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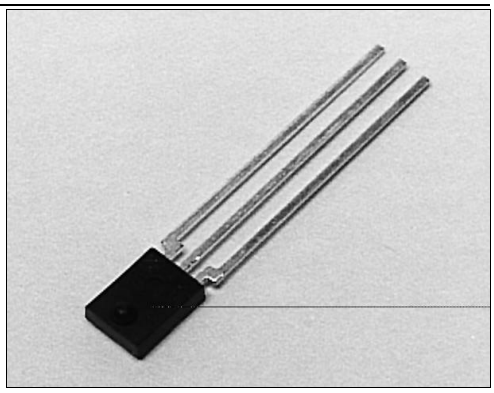
# SDP8604/8614

## Optoschmitt Detector
## 10 k Ohm Pull-Up Output

**FEATURES**

- Side-looking plastic package
- 55° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- 10Ω pull- up output
- Buffer or inverting logic available
- High noise immunity output
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



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**DESCRIPTION**

The SDP8604/8614 series consists of a high speed IC molded in a side-looking black plastic package to minimize the effect of visible ambient light. The detector incorporates a Schmitt trigger which provides pulse shaping and hysteresis for noise immunity. Detector output is an NPN silicon transistor with a 10 kΩ (nominal) pull-up resistor. This option eliminates the need for an external load resistor to generate an output signal voltage. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. For additional output configuration options refer to SDP8004/8014 and SDP8304/8314.

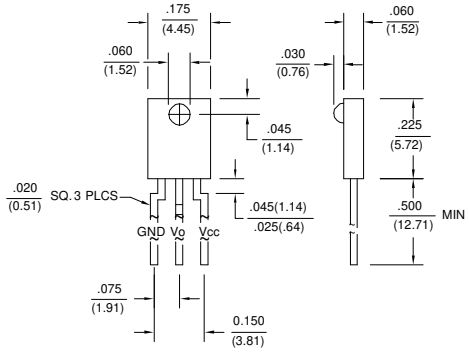
Device Polarity:

Buffer - Output is HI when incident light intensity is above the turn- on threshold level.

Inverter - Output is LO when incident light intensity is above the turn- on threshold level.

**OUTLINE DIMENSIONS** in inches (mm)

Tolerance 3 plc decimals ±0.005(0.12)
2 plc decimals ±0.020(0.51)

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# SDP8604/8614

## Optoschmitt Detector
## 10 k Ohm Pull-Up Output

**ELECTRICAL CHARACTERISTICS** (-40°C to +85°C unless otherwise noted)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Operating Supply Voltage | $V_{CC}$ | 4.5 | | 12.0 | V | $T_A$=25°C |
| Turn-on Threshold Irradiance (2) | $E_{eT(+)}$ | | | | mW/cm² | $V_{CC}$=5 V |
| SDP8604-301, SDP8614-301 | | 0.06 | | 0.37 | | $T_A$=25°C |
| Hysteresis (3) | HYST | 33 | | 67 | % | |
| Supply Current | $I_{CC}$ | | | 15.0 | mA | $V_{CC}$=12 V<br>$E_e$=0 Or 3.0 mW/cm² |
| High Level Output Voltage | $V_{OH}$ | | | | V | $V_{CC}$=4.5 V, $I_{OH}$=0 |
| SDP8604 | | 2.4 | | | | $E_e$=3.0 mW/cm² |
| SDP8614 | | 2.4 | | | | $E_e$=0 |
| Low Level Output Voltage | $V_{OL}$ | | | | V | $V_{CC}$=4.5 V, $I_{OL}$=12.8 mA |
| SDP8604 | | | | 0.4 | | $E_e$=0 |
| SDP8614 | | | | 0.4 | | $E_e$=3.0 mW/cm² |
| Internal Pull-Up Resistor | $R_{INT}$ | 5.0 | 10.0 | 20.0 | kΩ | |
| Operate Point Temperature Coefficient | | | -0.76 | | %/°C | Emitter @ Constant Temperature |
| Output Rise Time, Output Fall Time | $t_r$, $t_f$ | | 70 | | ns | $V_{CC}$=5 V, $T_A$=25°C<br>$E_e$=0 or 3.0 mW/cm²<br>f=10.0 kHz, D.C.=50%<br>$R_L$=390 Ω |
| Propagation Delay, Low-High, High-Low | $t_{PLH}$, $t_{PHL}$ | | 2.5 | 5.0 | µs | $V_{CC}$=5 V, $T_A$=25°C<br>$E_e$=0 or 3.0 mW/cm²<br>f=10.0 kHz, D.C.=50%<br>$R_L$=390 Ω |
| Clock Frequency | | | | 100 | kHz | $R_L$=390 Ω, $C_L$=50 pF |

