

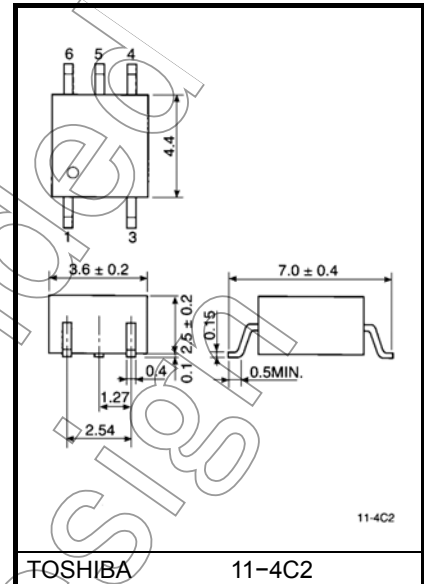
TLP114A

- Digital Logic Isolation
- Line Receiver
- Power Supply Control Feedback Control
- Switching Power Supply
- Transistor Inverter

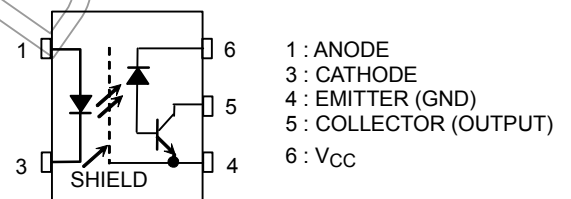
The TOSHIBA mini flat coupler TLP114A is a small outline coupler, suitable for surface mount assembly. TLP114A consists of a high output power GaAlAs light emitting diode, optically coupled to a high speed detector of one chip photodiode-transistor.

- Isolation voltage: 3750 Vrms (min)
- Switching speed: $t_{pHL} = 0.8\mu s$, $t_{pLH} = 0.8\mu s$ (max)
($R_L = 1.9 k\Omega$)
- TTL compatible
- UL recognized: UL1577, file no. E67349

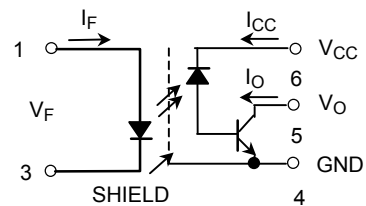
Unit in mm



Pin Configuration (top view)



Schematic



Absolute Maximum Ratings (Ta = 25°C)

| Characteristic | | Symbol | Rating | Unit |
|---|---|-----------|------------|------|
| LED | Forward current (Note 1) | I_F | 20 | mA |
| | Pulse forward current (Note 2) | I_{FP} | 40 | mA |
| | Peak transient forward current (Note 3) | I_{FPT} | 1 | A |
| | Reverse voltage | V_R | 5 | V |
| Detector | Output current | I_O | 8 | mA |
| | Peak output current | I_{OP} | 16 | mA |
| | Supply voltage | V_{CC} | -0.5 to 30 | V |
| | Output voltage | V_O | -0.5 to 20 | V |
| | Output power dissipation (Note 4) | 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 sec.) | | T_{sol} | 260 | °C |
| Isolation Voltage (AC, 1 min., R.H. ≤ 60%) | | BV_S | 3750 | Vrms |
| | | (Note 5) | | |

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 0.36mA / °C above 70°C.

(Note 2) 50% duty cycle, 1ms pulse width.

Derate 0.72mA / °C above 70°C.

(Note 3) Pulse width ≤ 1μs, 300pps.

(Note 4) Derate 1.8mW / °C above 70°C.

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

Not for New

Electrical Characteristics (Ta = 25°C)

