

TLP3904

TELECOMMUNICATION
PROGRAMMABLE CONTROLLERS
MOSFET GATE DRIVER

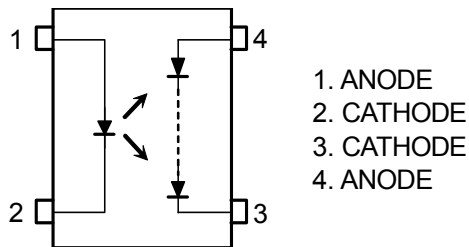
The TOSHIBA SSOP coupler TLP3904 is a small outline coupler, suitable for surface mount assembly.

The TLP3904 consists of a GaAs light emitting diode, optically coupled to a series connected photo diode array which is suitable for MOS FET gate drive.

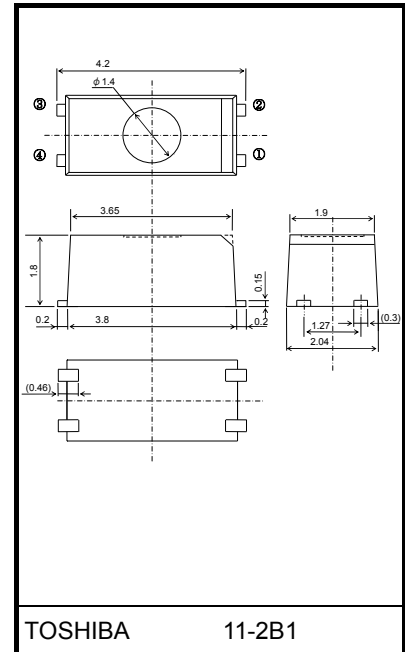
Features

- 4 pin SSOP (SSOP4) : 1.8 mm high, 1.27 mm pitch
- Open Voltage : 7 V (min)
- Short Current : 5 μ A (min)
- Isolation Voltage : 1500 Vrms (min)

Pin Configuration (top view)



Unit: mm



Weight: 0.03 g (typ.)

Start of commercial production
2004/08

Absolute Maximum Ratings (Ta = 25°C)

| Characteristic | | Symbol | Rating | Unit |
|--|--------------------------------------|-------------------------------|---------|---------|
| LED | Forward Current | I_F | 50 | mA |
| | Forward Current Derating (Ta ≥ 25°C) | $\Delta I_F / ^\circ\text{C}$ | -0.5 | mA / °C |
| | Reverse Voltage | V_R | 5 | V |
| | Junction Temperature | T_j | 125 | °C |
| DETECTOR | Forward Current | I_{FD} | 50 | μA |
| | Reverse Voltage | V_{RD} | 10 | V |
| | Junction Temperature | T_j | 125 | °C |
| Storage Temperature Range | | T_{stg} | -55~125 | °C |
| Operating Temperature Range | | T_{opr} | -40~85 | °C |
| Lead Soldering Temperature (10 s) | | T_{sol} | 260 | °C |
| Isolation Voltage (AC, 1 minute, R.H. ≤ 60%) (Note 1) | | BV_S | 1500 | 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: Device considered a two terminal device: Pins 1 and 2 shorted together and pins 3 and 4 shorted together.

Precautions

This device is sensitive to electrostatic discharge. When using this device, please ensure that all tools and equipment are earthed.

Recommended Operating Conditions (Note 2)

| Characteristic | Symbol | Min | Typ. | Max | Unit |
|-----------------------|-----------|-----|------|-----|------|
| Forward Current | I_F | 7 | — | 20 | mA |
| Operating Temperature | T_{opr} | -25 | — | 65 | °C |

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

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 | Forward Voltage | V_{FD} | $I_{FD} = 10 \text{ μA}$ | — | 9.6 | — | V |
| | Reverse Current | I_{RD} | $V_{RD} = 10 \text{ V}$ | — | 1 | — | nA |
| | Capacitance (Anode to Cathode) | C_{TD} | $V = 0, f = 1 \text{ MHz}$ | — | 2.5 | — | pF |

Coupled Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------|-----------------|------------------------|-----|------|-----|------|
| Open-Circuit Voltage | V _{OC} | I _F = 10 mA | 7 | — | — | V |
| Short-Circuit Current | I _{SC} | I _F = 10 mA | 5 | — | — | μA |

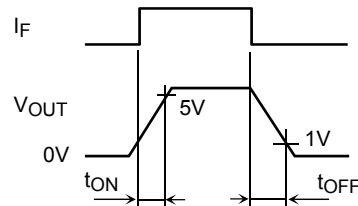
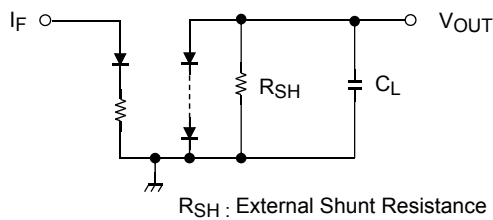
Isolation Characteristics (Ta = 25°C)

