

TLP630

PROGRAMMABLE CONTROLLERS

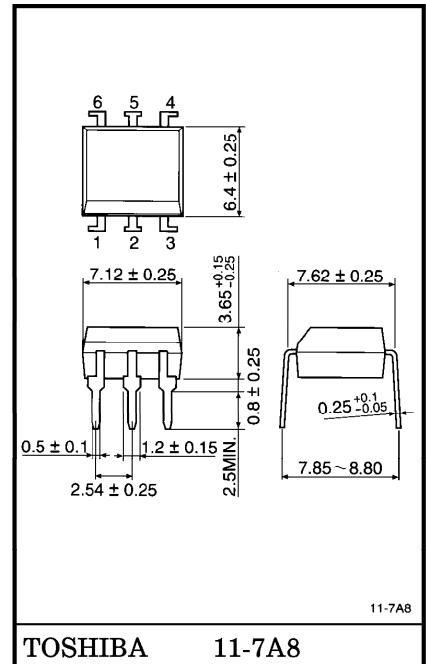
AC/DC-INPUT MODULE

TELECOMMUNICATION

The TOSHIBA TLP630 consists of a photo-transistor optically coupled to two gallium arsenide infrared emitting diode connected inverse parallel in a six lead plastic DIP package.

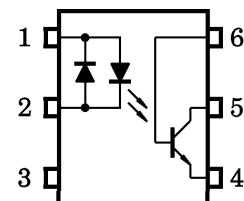
- Collector-Emitter Voltage : 55V Min.
- Current Transfer Ratio : 50% Min.
Rank GB : 100% Min.
- Isolation Voltage : 5000Vrms Min.
- UL Recognized : UL1577 File No. E67349

Unit in mm



Weight : 0.4g

PIN CONFIGURATIONS (TOP VIEW)



- 1 : ANODE, CATHODE
- 2 : CATHODE, ANODE
- 3 : N.C.
- 4 : EMITTER
- 5 : COLLECTOR
- 6 : BASE

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|--|----------------------|-----------|------------------|
| LED | Forward Current | I _F (RMS) | 60 | mA |
| | Forward Current Derating (Ta ≥ 39°C) | ΔI _F / °C | -0.7 | mA / °C |
| DETECTOR | Peak Forward Current (100 μs pulse, 100pps) | I _{FPT} | ±1 | A |
| | Collector-Emitter Voltage | V _{CEO} | 55 | V |
| | Collector-Base Voltage | V _{CBO} | 80 | V |
| | Emitter-Collector Voltage | V _{ECO} | 7 | V |
| | Emitter-Base Voltage | V _{EBO} | 7 | V |
| | Collector Current | I _C | 50 | mA |
| | Power Dissipation | P _C | 150 | mW |
| | Power Dissipation Derating (Ta ≥ 25°C) | ΔP _C / °C | -1.5 | mW / °C |
| Operating Temperature Range | | T _{opr} | -55~100 | °C |
| Storage Temperature Range | | T _{stg} | -55~125 | °C |
| Lead Soldering Temperature Temperature | | T _{sol} | 260 (10s) | °C |
| Junction Temperature | | T _j | 125 | °C |
| Total Package Power Dissipation | | P _T | 250 | mW |
| Total Package Power Dissipation Derating | | ΔP _T / °C | -2.5 | mW / °C |
| Isolation Voltage (AC, 1 min., R.H. ≤ 60%) | | BV _S | 5000 | V _{rms} |

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|----------------------|------|------|------|------|
| Supply Voltage | V _{CC} | — | 5 | 24 | V |
| Forward Current | I _F (RMS) | — | 16 | 25 | mA |
| Collector Current | I _C | — | 1 | 10 | mA |
| Operating Temperature | T _{opr} | -25 | — | 85 | °C |