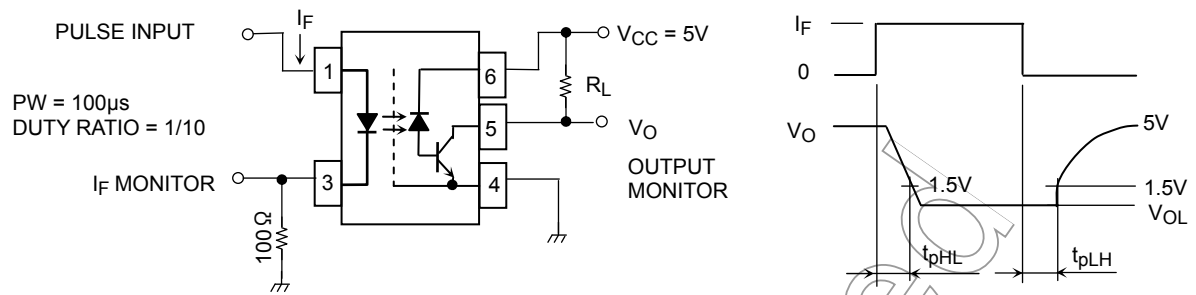
| Characteristic | | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|----------------|---|---------------------------|---|--------------------|-----------|------|---------|
| LED | Forward voltage | V_F | $I_F = 16\text{mA}$ | 1.22 | 1.42 | 1.72 | V |
| | Forward voltage temperature coefficient | $\Delta V_F / \Delta T_a$ | $I_F = 16\text{mA}$ | — | -2 | — | mV / °C |
| | Reverse current | I_R | $V_R = 3\text{V}$ | — | — | 10 | μA |
| | Capacitance between terminals | C_T | $V_F = 0, f = 1\text{MHz}$ | — | 30 | — | pF |
| Detector | High level output current | $I_{OH(1)}$ | $I_F = 0\text{mA}, V_{CC} = V_O = 5.5\text{V}$ | — | 3 | 500 | nA |
| | | $I_{OH(2)}$ | $I_F = 0\text{mA}, V_{CC} = 30\text{V}, V_O = 20\text{V}$ | — | — | 5 | μA |
| | | I_{OH} | $I_F = 0\text{mA}, V_{CC} = 30\text{V}, V_O = 20\text{V}, T_a = 70^\circ\text{C}$ | — | — | 50 | |
| | High level supply current | I_{CCH} | $I_F = 0\text{mA}, V_{CC} = 30\text{V}$ | — | 0.01 | 1 | μA |
| Coupled | Current transfer ratio | I_O / I_F | $I_F = 16\text{mA}, V_{CC} = 4.5\text{V}, V_O = 0.4\text{V}$ | 20 | — | — | % |
| | Low level output voltage | V_{OL} | $I_F = 16\text{mA}, V_{CC} = 4.5\text{V}, I_O = 2.4\text{mA}$ | — | — | 0.4 | V |
| | Isolation resistance | R_S | R.H. ≤ 60%, $V_S = 500\text{V}$ (Note 5) | 5×10^{10} | 10^{24} | — | Ω |
| | Stray capacitance between input to output | C_S | $V_S = 0, f = 1\text{MHz}$ (Note 5) | — | 0.8 | — | pF |

Switching Characteristics (Ta = 25°C, VCC = 5V)

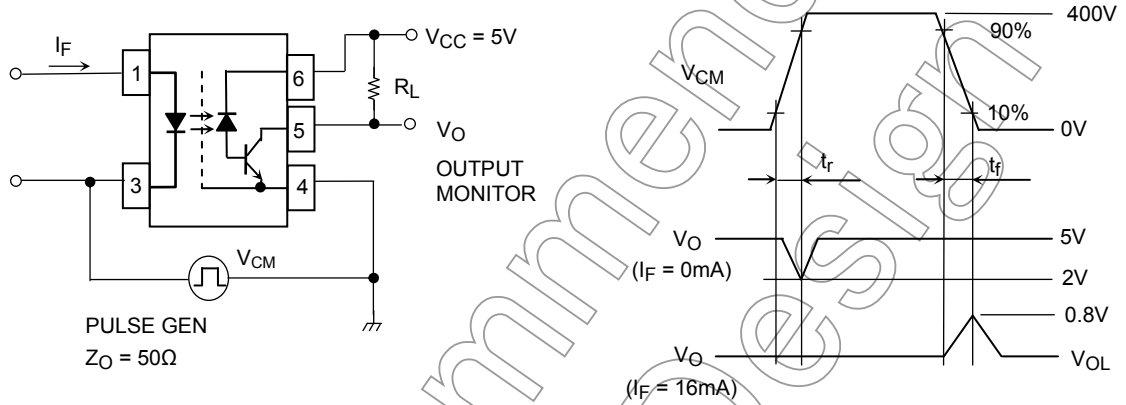
| Characteristic | Symbol | Test Circuit | Test Condition | Min. | Typ. | Max. | Unit |
|---|-----------|--------------|--|-------|--------|------|--------|
| Propagation delay time (H → L) | t_{pHL} | 1 | $I_F = 0 \rightarrow 16\text{mA}, V_{CC} = 5\text{V}, R_L = 1.9\text{k}\Omega$ | — | — | 0.8 | μs |
| Propagation delay time (L → H) | t_{pLH} | 1 | $I_F = 16 \rightarrow 0\text{mA}, V_{CC} = 5\text{V}, R_L = 1.9\text{k}\Omega$ | — | — | 0.8 | μs |
| Common mode transient immunity at high output level | C_{MH} | 2 | $I_F = 0\text{mA}, V_{CM} = 400\text{V}_{p-p}, R_L = 4.1\text{k}\Omega$ | 5000 | 10000 | — | V / μs |
| Common mode transient immunity at low output level | C_{ML} | 2 | $I_F = 16\text{mA}, V_{CM} = 400\text{V}_{p-p}, R_L = 4.1\text{k}\Omega$ | -5000 | -10000 | — | V / μs |

