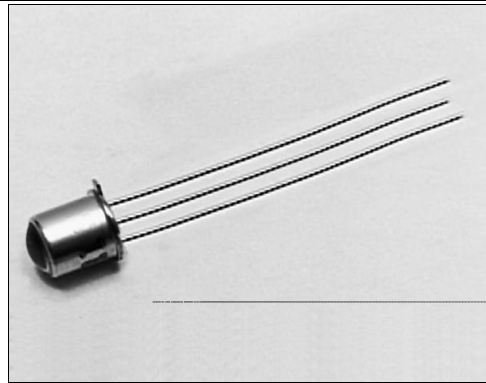# SD5600/5610

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
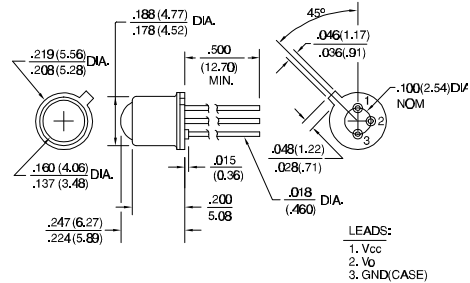
INFRA-81.TIF

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)

.188 (4.77) DIA.
.178 (4.52)

.219 (5.56) DIA.
.208 (5.28)

.500
(12.70)
MIN.

45º

.046 (1.17)
.036 (.91)

.100 (2.54) DIA
NOM

.160 (4.06) DIA.
.137 (3.48)

.015
(0.36)

.200
5.08

.048 (1.22)
.028 (.71)

.018
(.460) DIA.

.247 (6.27)
.224 (5.89)

LEADS:
1. Vcc
2. Vo
3. GND(CASE)

DIM_025.cdr

Honeywell

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_{CC}	4.5		16.0	V	T_A=25°C
Turn-on Threshold Irradiance [2]	$E_{ET(+)}$				mW/cm²	V_{CC}=5 V
SD5600-001, SD5610-001				2.50		T_A=25°C
Hysteresis [3]	HYST	5		30	%	
Supply Current	I_{CC}				mA	E_e=0 Or 3.0 mW/cm²
				12.0		V_{CC}=5 V
				15.0		V_{CC}=16 V
High Level Output Voltage	V_{OH}				V	V_{CC}=5 V, I_{OH}=0
SD5600		2.4				E_e=0
SD5610		2.4				E_e=3.0 mW/cm²
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SD5600				0.4		E_e=0
SD5610				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	O_{PTC}		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time	t_r		60		ns	R_L=390 Ω, C_L=50 pF
Output Fall Time	t_f		15		ns	R_L=390 Ω, C_L=50 pF
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		5.0		µs	R_L=390 Ω, C_L=50 pF
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.
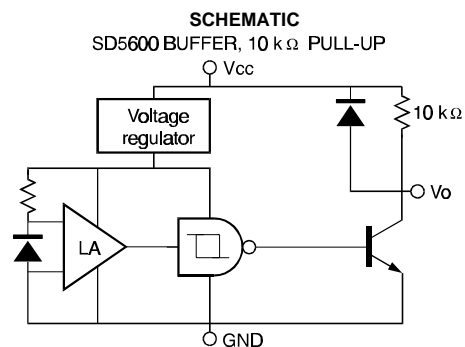
ABSOLUTE MAXIMUM RATINGS

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

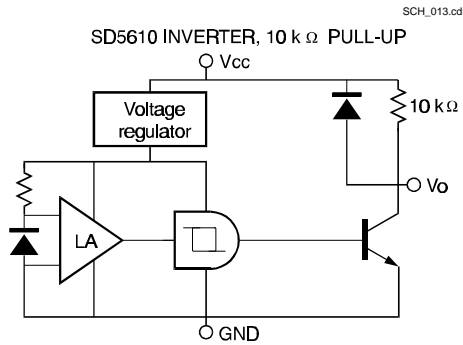|	
Supply Voltage	16 V [1]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Output Current	18 mA
Operating Temperature Range	-40°C to 100°C
Storage Temperature Range	-55°C to 125°C
Soldering Temperature (10 sec)	260°C