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

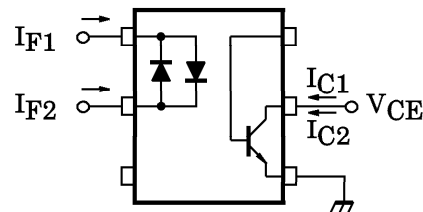
| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|------------------------------------|-------------------------------------|------------------------------------|----------------------------------|------|------|------|------|
| LED | Forward Voltage | V _F | I _F = 10mA | 1.0 | 1.15 | 1.3 | V |
| | Forward Current | I _F | V _F = 0.7V | — | 2.5 | 10 | μA |
| | Capacitance | C _T | V = 0, f = 1MHz | — | 60 | — | pF |
| DETECTOR | Collector-Emitter Breakdown Voltage | V (BR) CEO | I _C = 0.5mA | 55 | — | — | V |
| | Emitter-Collector Breakdown Voltage | V (BR) ECO | I _E = 0.1mA | 7 | — | — | V |
| | Collector-Base Breakdown Voltage | V (BR) CBO | I _C = 0.1mA | 80 | — | — | V |
| | Emitter-Base Breakdown Voltage | V (BR) EBO | I _E = 0.1mA | 7 | — | — | V |
| | Collector Dark Current | I _D (I _{CEO}) | V _{CE} = 24V | — | 10 | 100 | nA |
| | | | V _{CE} = 24V, Ta = 85°C | — | 2 | 50 | μA |
| | Collector Dark Current | I _{CBO} | V _{CB} = 10V | — | 0.1 | — | nA |
| Capacitance (Collector to Emitter) | C _{CCE} | V = 0, f = 1MHz | — | 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 = ± 5mA, V _{CE} = 5V Rank GB | 50 | — | 600 | % |
| | | | 100 | — | 600 | |
| Saturated CTR | I _C / I _F (sat) | I _F = ± 1mA, V _{CE} = 0.4V Rank GB | — | 60 | — | % |
| | | | 30 | — | — | |
| Base Photo-current | I _{PB} | I _F = ± 5mA, V _{CB} = 5V | — | 10 | — | μA |
| Collector-Emitter Saturation Voltage | V _{CE} (sat) | I _C = 2.4mA, I _F = ± 8mA | — | — | 0.4 | V |
| Off-State Collector Current | I _C (off) | V _F = ± 0.7V, V _{CE} = 24V | — | 1 | 10 | μA |
| CTR Symmetry | I _C (ratio) | I _C (I _F = -5mA) / I _C (I _F = +5mA) (Note 1) | 0.33 | 1 | 3 | — |

(Note 1)

$$I_C \text{ (ratio)} = \frac{I_{C2} (I_F = I_{F2}, V_{CE} = 5V)}{I_{C1} (I_F = I_{F1}, V_{CE} = 5V)}$$



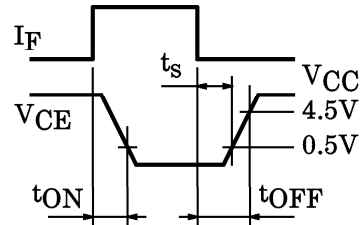
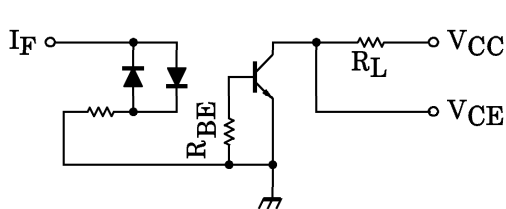
ISOLATION CHARACTERISTICS (Ta = 25°C)

