

(TLP371)

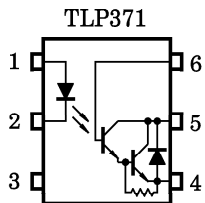
- OFFICE MACHINE
- HOUSEHOLD USE EQUIPMENT
- TELECOMMUNICATION
- SOLID STATE RELAY
- PROGRAMMABLE CONTROLLERS

The TOSHIBA TLP371 and TLP372 consists of a gallium arsenide infrared emitting diode optically coupled to a darlington connected photo-transistor which has an integrated base-emitter resistor to optimize switching speed and elevated temperature characteristics in a six lead plastic DIP package.

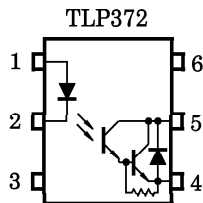
TLP372 is no-base internal connection for high-EMI environments.

- Current Transfer Ratio : 1000% (Min.) ($I_F = 1\text{mA}$)
- Isolation Voltage : 5000Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)

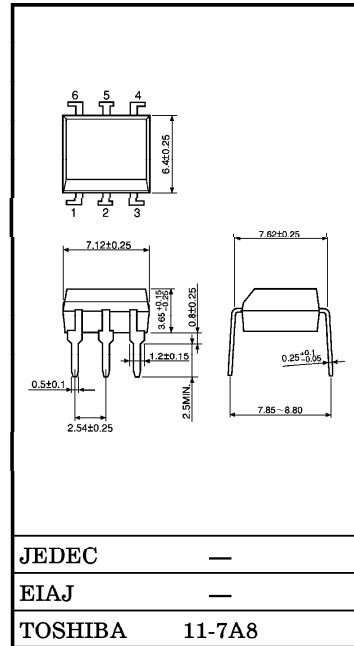


- 1 : ANODE
- 2 : CATHODE
- 3 : NC
- 4 : EMITTER
- 5 : COLLECTOR
- 6 : BASE



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Unit in mm



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(TLP371)

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|--|---------------------|------------------|-------|
| LED | Forward Current | I _F | 60 | mA |
| | Forward Current Derating (Ta ≥ 39°C) | ΔI _F /°C | -0.7 | mA/°C |
| | Peak Forward Current (100μs pulse, 100pps) | I _{FP} | 1 | A |
| | Reverse Voltage | V _R | 5 | V |
| | Junction Temperature | T _j | 125 | °C |
| DETECTOR | Collector-Emitter Voltage | V _{CEO} | 300 | V |
| | Collector-Base Voltage (TLP371) | V _{CBO} | 300 | V |
| | Emitter-Collector Voltage | V _{ECO} | 0.3 | V |
| | Emitter-Base Voltage (TLP371) | V _{EBO} | 7 | V |
| | Collector Current | I _C | 150 | mA |
| | Power Dissipation | P _C | 300 | mW |
| | Power Dissipation Derating (Ta ≥ 25°C) | ΔP _C /°C | -3.0 | mW/°C |
| | Junction Temperature | T _j | 125 | °C |
| Storage Temperature Range | T _{stg} | -55~125 | °C | |
| Operating Temperature Range | T _{opr} | -55~100 | °C | |
| Lead Soldering Temperature (10sec.) | T _{sold} | 260 | °C | |
| Total Package Power Dissipation | P _T | 350 | mW | |
| Total Package Power Dissipation Derating (Ta ≥ 25°C) | ΔP _T /°C | -3.5 | mW/°C | |
| Isolation Voltage (AC, 1 min., RH ≤ 60%) (Note 1) | BV _S | 5000 | V _{rms} | |

Note 1 : Device considered a two terminal device : Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

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(TLP371)

