CEL

# NEC's HIGH NOISE REDUCTION HIGH SPEED ANALOG OUTPUT 5 PIN SOP OPTOCOUPLER

# PS8101

## FEATURES

- **HIGH COMMON MODE TRANSISENT IMMUNITY:**
  $C_{MH}$,$C_{ML}$: ±10 kV/μs MIN
- **HIGH ISOLATION VOLTAGE:**
  BV: 2500 $V_{r.m.s.}$
- **HIGH SUPPLY VOLTAGE:**
  $V_{CC}$ = 35 V
- **HIGH SPEED RESPONSE:**
  $t_{PHL}$ = 0.8 μs MAX, $t_{PLH}$ = 1.2 μs MAX
- **AVAILABLE IN TAPE AND REEL:**
  PS8101-F3, F4

ESD SENSITIVE

## DESCRIPTION

NEC's PS8101 is an optically coupled isolator containing a GaAlAs LED on the light emitting diode (input) side and a PIN photodiode and a high speed amplifier transistor on the output side on one chip. Its small package makes it ideal for high density circuits and applications.

## APPLICATIONS

- **COMPUTERS AND PERIPHERALS MANUFACTURES**
- **GENERAL PURPOSE INVERTER**
- **POWER SUPPLIES**
- **RELAY AND PULSE TRANSFORMER REPLACEMENTS**

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C)

| PART NUMBER | | | | PS8101 | | |
|---|---|---|---|---|---|---|
| | SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX |
| Diode | $V_F$ | Forward Voltage, $I_F$ = 16 mA | V | | 1.7 | 2.2 |
| | $I_R$ | Reverse Current, $V_R$ = 3 V | μA | | | 10 |
| | $\Delta V_F/\Delta T$ | Forward Voltage Temp. Coefficient, $I_F$ = 16 mA | mV/°C | | -1.6 | |
| | $C_t$ | Terminal Capacitance, V = 0 V, f = 1.0 MHz | pF | | 60 | |
| Detector | $I_{OH(1)}$ | High Level Output Current<br>$I_F$ = 0 mA, $V_{CC}$ = $V_O$ = 5.5 V | nA | | 3 | 500 |
| | $I_{OH(2)}$ | High Level Output Current<br>$I_F$ = 0 mA, $V_{CC}$ = $V_O$ = 30 V | μA | | | 100 |
| | $V_{OL}$ | Low Level Output Voltage<br>$I_F$ = 16 mA, $V_{CC}$ = 4.5 V, $I_O$ = 1.2 mA | V | | 0.1 | 0.4 |
| | $I_{CCL}$ | Low Level Supply Current<br>$I_F$ = 16 mA, $V_O$ = Open, $V_{CC}$ = 30 V | μA | | 50 | |
| | $I_{CCH}$ | High Level Supply Current<br>$I_F$ = 0 mA, $V_O$ = Open, $V_{CC}$ = 30 V | μA | | 0.01 | 2 |
| Coupled | CTR | Current Transfer Ratio, $I_F$= 16 mA, $V_{CC}$ = 4.5 V, $V_O$ = 0.4 V | % | 15 | 20 | 35 |
| | $R_{I-O}$ | Isolation Resistance, $V_{IN-OUT}$ = 1k $V_{DC}$, RH = 40 to 60 % | Ω | $10^{11}$ | | |
| | $C_{I-O}$ | Isolation Capacitance, V = 0, f = 1.0 MHz | pF | | 0.4 | |
| | $t_{PHL}$ | Propagation Delay Time, (High → Low)[1]<br>$I_F$ = 16 mA, $V_{CC}$ = 5 V, $R_L$ = 2.2 k Ω, $C_L$ = 15 pF | μs | | 0.5 | 0.8 |
| | $t_{PLH}$ | Propagation Delay Time, (Low → High)[1]<br>$I_F$= 16 mA, $V_{CC}$ = 5 V, $R_L$ = 2.2 k Ω, $C_L$ = 15 pF | μs | | 0.6 | 1.2 |
| | $C_{MH}$ | Common Mode Transient Immunity at High Level Output[2]<br>$I_F$= 0 mA, $V_{CC}$ = 5 V, $R_L$ = 4.1 k Ω, $V_{CM}$ = 1.5 kV | kV/μs | 10 | | |
| | $C_{ML}$ | Common Mode Transient Immunity at Low Level Output [2]<br>$I_F$= 16 mA, $V_{CC}$ = 5 V, $R_L$ = 4.1 k Ω, $V_{CM}$ = 1.5 kV | kV/μs | -10 | | |

NOTES:
1. CTR rank
   K: 20 to 35 (%)
   N: 10 to 35 (%)

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## ABSOLUTE MAXIMUM RATINGS[1] ($T_A$ = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATING |
|---|---|---|---|
| Diode | | | |
| $I_F$ | Forward Current | mA | 25 |
| $V_R$ | Reverse Voltage | V | 5.0 |
| $P_D$ | Power Dissipation | mW | 45 |
| Detector | | | |
| $V_{CC}$ | Supply Voltage | V | 35 |
| $V_O$ | Output Voltage | V | 35 |
| $I_O$ | Output Current | mA | 8.0 |
| $P_C$ | Power Dissipation | mW | 100 |
| Coupled | | | |
| BV | Isolation Voltage[2] | $V_{r.m.s.}$ | 2500 |
| $T_A$ | Operating Ambient Temp. | °C | -55 to +100 |
| $T_{STG}$ | Storage Temperature | °C | -55 to +125 |

Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for one minute at $T_A$ = 25°C, RH = 60% between input and output.