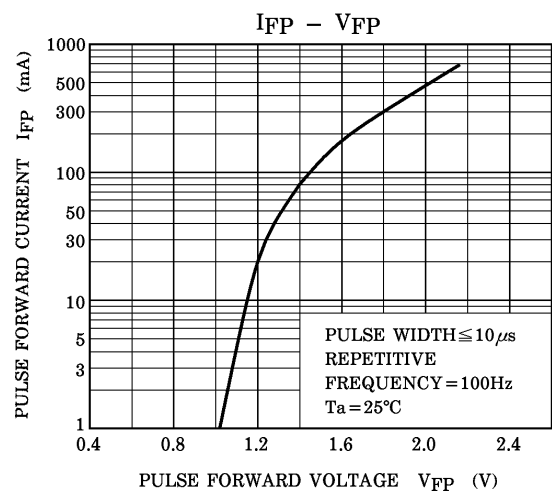
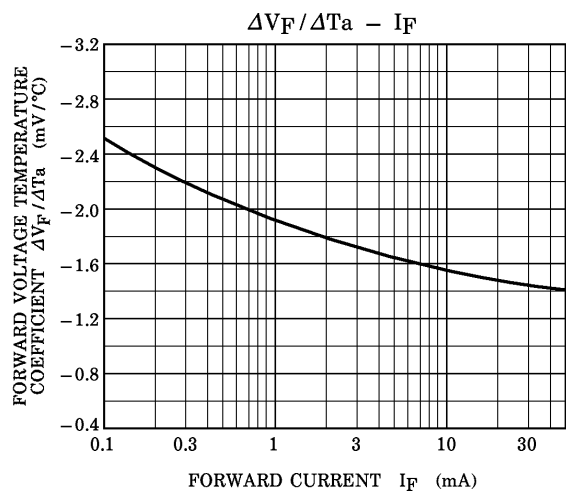
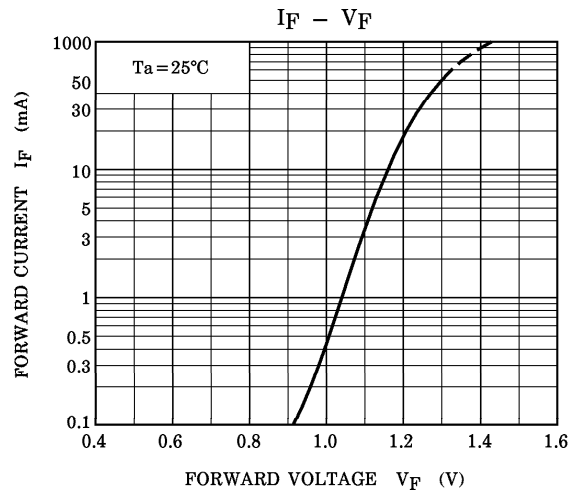
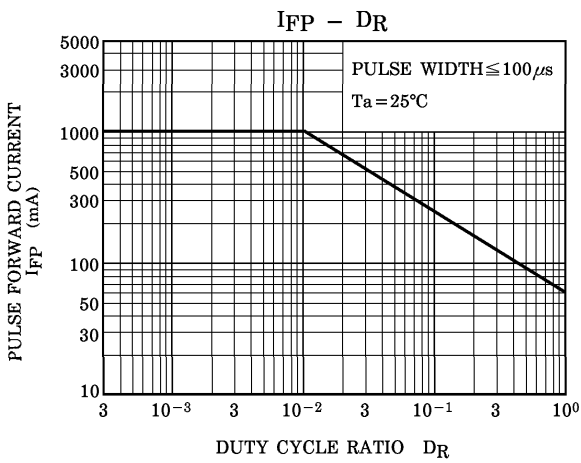
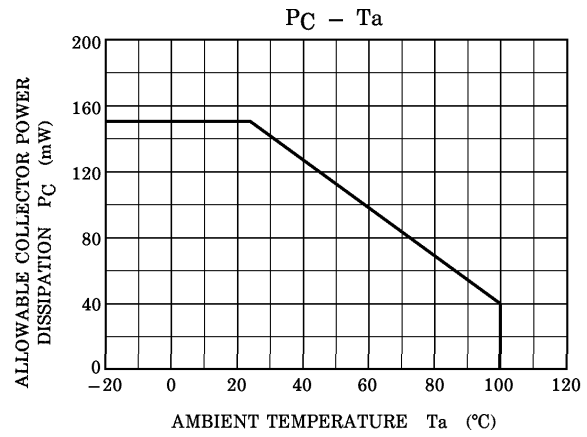
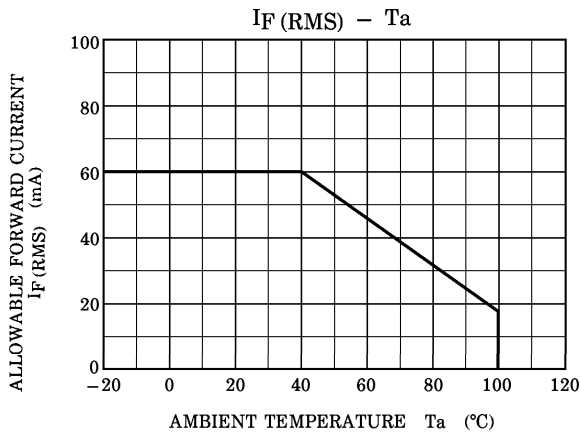
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-------------------------------|-----------------|--------------------------------|--------------------|------------------|------|------------------|
| Capacitance (Input to Output) | C _S | V _S =0, f=1MHz | — | 0.8 | — | pF |
| Isolation Resistance | R _S | V _S =500V, R.H.≤60% | 5×10 ¹⁰ | 10 ¹⁴ | — | Ω |
| Isolation Voltage | BV _S | AC, 1 minute | 5000 | — | — | V _{rms} |
| | | AC, 1 second, in oil | — | 10000 | — | |
| | | DC, 1 minute, in oil | — | 10000 | — | V _{dc} |