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 | $V = 0, f = 1\text{MHz}$ | — | 30 | — | pF |
| DETECTOR | Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 0.1\text{mA}$ | 300 | — | — | V |
| | Emitter-Collector Breakdown Voltage | $V_{(BR)ECO}$ | $I_E = 0.1\text{mA}$ | 0.3 | — | — | V |
| | Collector-Base Breakdown Voltage (TLP371) | $V_{(BR)CBO}$ | $I_C = 0.1\text{mA}$ | 300 | — | — | V |
| | Emitter-Base Breakdown Voltage (TLP371) | $V_{(BR)EBO}$ | $I_E = 0.1\text{mA}$ | 7 | — | — | V |
| | Collector Dark Current | I_{CEO} | $V_{CE} = 200\text{V}$ | — | 10 | 200 | nA |
| | | | $V_{CE} = 200\text{V}$ $T_a = 85^\circ\text{C}$ | — | — | 20 | μA |
| | Collector Dark Current (TLP371) | I_{CER} | $V_{CE} = 200\text{V}$ $T_a = 85^\circ\text{C}$, $R_{BE} = 10\text{M}\Omega$ | — | 0.5 | 10 | μA |
| | Collector Dark Current (TLP371) | I_{CBO} | $V_{CE} = 200\text{V}$ | — | 0.1 | — | nA |
| | DC Forward Current Gain (TLP371) | h_{FE} | $V_{CE} = 5\text{V}, I_C = 10\text{mA}$ | — | 7000 | — | — |
| Capacitance (Collector to Emitter) | C_{CE} | $V = 0, f = 1\text{MHz}$ | — | 10 | — | pF | |

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-------------------------|---|------|------|------|---------------|
| Current Transfer Ratio | I_C / I_F | $I_F = 1\text{mA}, V_{CE} = 1\text{V}$ | 1000 | 4000 | — | % |
| Saturated CTR | $I_C / I_F(\text{sat})$ | $I_F = 10\text{mA}, V_{CE} = 1\text{V}$ | 500 | — | — | % |
| Base Photo-Current (TLP371) | I_{PB} | $I_F = 1\text{mA}, V_{CB} = 1\text{V}$ | — | 6 | — | μA |
| Collector-Emitter Saturation Voltage | $V_{CE(\text{sat})}$ | $I_C = 10\text{mA}, I_F = 1\text{mA}$ | — | — | 1.0 | V |
| | | $I_C = 100\text{mA}, I_F = 10\text{mA}$ | 0.3 | — | 0.2 | |

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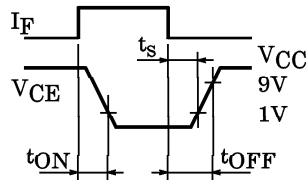
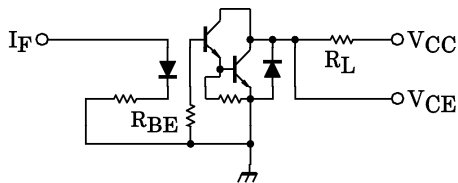
ISOLATION CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-----------------|---------------------------|--------------------|------------------|------|------------------|
| Capacitance (Input to Output) | C _S | V _S =0, f=1MHz | — | 0.8 | — | pF |
| Isolation Resistance | R _S | V _S =500V | 5×10 ¹⁰ | 10 ¹⁴ | — | Ω |
| Isolation Voltage | BV _S | AC, 1 minute | 5000 | — | — | V _{rms} |
| | | AC, 1 second | — | 10000 | — | |
| | | DC, 1 minute | — | 10000 | — | V _{dc} |

SWITCHING CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|------------------|--|------|------|------|------|
| Rise Time | t _r | V _{CC} =10V I _C =10mA R _L =100Ω | — | 40 | — | μs |
| Fall Time | t _f | | — | 15 | — | |
| Turn-on Time | t _{on} | | — | 50 | — | |
| Turn-off Time | t _{off} | | — | 15 | — | |
| Turn-on Time | t _{ON} | R _L =180Ω (Fig.1) | — | 3 | — | μs |
| Storage Time | t _s | R _{BE} =OPEN | — | 45 | — | |
| Turn-off Time | t _{OFF} | V _{CC} =10V, I _F =16mA | — | 90 | — | |
| Turn-on Time | t _{ON} | R _L =180Ω (Fig.1) | — | 5 | — | μs |
| Storage Time | t _s | R _{BE} =10MΩ (TLP371) | — | 40 | — | |
| Turn-off Time | t _{OFF} | V _{CC} =10V, I _F =16mA | — | 80 | — | |