## ORDERING INFORMATION

| PART NUMBER | PACKAGE | PACKAGE STYLE | APPLIICATION PART NUMBER* |
|---|---|---|---|
| PS8101 | 5-pin SOP | Magazine case 100 PCS | PS8101 |
| PS8101-F3 | | Embossed Tape 2500 pcs/reel | |
| PS8101-F4 | | | |

* For the application of the Safety Standard, following part number should be used.

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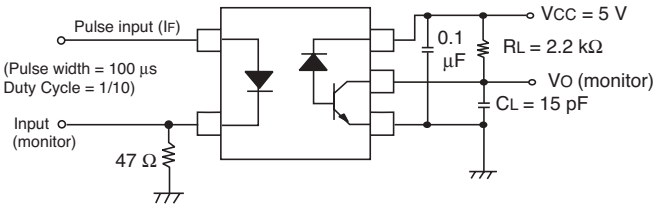
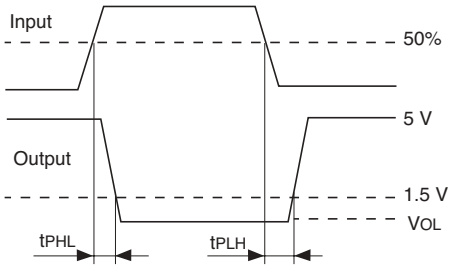
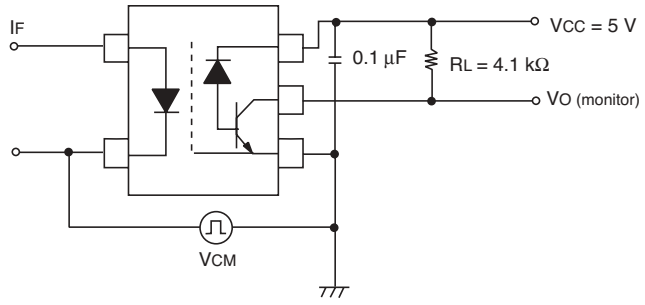
NOTES:
2. Test Circuit for Propagation Delay Time:

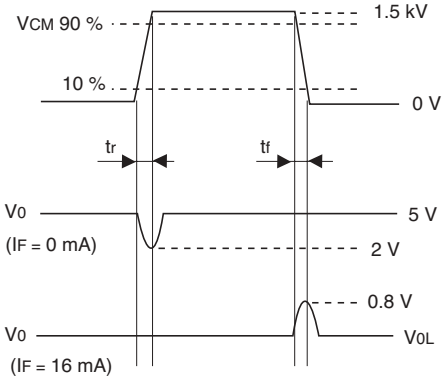



*$C_L$ is approximately 15 pF which includes probe and stray wiring capacitance.

3. Test Circuit forCommon Mode Transient Immunity:

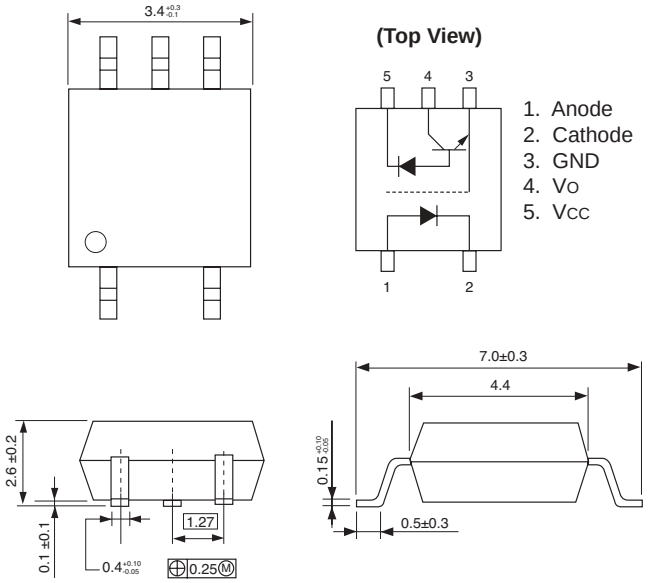



Usage Cautions:
1. When handling this product, precautions should be taken against static electricity.
2. A by-pass capacitor of ≥ 0.1 µF is used between $V_{CC}$ and GND.

## OUTLINE DIMENSIONS (Units in mm)

**PS8101**




## MARKING