(Note 6) Maximum electrostatic discharge voltage for any pins: 100V (C=200pF, R=0)

Test Circuit 1: Switching Time Test Circuit

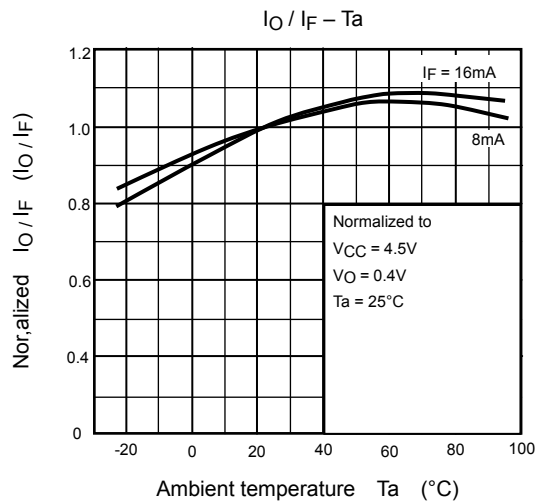
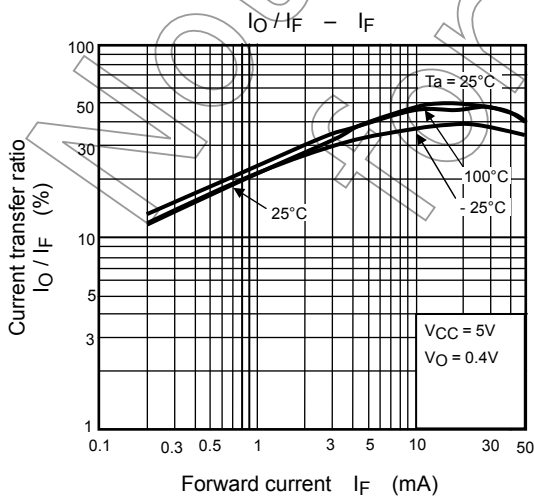
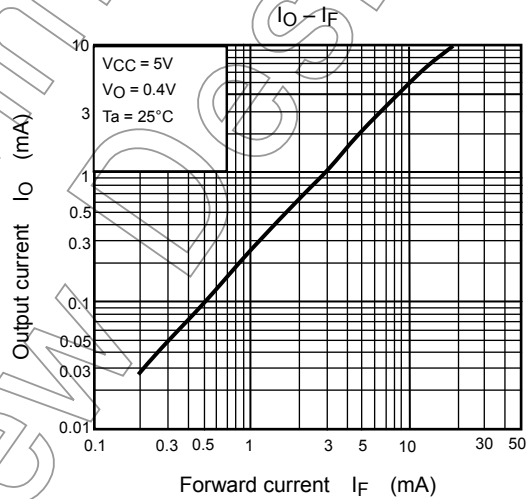
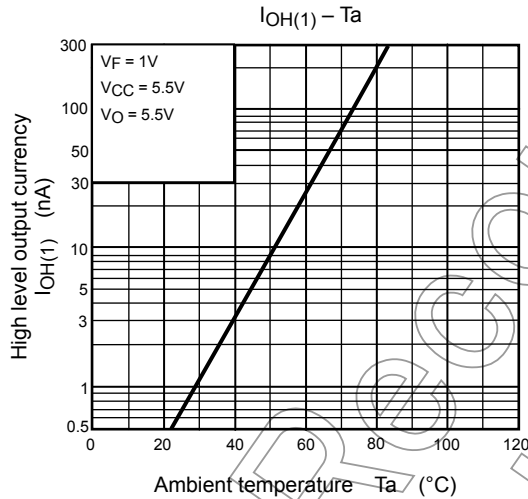
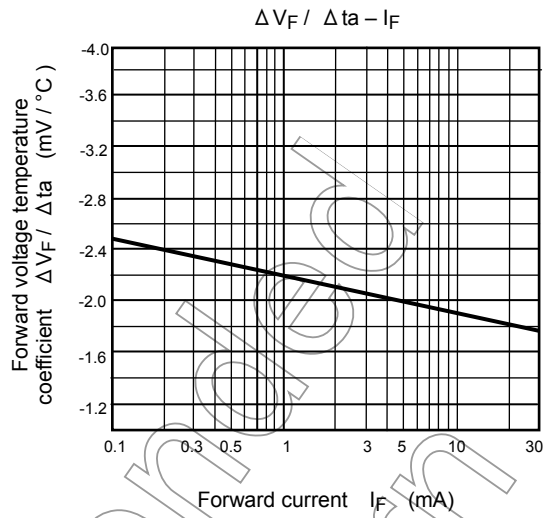
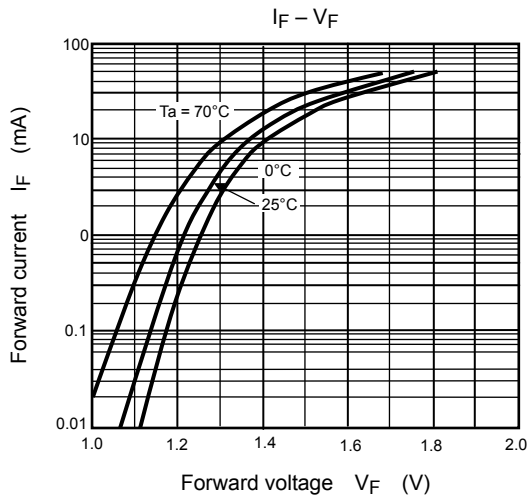