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

SCHEMATIC
SD5600 BUFFER, 10 kΩ PULL-UP

Honeywell

SD5600/5610

Optoschmitt Detector

SCHEMATIC

SCH_013.cdr

SD5610 INVERTER, 10 kΩ PULL-UP

SWITCHING TIME TEST CIRCUIT

cir_007.cdr
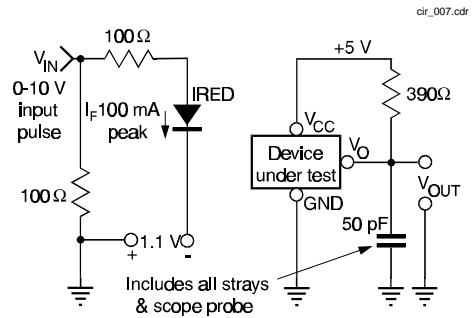
SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr

SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr
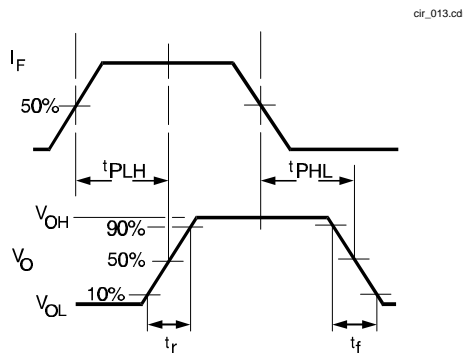
Fig. 1   Responsivity vs Angular Displacement

gra_064.ds4

Relative response

Angular displacement - degrees
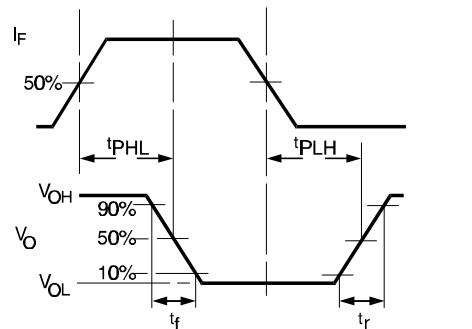
Fig. 2   Threshold Irradiance vs Temperature

gra_060.ds4

Relative irradiance

Temperature - °C

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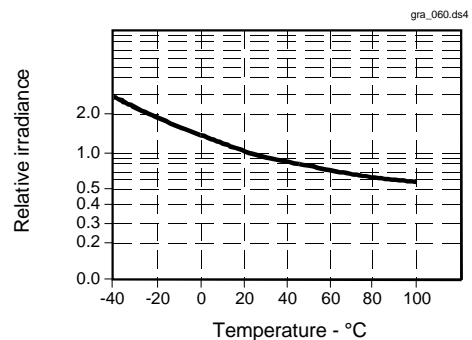
SD5600/5610

Optoschmitt Detector

Fig. 3   Output Rise Time (t_r) and Output Fall
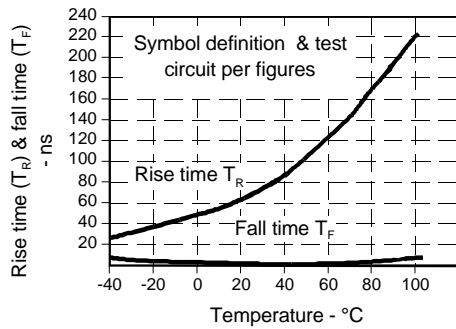Time (t_f) vs Temperature   gra_061.ds4

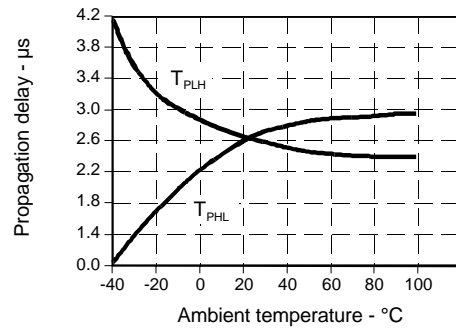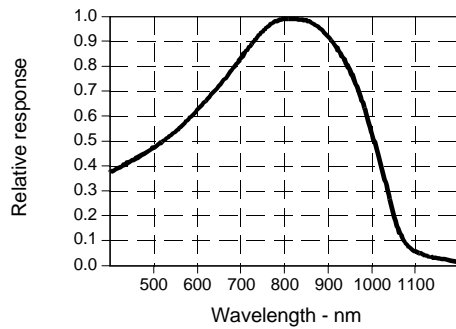Fig. 4   Delay Time vs Temperature
gra_062.ds4

Fig. 5   Spectral Responsivity
gra_063.ds4

All Performance Curves Show Typical Values

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