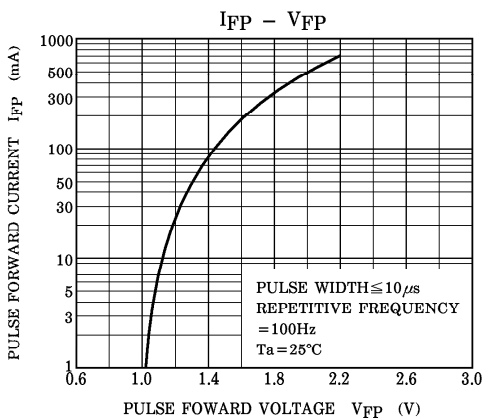
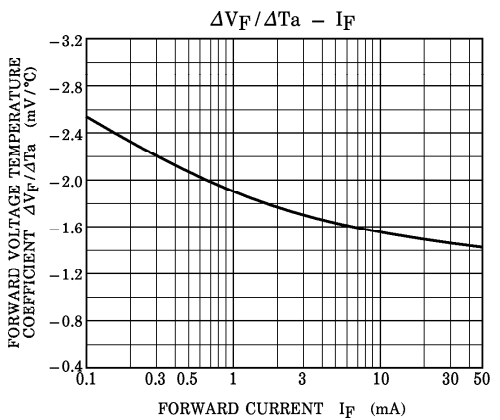
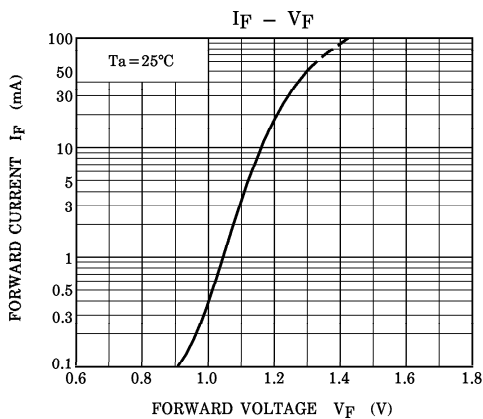
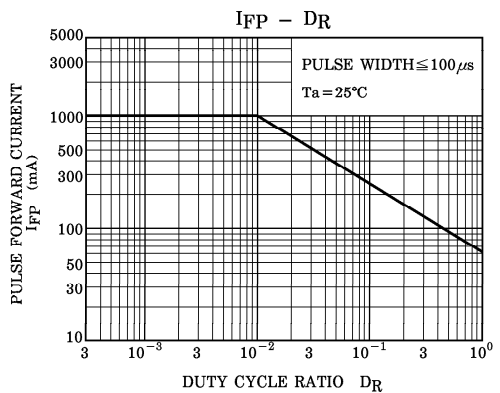
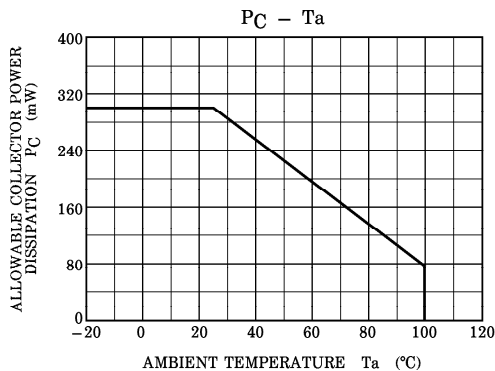
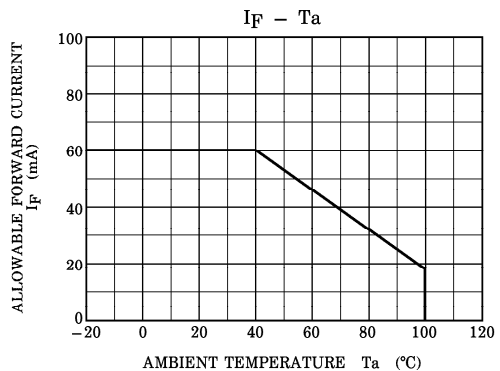
Fig.1 SWITCHING TIME TEST CIRCUIT