Notes
1. It is recommended that a bypass capacitor, 0.1 µF typical, be added between $V_{CC}$ and GND near the device in order to stabilize power supply line.
2. The radiation source is an IRED with a peak wavelength of 935 nm.
3. Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

**ABSOLUTE MAXIMUM RATINGS**

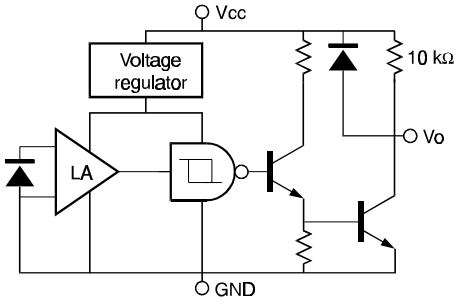
(25°C Free-Air Temperature unless otherwise noted)

| | |
|---|---|
| Supply Voltage | 12 V (1) |
| Duration of Output | |
| Short to $V_{CC}$ or Ground | 1.0 sec |
| Low Level Output Current | 16.0 mA |
| Irradiance | 25 mW/cm² |
| Operating Temperature Range | -40°C to 85°C |
| Storage Temperature Range | -40°C to 85°C |
| Soldering Temperature (5 sec) | 240°C |

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

**SCHEMATIC**

SDP8604 BUFFER, 10 k Ω PULL-UP



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# SDP8604/8614

## Optoschmitt Detector
## 10 k Ohm Pull-Up Output

**SCHEMATIC**

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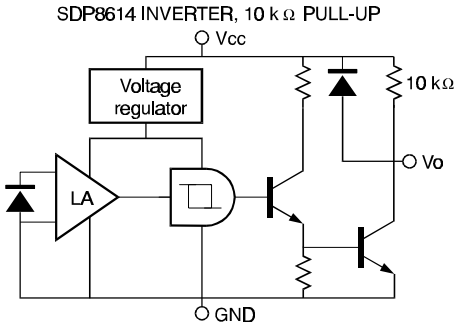
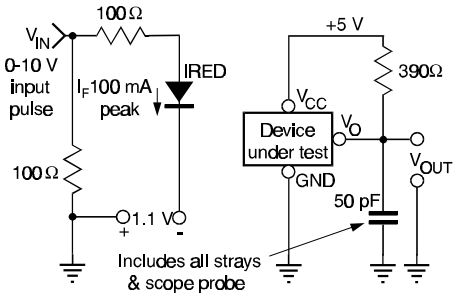