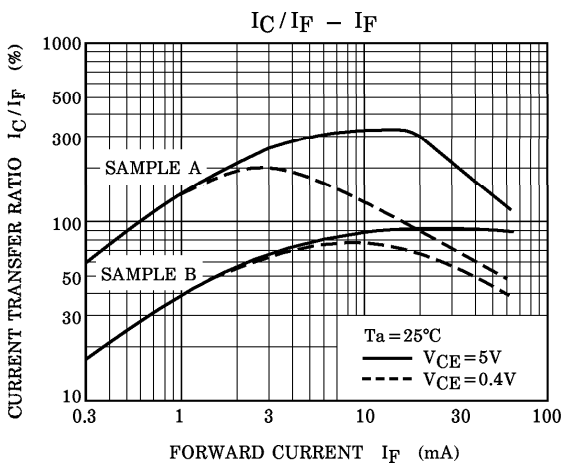
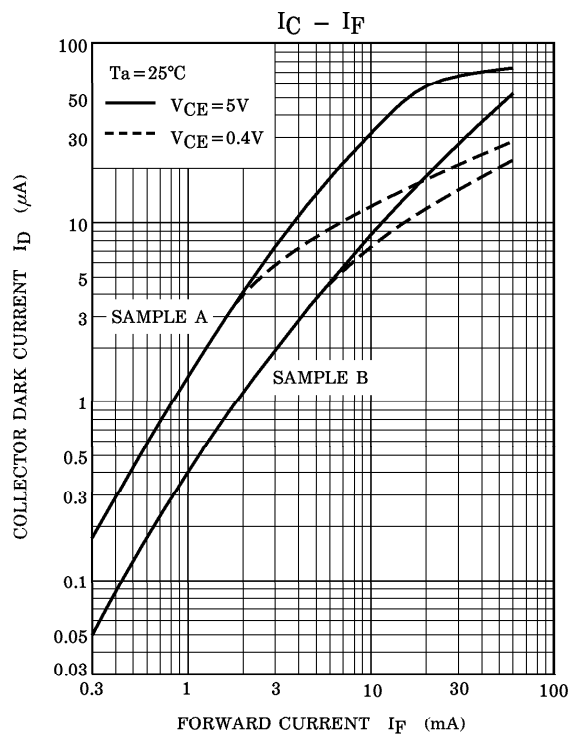
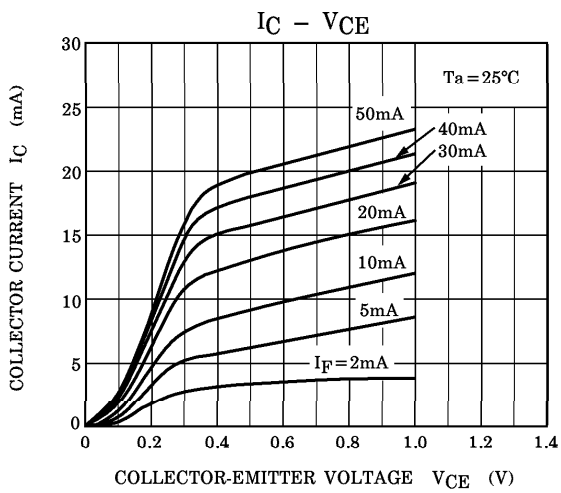
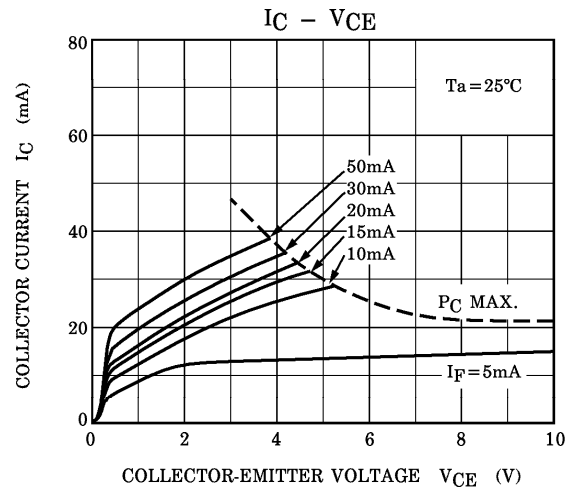
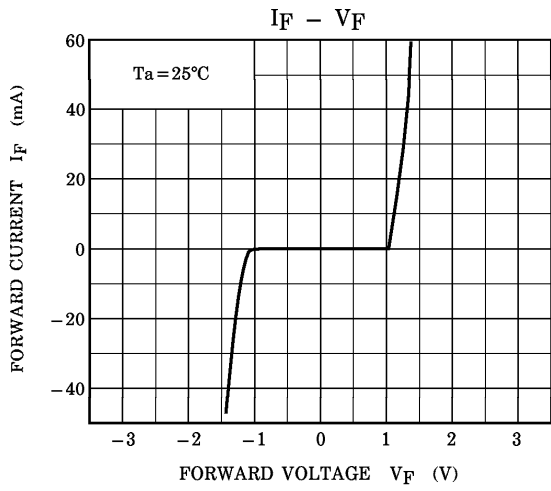
SWITCHING CHARACTERISTICS (Ta = 25°C)