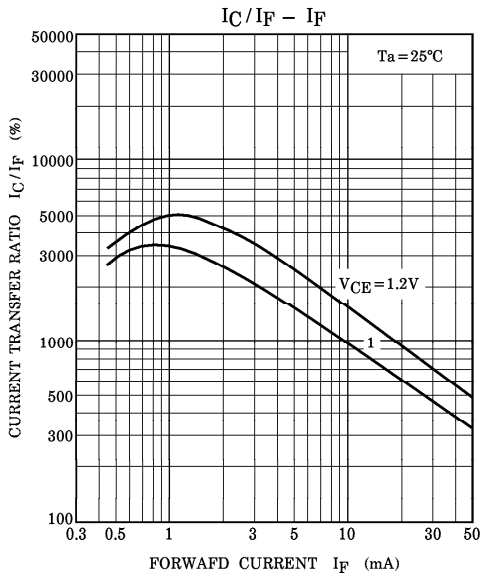
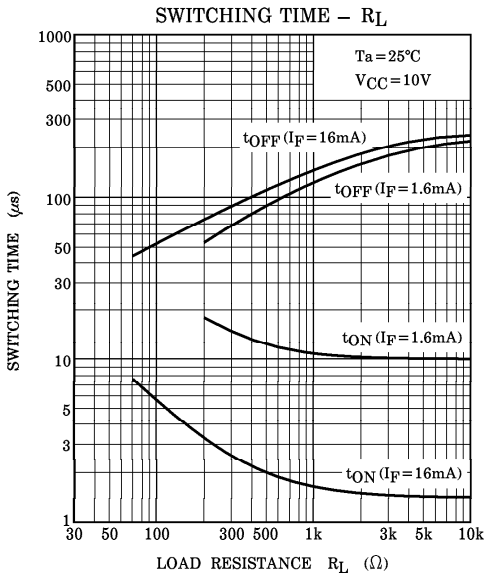
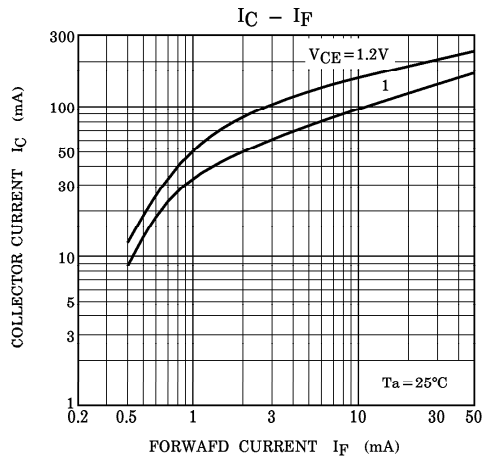
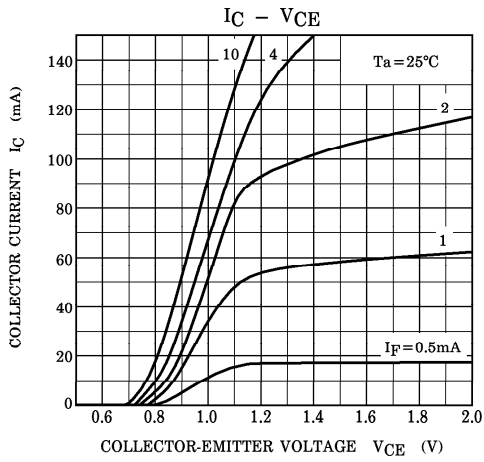
RECOMMENDS OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|------------------|------|------|------|------|
| Supply Voltage | V _{CC} | — | — | 200 | V |
| Forward Current | I _F | — | 16 | 25 | mA |
| Collector Current | I _C | — | — | 120 | mA |
| Operating Temperature | T _{opr} | -25 | — | 85 | °C |

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