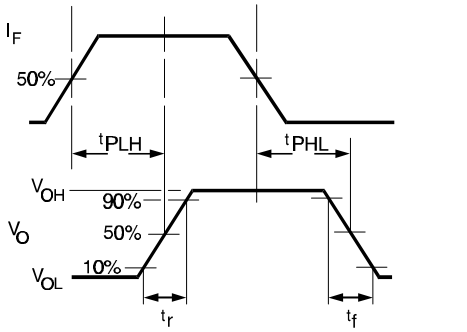

**SWITCHING TIME TEST CIRCUIT**

cir_007.cdr




**SWITCHING WAVEFORM FOR BUFFERS**

cir_013.cdr




**SWITCHING WAVEFORM FOR INVERTERS**

cir_011.cdr

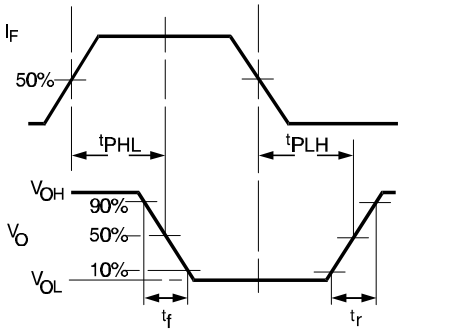



Fig. 1 Responsivity vs Angular Displacement

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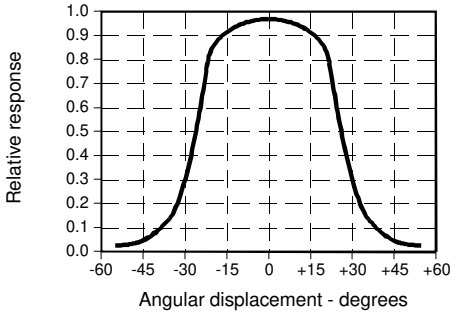


Fig. 2 Threshold Irradiance vs Temperature

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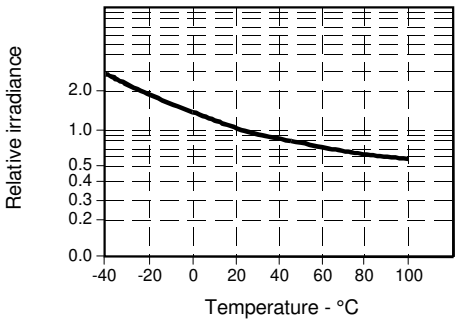




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# SDP8604/8614

**Optoschmitt Detector**
**10 k Ohm Pull-Up Output**

Fig. 3 Output Rise Time ($t_r$) and Output Fall Time ($t_f$) vs Temperature

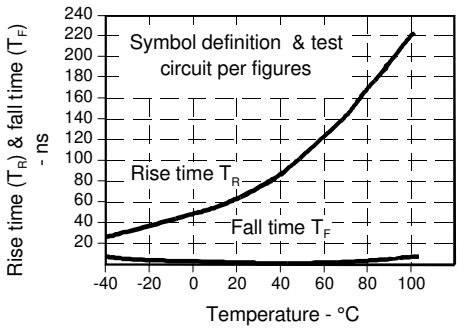



Fig. 4 Delay Time vs Temperature

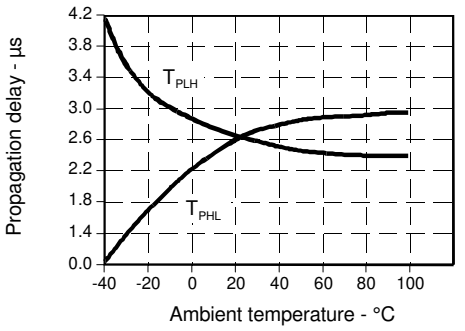
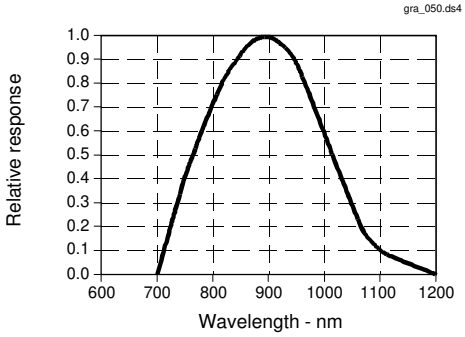



Fig. 5 Spectral Responsivity




All Performance Curves Show Typical Values



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