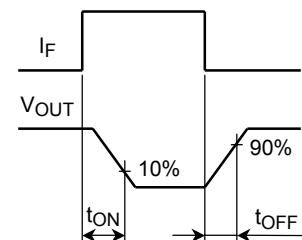
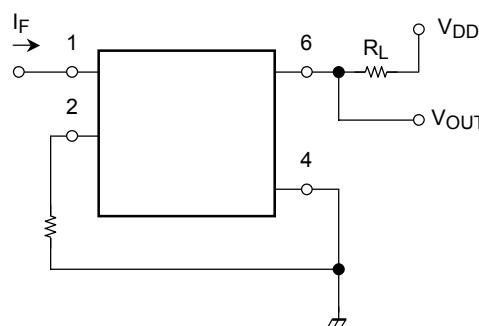
Isolation Characteristics ($T_a = 25^\circ\text{C}$)

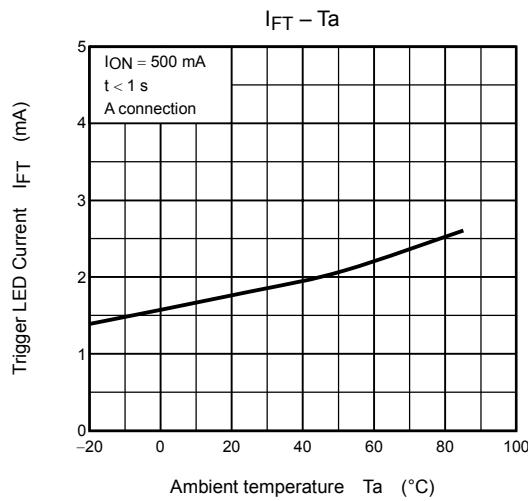
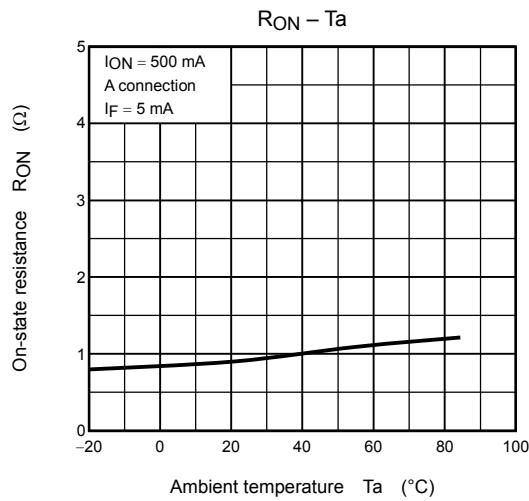
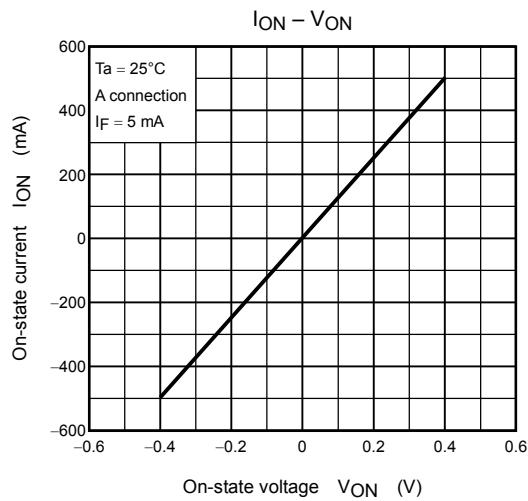
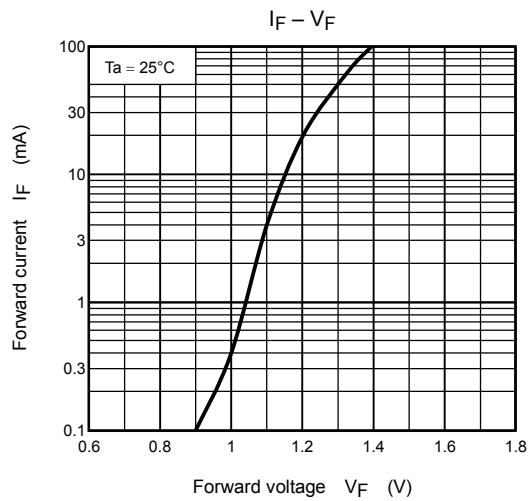
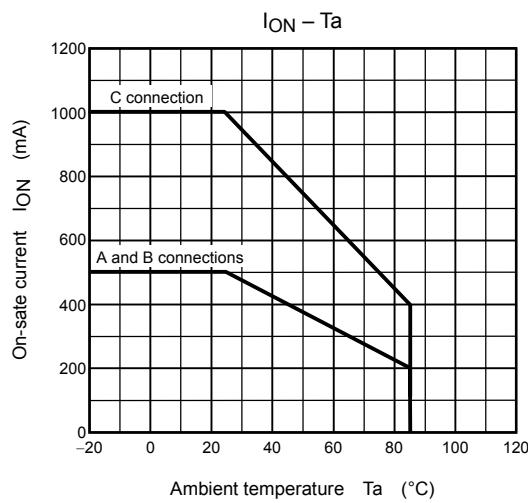
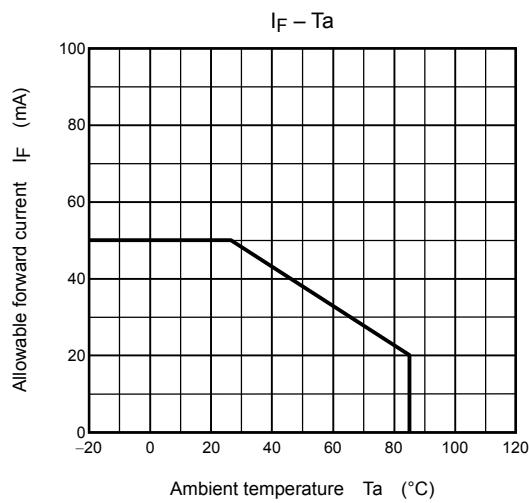
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------------|--------|--------|--|--------------------|-----------|-----|---------------|
| Capacitance input to output | | C_S | $V_S = 0 \text{ V}, f = 1 \text{ MHz}$ | — | 0.8 | — | pF |
| Isolation resistance | | 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 | 2500 | — | — | Vrms |
| | | | AC, 1 s, in oil | — | 5000 | — | |
| | | | DC, 1 min, in oil | — | 5000 | — | Vdc |