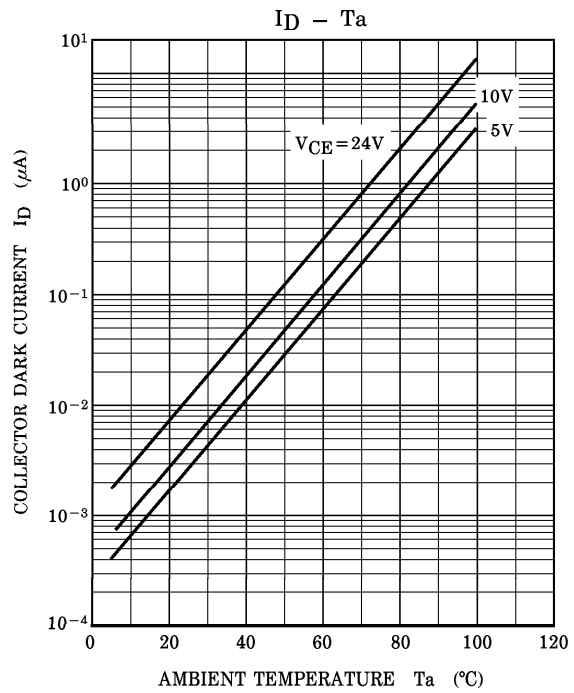
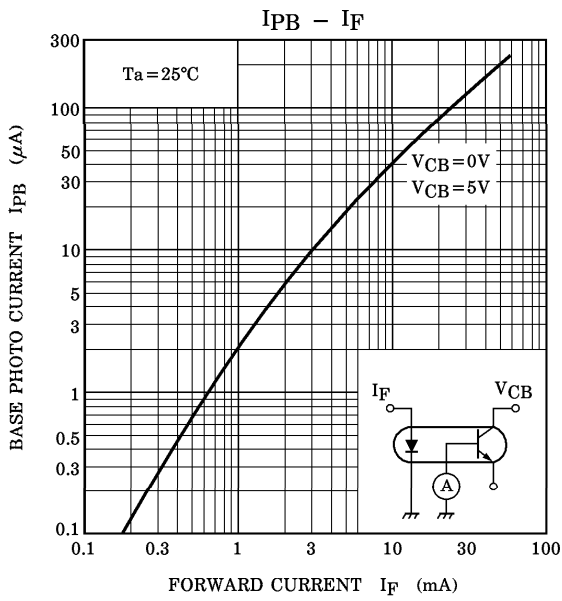
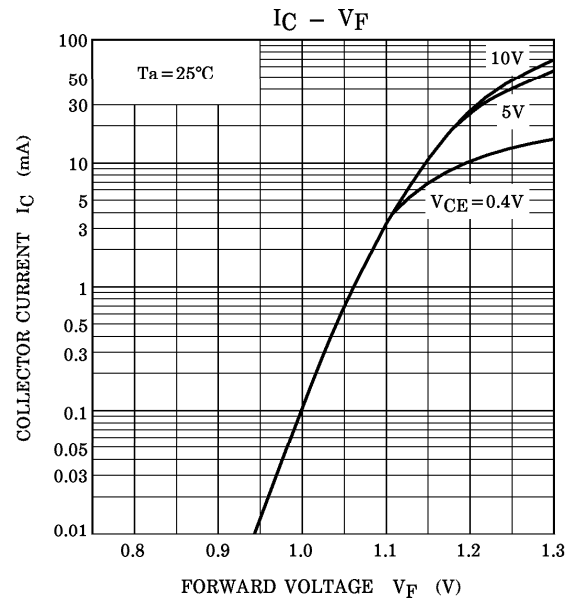
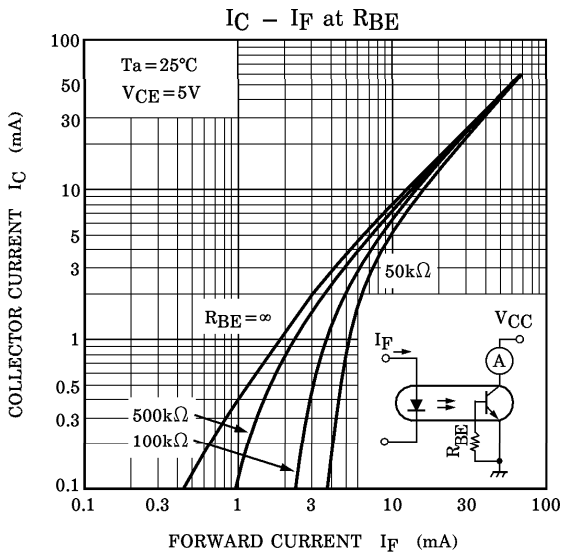
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|------------------|---|------|------|------|------|
| Rise Time | t _r | V _{CC} =10V, I _C =2mA R _L =100Ω | — | 2 | — | μs |
| Fall Time | t _f | | — | 3 | — | |
| Turn-on Time | t _{ON} | | — | 3 | — | |
| Turn-off Time | t _{OFF} | | — | 3 | — | |
| Turn-on Time | t _{ON} | R _L =1.9kΩ (Note 2) | — | 2 | — | μs |
| Storage Time | t _s | R _{BE} =OPEN | — | 15 | — | |
| Turn-off Time | t _{OFF} | V _{CC} =5V, I _F =±16mA | — | 25 | — | |
| Turn-on Time | t _{ON} | R _L =1.9kΩ (Note 2) | — | 2 | — | μs |
| Storage Time | t _s | R _{BE} =220kΩ, V _{CC} =5V | — | 12 | — | |
| Turn-off Time | t _{OFF} | I _F =±16mA | — | 20 | — | |

