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

| Characteristic | | | Symbol | Rating | Unit |
|---|---|---|---|---|---|
| LED | Forward current | (Note 1) | $I_F$ | 25 | mA |
| | Pulse forward current | (Note 2) | $I_{FP}$ | 50 | mA |
| | Peak transient forward current | (Note 3) | $I_{FPT}$ | 1 | A |
| | Reverse voltage | | $V_R$ | 5 | V |
| | Diode power dissipation | (Note 4) | $P_D$ | 45 | mW |
| Detector | Output current | | $I_O$ | 8 | mA |
| | Peak output current | | $I_{OP}$ | 16 | mA |
| | Output voltage | | $V_O$ | −0.5 to 15 | V |
| | Supply voltage | | $V_{CC}$ | −0.5 to 15 | V |
| | Output power dissipation | (Note 5) | $P_O$ | 100 | mW |
| Operating temperature range | | | $T_{opr}$ | −55 to 100 | °C |
| Storage temperature range | | | $T_{stg}$ | −55 to 125 | °C |
| Lead solder temperature (10 s) | | (Note 6) | $T_{sol}$ | 260 | °C |
| Isolation voltage (AC, 60 s, R.H. ≤ 60 %) | | (Note 7) | $BV_S$ | 2500 | Vrms |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

(Note 1) Derate 0.8mA above 70 °C.

(Note 2) 50 % duty cycle,1 ms pulse width.Derate 1.6 mA / °C above 70 °C.

(Note 3) Pulse width ≤ 1μs, 300 pps.

(Note 4) Derate 0.9 mW / °C above 70 °C.

(Note 5) Derate 2 mW / °C above 70 °C.

(Note 6) Soldering portion of lead: up to 2 mm from body of the devise.

(Note 7) Device considered a two-terminal device: Pins 1, 2, 3 and 4 shorted together and pins 5, 6, 7 and 8 shorted together.

## Electrical Characteristics (Ta = 25°C)

| Characteristic | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| LED | Forward voltage | $V_F$ | $I_F$ = 16 mA | — | 1.65 | 1.85 | V |
| | Forward voltage temperature coefficient | $\Delta V_F / \Delta Ta$ | $I_F$ = 16 mA | — | −2 | — | mV / °C |
| | Reverse current | $I_R$ | $V_R$ = 5 V | — | — | 10 | μA |
| | Capacitance between terminal | $C_T$ | $V_F$ = 0 V, f = 1 MHz | — | 45 | — | pF |
| Detector | High level output current | $I_{OH\ (1)}$ | $I_F$ = 0 mA, $V_{CC}$ = $V_O$ = 5.5 V | — | 3 | 500 | nA |
| | | $I_{OH\ (2)}$ | $I_F$ = 0 mA, $V_{CC}$ = $V_O$ = 15 V | — | — | 5 | μA |
| | | $I_{OH}$ | $I_F$ = 0 mA, $V_{CC}$ = 15 V, $V_O$ = 15 V, Ta = 70 °C | — | — | 50 | |
| | High level supply voltage | $I_{CCH}$ | $I_F$ = 0 mA, $V_{CC}$ = 15 V | — | 0.01 | 1 | μA |
| | Supply voltage | $V_{CC}$ | $I_{CC}$ = 0.01 mA | 15 | — | — | V |
| | Output voltage | $V_O$ | $I_O$ = 0.5 mA | 15 | — | — | V |

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

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Current transfer ratio | $I_O/I_F$ | $I_F$ = 16 mA, $V_{CC}$ = 4.5 V, $V_O$ = 0.4 V | 20 | 40 | — | % |
| | | $I_F$ = 16 mA, $V_{CC}$ = 4.5 V, $V_O$ = 0.4 V, Ta = 0 to 70 °C | 15 | — | — | |
| Low level output voltage | $V_{OL}$ | $I_F$ = 16 mA, $V_{CC}$ = 4.5 V, $I_O$ = 2.4 mA | — | — | 0.4 | V |