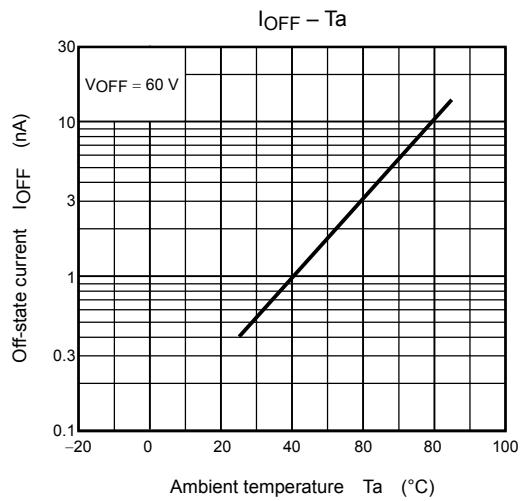
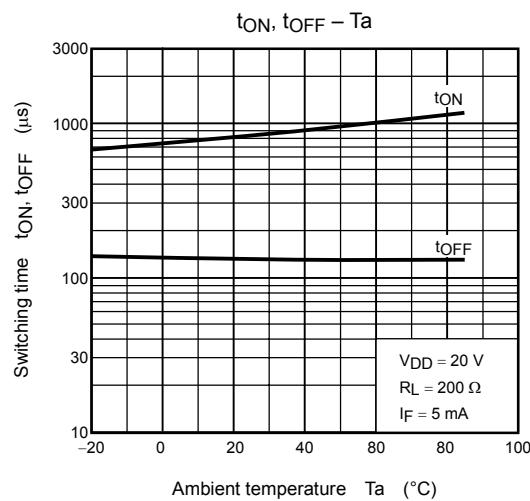
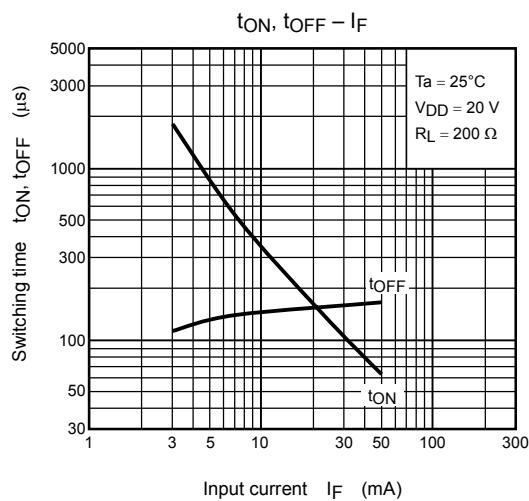
Switching Characteristics ($T_a = 25^\circ\text{C}$)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------|--|-----------|---|-----|------|-----|------|
| Turn-on time | | t_{ON} | $R_L = 200 \Omega$ $V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ | — | 0.8 | 2 | ms |
| Turn-off time | | t_{OFF} | | — | 0.1 | 0.5 | |

Note 2: Switching time test circuit







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