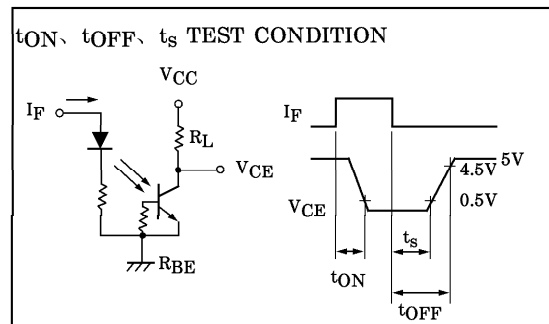
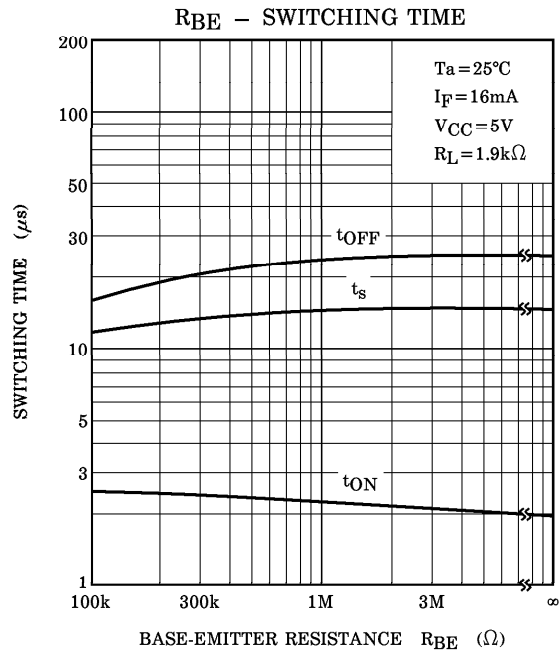
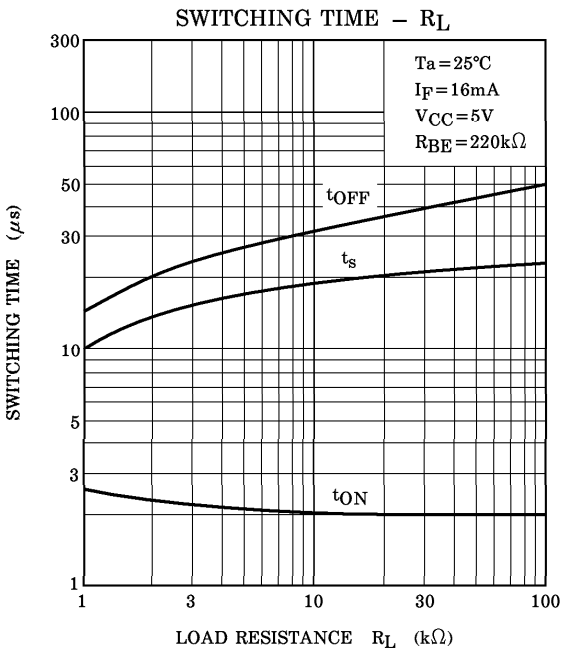
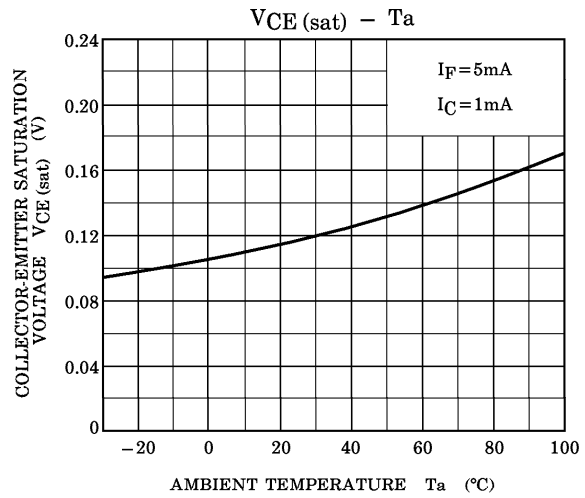
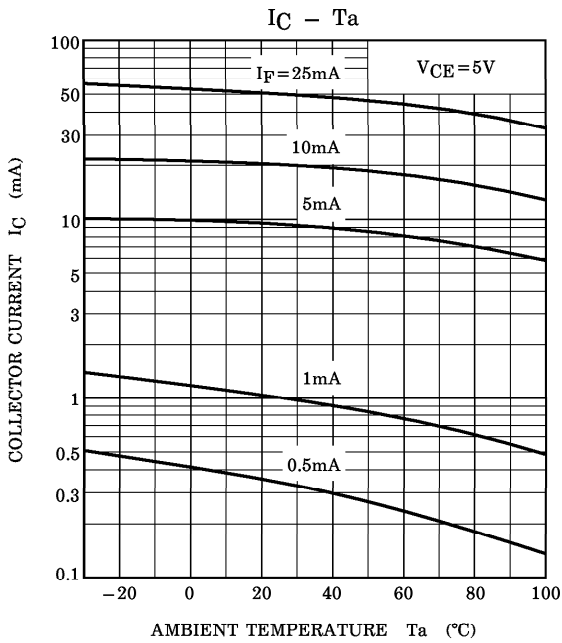
(Note 2) SWITCHING TIME TEST CIRCUIT











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