## Isolation Characteristics (Ta = 25°C)

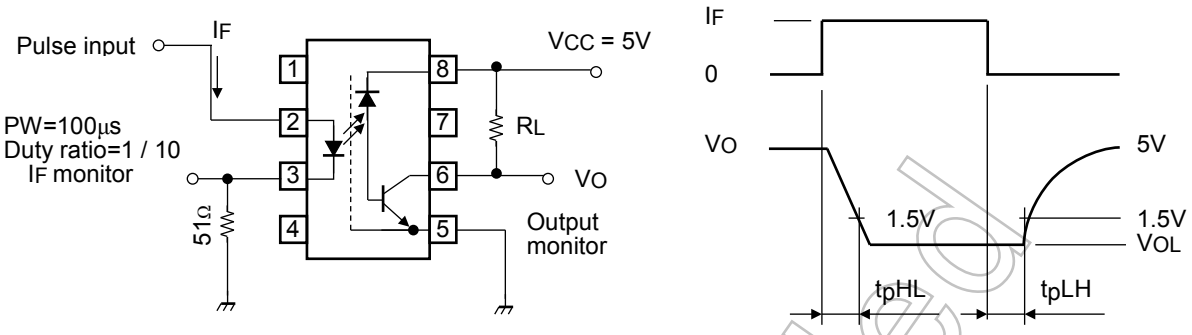
| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Capacitance (input-output) (Note 7) | $C_S$ | $V_S$ = 0 V, f = 1 MHz | — | 0.8 | — | pF |
| Resistance (input-output) (Note 7) | $R_S$ | R.H. ≤ 60 %, $V_S$ = 500 $V_{DC}$ | $5 \times 10^{10}$ | $10^{14}$ | — | Ω |
| Isolation voltage (Note 7) | $BV_S$ | AC, 60 s | 2500 | — | — | $V_{rms}$ |

## Switching Characteristics (Ta = 25°C、Vcc = 5V)

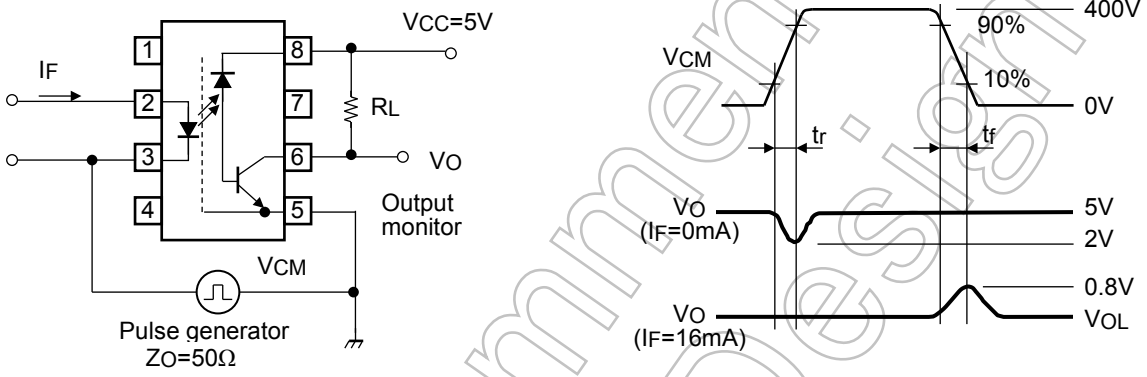
| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Propagation delay time (H→ L) | $t_{pHL}$ | 1 | $I_F$ = 16 mA, $R_L$ = 1.9 kΩ | — | 0.2 | 0.8 | μs |
| Propagation delay time (L→ H) | $t_{pLH}$ | | | — | 0.3 | 0.8 | μs |
| Common mode transient immunity at logic high output (Note 8) | $CM_H$ | 2 | $I_F$ = 0 mA, $V_{CM}$ = 400 $V_{p-p}$, $R_L$ = 4.1 kΩ | 2000 | 10000 | — | V / μs |
| Common mode transient immunity at logic high output (Note 8) | $CM_L$ | | $I_F$ =16 mA, $V_{CM}$ = 400 $V_{p-p}$, $R_L$ = 4.1kΩ | −2000 | −10000 | — | V / μs |

(Note 8) $CM_L$ is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state ($V_O$ < 0.8 V).
$CM_H$ is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state ($V_O$ > 2.0 V).

