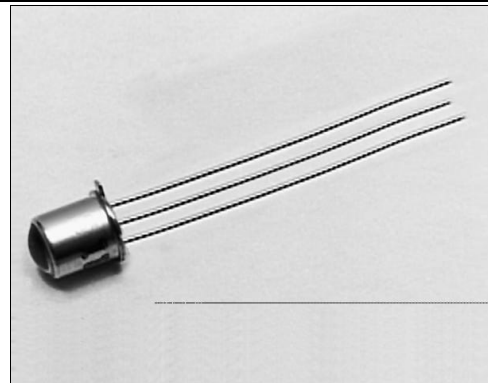


# SD5600/5610

## Optoschmitt Detector

### FEATURES

- TO-46 metal can package
- 6° (nominal) acceptance angle
- High noise immunity output
- TTL/LSTTL/CMOS compatible
- Buffer (SD5600) or inverting (SD5610) logic available
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



INFRA-81.TIF

### DESCRIPTION

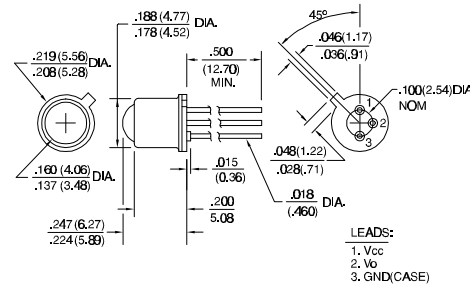
The SD5600/5610 series is a family of single chip Optoschmitt IC detectors mounted in a TO-46 metal can package. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 kΩ (nominal) pull-up resistor. Output rise and fall times are independent of the rate of change of incident light. Detector sensitivity has been internally temperature compensated. The TO-46 package is ideally suited for operation in hostile environments.

### 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)



# SD5600/5610

## Optoschmitt Detector

### ELECTRICAL CHARACTERISTICS (-40°C to +100°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V <sub>CC</sub>	4.5	16.0		V	T <sub>A</sub> =25°C
Turn-on Threshold Irradiance <sup>(2)</sup> SD5600-001, SD5610-001	E <sub>ET(+)</sub>		2.50		mW/cm <sup>2</sup>	V <sub>CC</sub> =5 V T <sub>A</sub> =25°C
Hysteresis <sup>(3)</sup>	HYST	5		30	%	
Supply Current	I <sub>CC</sub>			12.0 15.0	mA	E <sub>e</sub> =0 Or 3.0 mW/cm <sup>2</sup> V <sub>CC</sub> =5 V V <sub>CC</sub> =16 V
High Level Output Voltage SD5600 SD5610	V <sub>OH</sub>	2.4 2.4			V	V <sub>CC</sub> =5 V, I <sub>OH</sub> =0 E <sub>e</sub> =0 E <sub>e</sub> =3.0 mW/cm <sup>2</sup>
Low Level Output Voltage SD5600 SD5610	V <sub>OL</sub>			0.4 0.4	V	V <sub>CC</sub> =5 V, I <sub>OL</sub> =12.8 mA E <sub>e</sub> =0 E <sub>e</sub> =3.0 mW/cm <sup>2</sup>
Internal Pull-Up Resistor	R <sub>INT</sub>	5.0	10.0	20.0	kΩ	
Operate Point Temperature Coefficient	O <sub>PTC</sub>		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time	t <sub>r</sub>		60		ns	R <sub>L</sub> =390 Ω, C <sub>L</sub> =50 pF
Output Fall Time	t <sub>f</sub>		15		ns	R <sub>L</sub> =390 Ω, C <sub>L</sub> =50 pF
Propagation Delay, Low-High, High-Low	t <sub>PLH</sub> , t <sub>PHL</sub>		5.0		μs	R <sub>L</sub> =390 Ω, C <sub>L</sub> =50 pF
Clock Frequency				100	kHz	R <sub>L</sub> =390 Ω, C <sub>L</sub> =50 pF

#### Notes

- It is recommended that a bypass capacitor, 0.1 μF typical, be added between V<sub>CC</sub> and GND near the device in order to stabilize power supply line.
- The radiation source is an IRED with a peak wavelength of 935 nm.
- Hysteresis is defined as the difference between the operating and release threshold intensities, expressed as a percentage of the operate threshold intensity.

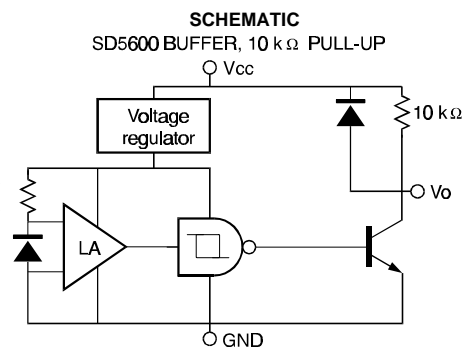
### ABSOLUTE MAXIMUM RATINGS

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

Supply Voltage	16 V <sup>(1)</sup>
Duration of Output Short to V <sub>CC</sub> or Ground	1.0 sec
Output Current	18 mA
Operating Temperature Range	-40°C to 100°C
Storage Temperature Range	-55°C to 125°C
Soldering Temperature (10 sec)	260°C

#### Notes

- Derate linearly from 25°C to 7 V at 100°C.