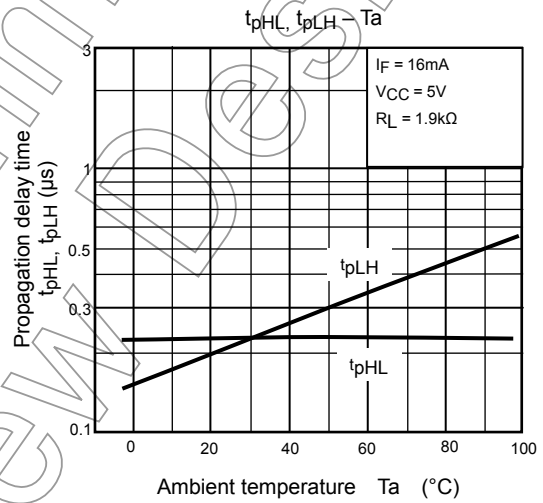
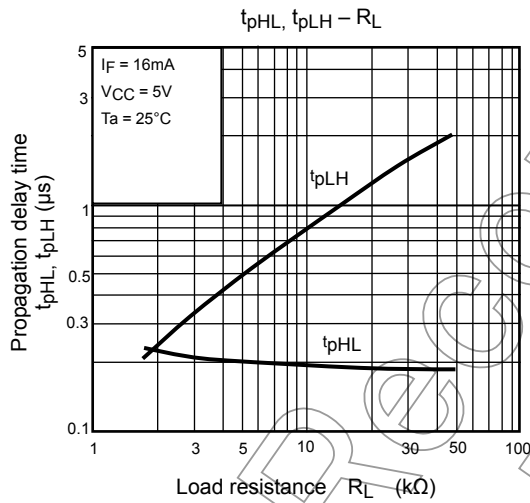
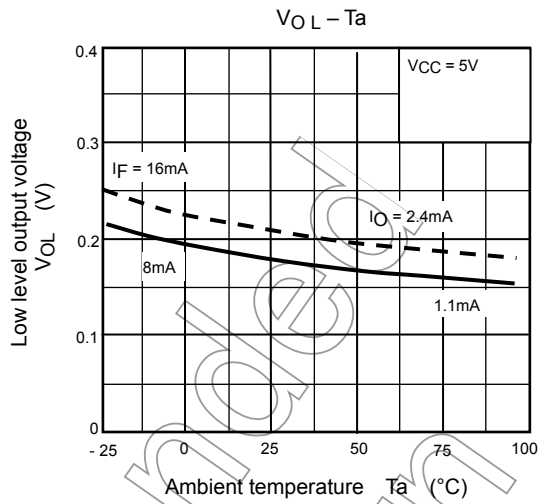
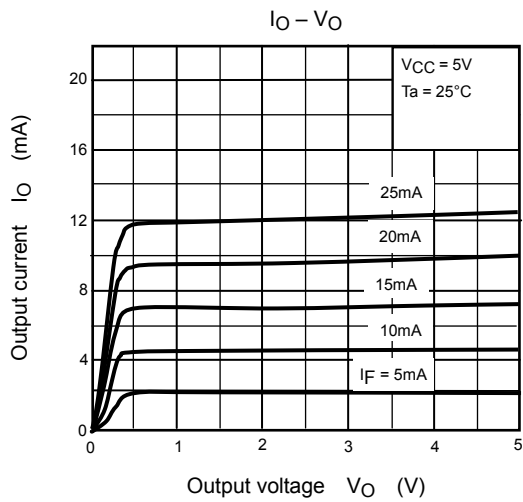
Test Circuit =2: Common Mode Transient Immunity Test Circuit



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

Not Recommended for New Design





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