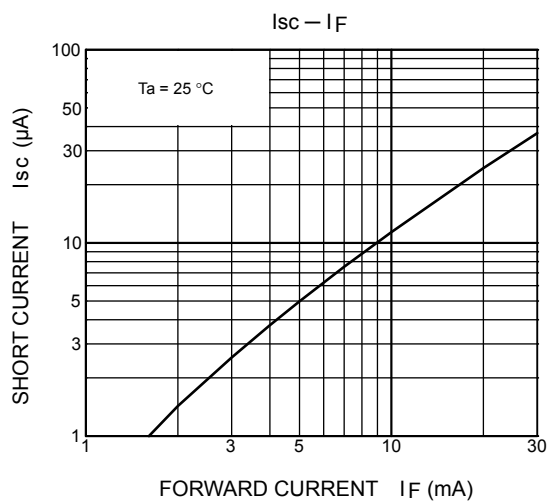
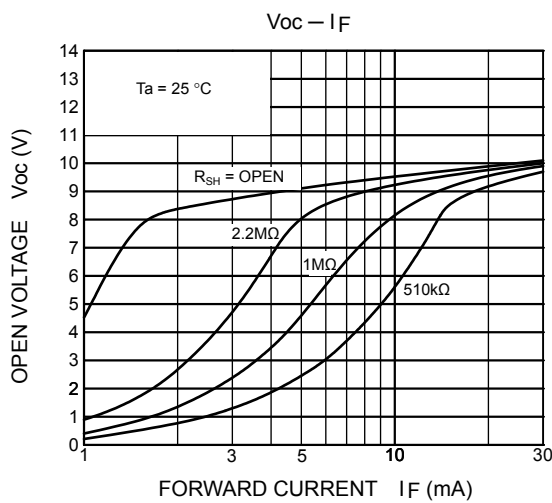
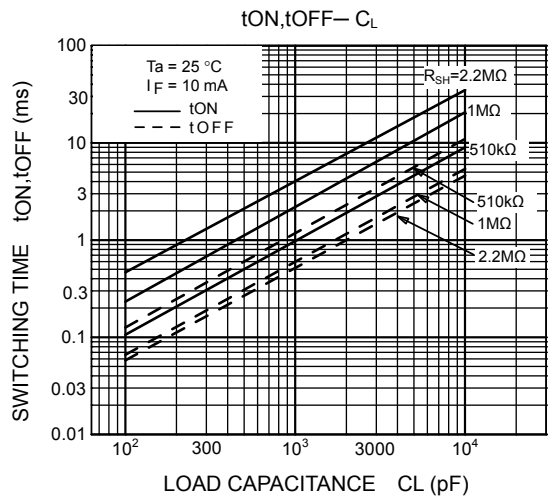
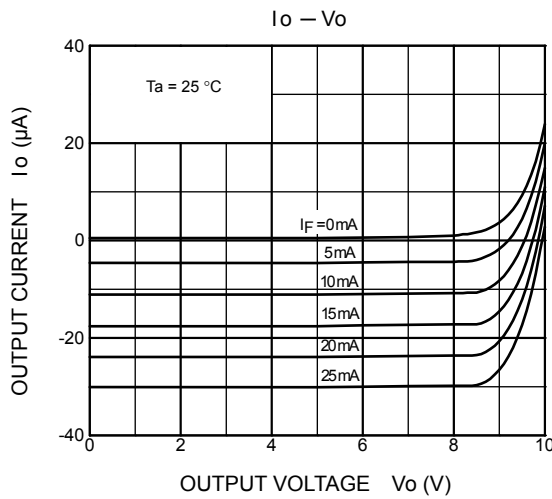
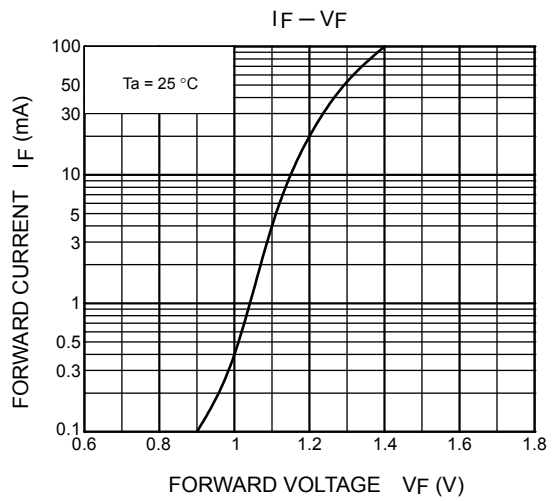
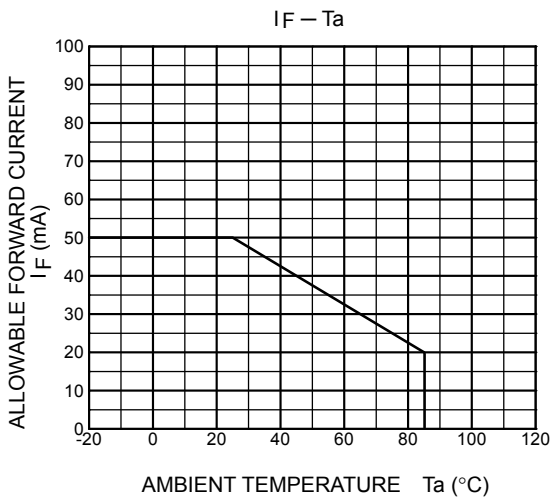
| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-----------------------------|-----------------|------------------------------------|--------------------|------------------|-----|------|
| Capacitance Input to Output | C _S | V _S = 0, f = 1 MHz | — | 0.8 | — | pF |
| Isolation Resistance | R _S | V _S = 500 V, R.H. ≤ 60% | 5×10 ¹⁰ | 10 ¹⁴ | — | Ω |
| Isolation Voltage | BV _S | AC, 1 minute | 1500 | — | — | Vrms |
| | | AC, 1 second in oil | — | 3000 | — | |
| | | DC, 1 minute in oil | — | 3000 | — | Vdc |