## Test Circuit 1: Switching Time Test Circuit

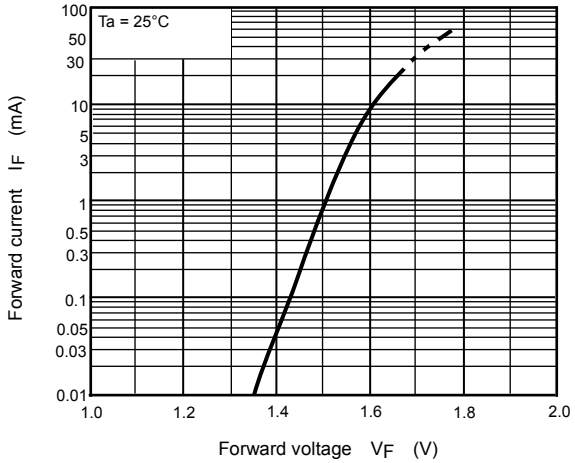



## Test Circuit 2: Common Mode Noise Immunity Test Circuit

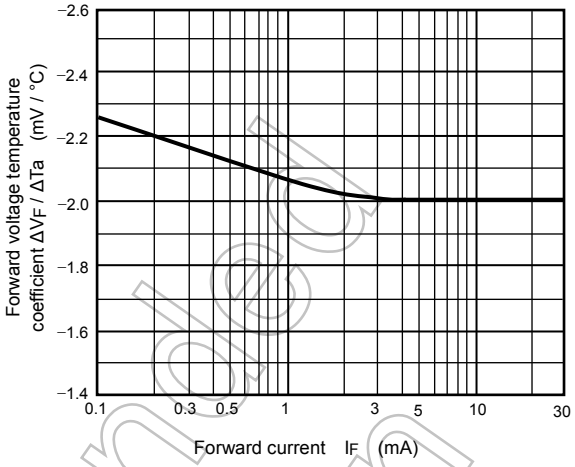



$$CM_H = \frac{320(V)}{t_r(\mu s)}, CM_L = \frac{320(V)}{t_f(\mu s)}$$

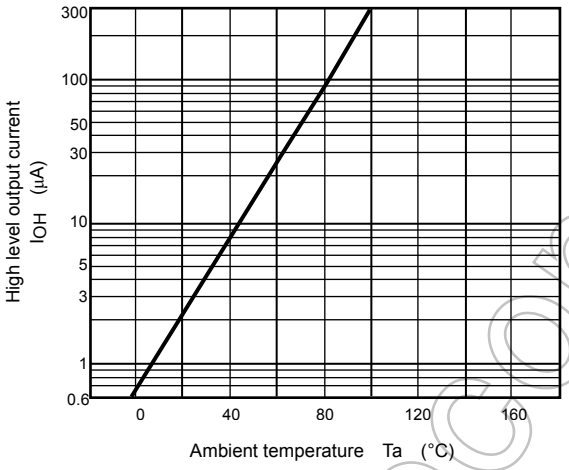
$I_F - V_F$



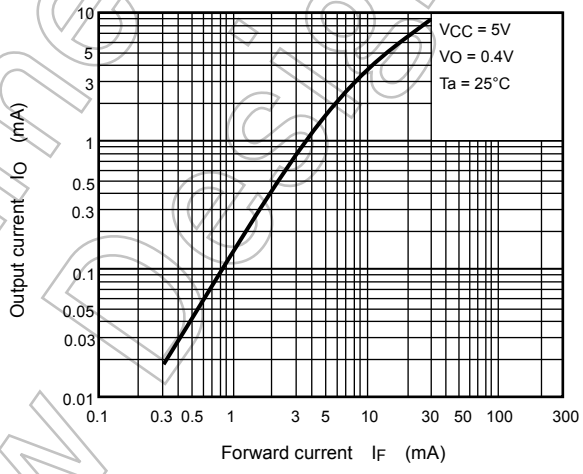

$\Delta V_F / \Delta Ta - I_F$



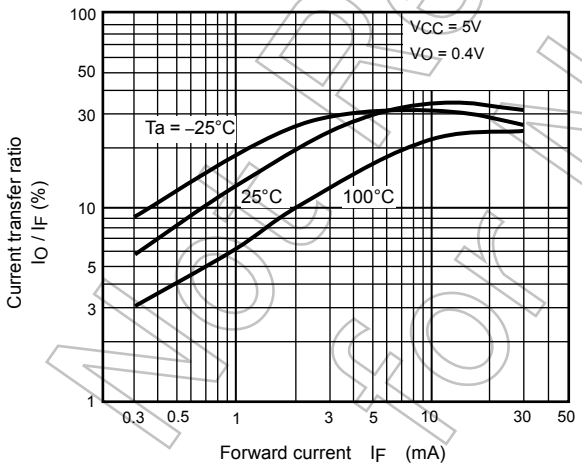