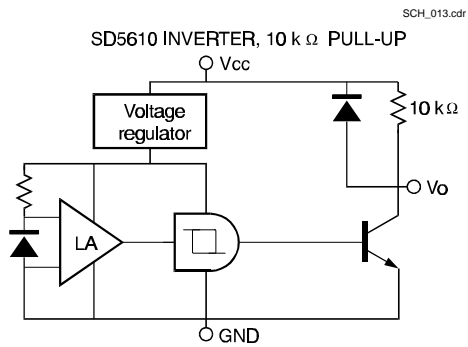
Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

# Honeywell

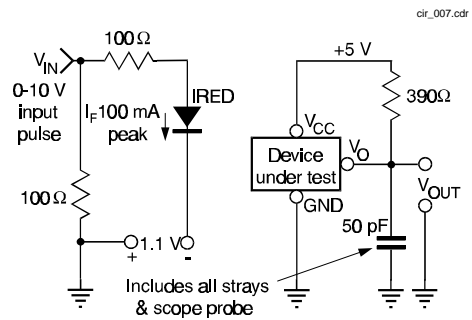
# SD5600/5610

## Optoschmitt Detector

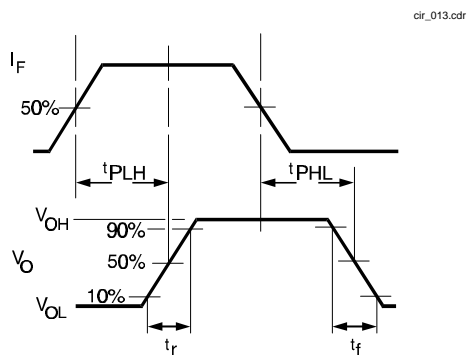
### SCHEMATIC



### SWITCHING TIME TEST CIRCUIT



### SWITCHING WAVEFORM FOR BUFFERS



### SWITCHING WAVEFORM FOR INVERTERS

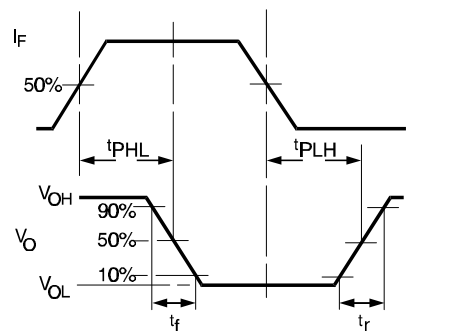


Fig. 1 Responsivity vs Angular Displacement

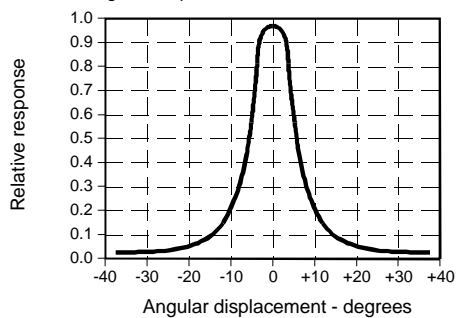
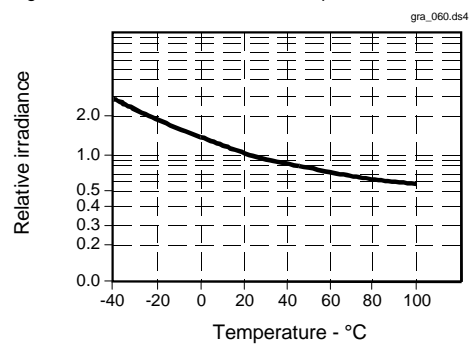


Fig. 2 Threshold Irradiance vs Temperature



# SD5600/5610

## Optoschmitt Detector

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

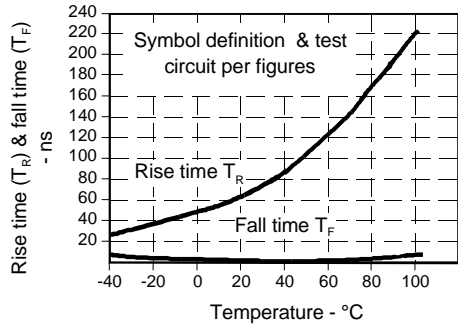


Fig. 4 Delay Time vs Temperature

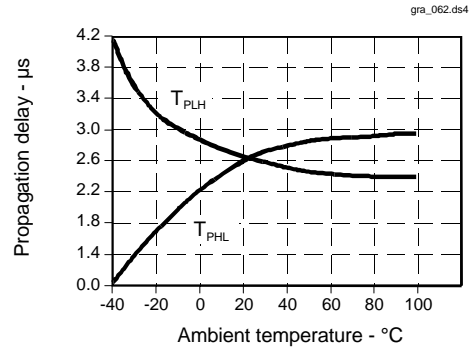
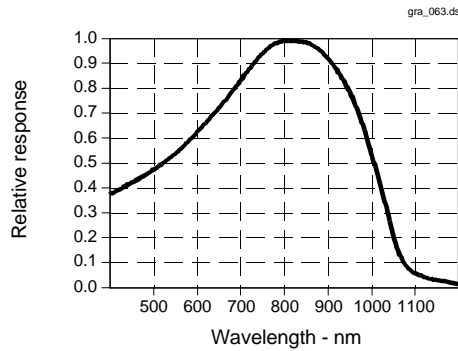


Fig. 5 Spectral Responsivity



All Performance Curves Show Typical Values