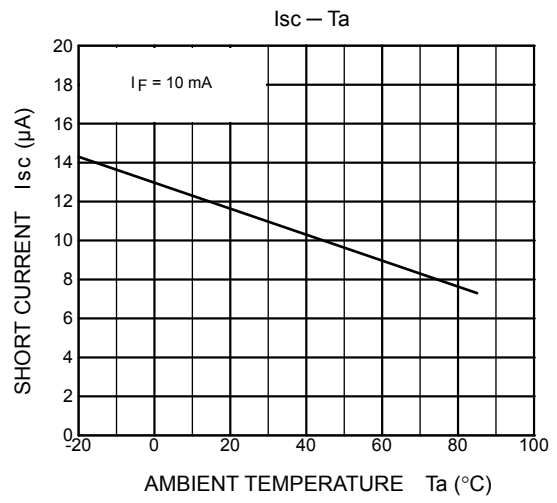
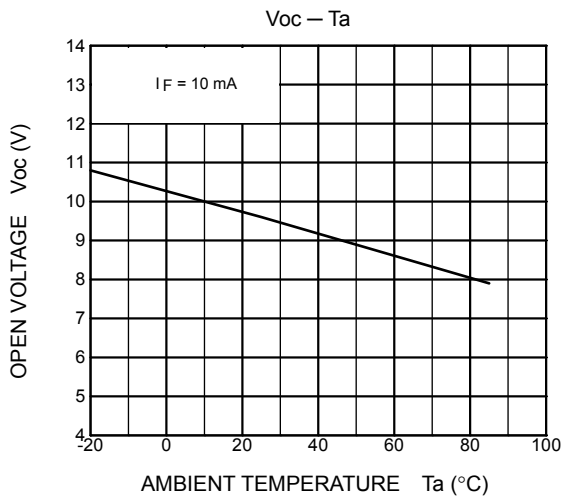
Switching Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------|------------------|--|-----|------|-----|------|
| Turn-on Time | t _{ON} | I _F = 10 mA, R _{SH} = 1 MΩ | — | 0.6 | — | ms |
| Turn-off Time | t _{OFF} | C _L = 1000pF (Note 3) | — | 2 | — | ms |

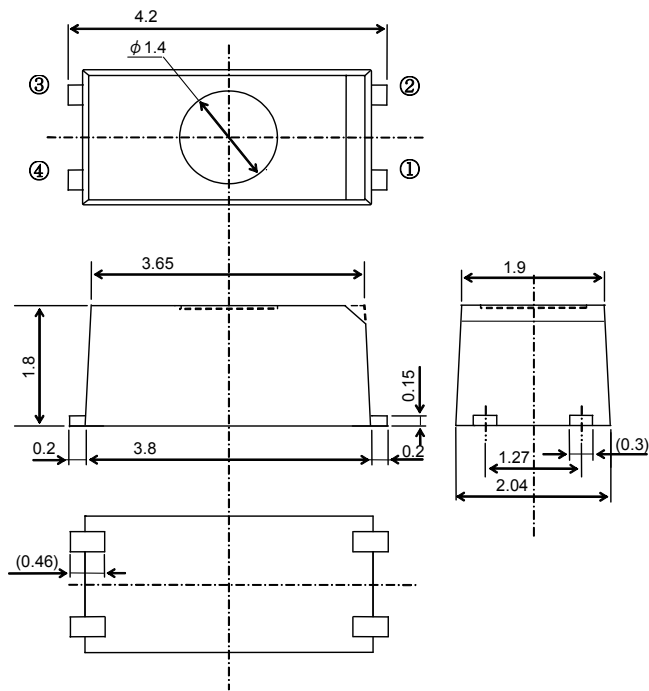
(Note 3) : SWITCHING TIME TEST CIRCUIT







OUTLINE DRAWING



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