$I_{OH}$ (1) – Ta



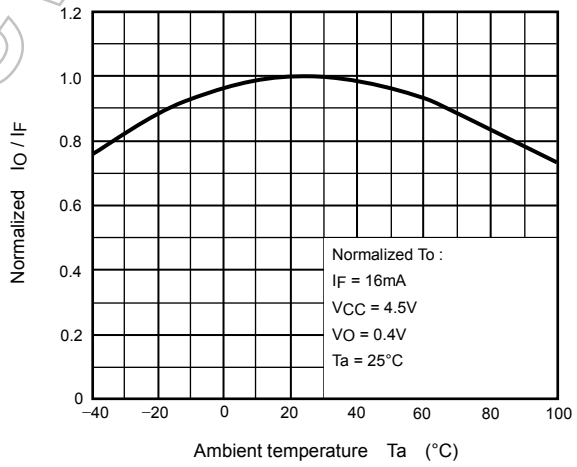

$I_O - I_F$




$I_O / I_F - I_F$




$I_O / I_F - Ta$

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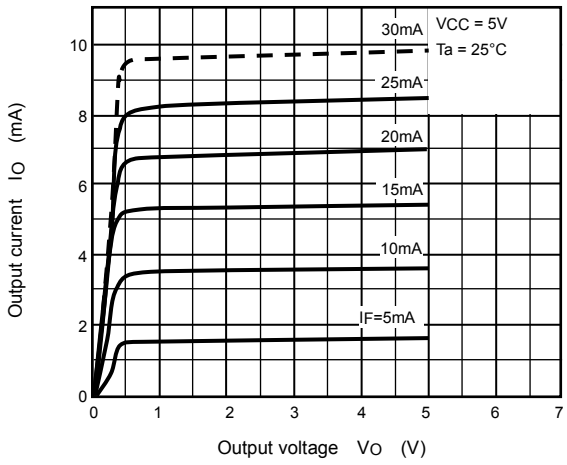
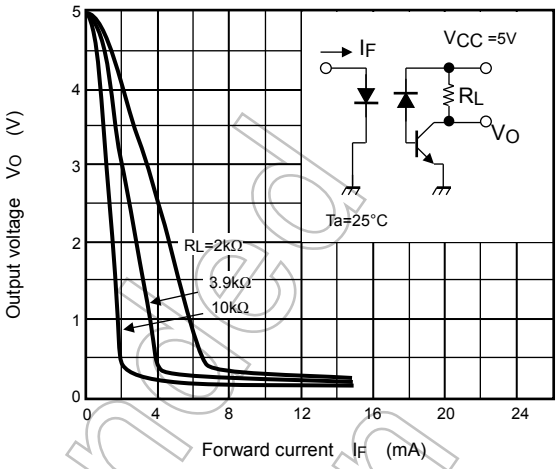
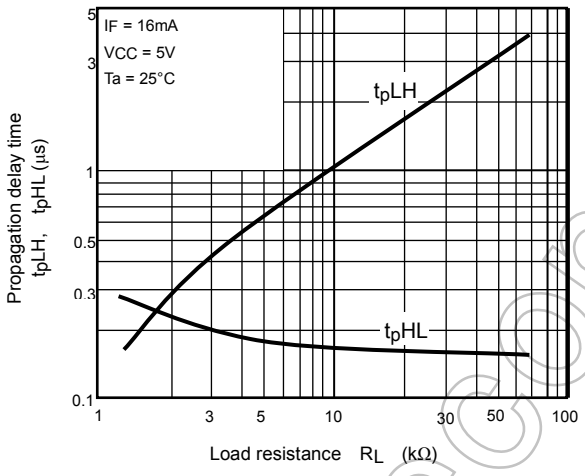
$I_O - V_O$




$V_O - I_F$




$t_{pHL}, t_{pLH} - R_L$




NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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