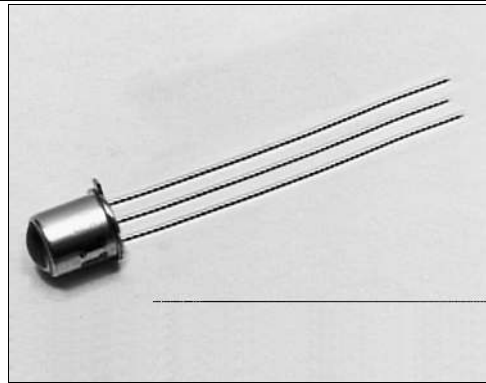# SD5600/5610

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)

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

DIM_025.cdr

Honeywell
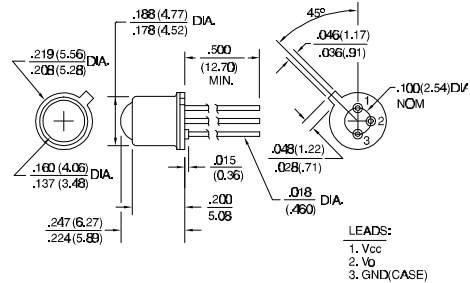
SD5600/5610

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] SD5600-001, SD5610-001	$E_{ET(+)}$			2.50	mW/cm²	V_{CC}=5 V T_A=25°C
Hysteresis [3]	HYST	5		30	%	
Supply Current	I_{CC}			12.0 15.0	mA	E_e=0 Or 3.0 mW/cm² V_{CC}=5 V V_{CC}=16 V
High Level Output Voltage SD5600 SD5610	V_{OH}	2.4 2.4			V	V_{CC}=5 V, I_{OH}=0 E_e=0 E_e=3.0 mW/cm²
Low Level Output Voltage SD5600 SD5610	V_{OL}			0.4 0.4	V	V_{CC}=5 V, I_{OL}=12.8 mA E_e=0 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.
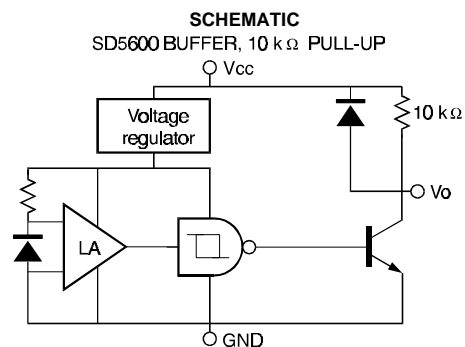
ABSOLUTE MAXIMUM RATINGS

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

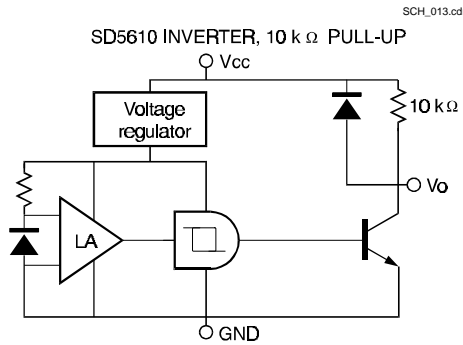|	
Supply Voltage	16 V [1]
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Output Current	18 mA
Operating Temperature Range	-40°C to 100°C
Storage Temperature Range	-55°C to 125°C
Soldering Temperature (10 sec)	260°C

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 k Ω PULL-UP

Vcc

Voltage regulator

10 k Ω

Vo

LA

GND

SWITCHING TIME TEST CIRCUIT

cir_007.cdr

100 Ω

V_{IN}

0-10 V input pulse

I_F 100 mA peak

IRED

+5 V

390 Ω

V_{CC}

Device under test

V_O

GND

V_{OUT}

100 Ω

1.1 V

50 pF

Includes all strays & scope probe
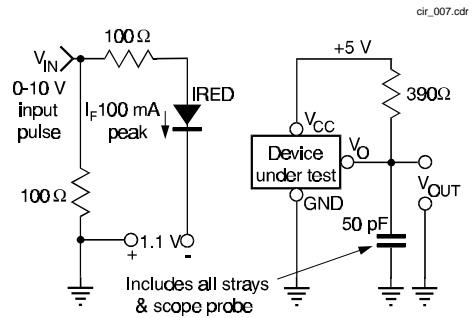
SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr

I_F

50%

^tPLH

^tPHL

V_{OH} 90%

V_O 50%

V_{OL} 10%

t_r

t_f
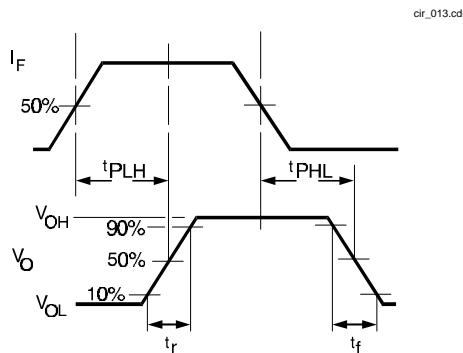
SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

I_F

50%

^tPHL

^tPLH

V_{OH} 90%

V_O 50%

V_{OL} 10%

t_f

t_r
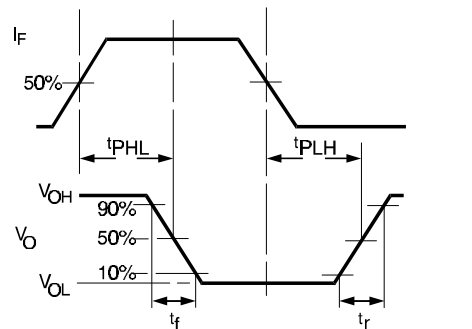
Fig. 1   Responsivity vs Angular Displacement

gra_064.ds4

Relative response

Angular displacement - degrees
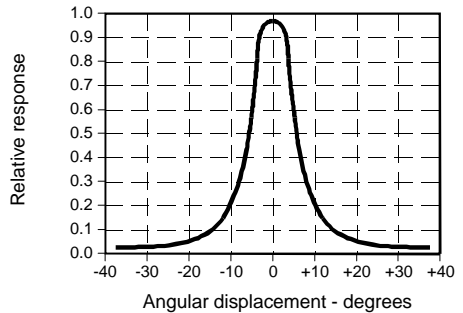
Fig. 2   Threshold Irradiance vs Temperature

gra_060.ds4

Relative irradiance

Temperature - °C

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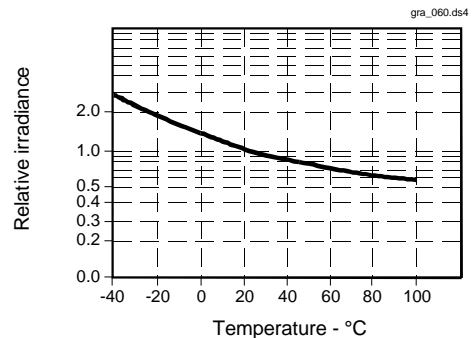
SD5600/5610
Optoschmitt Detector

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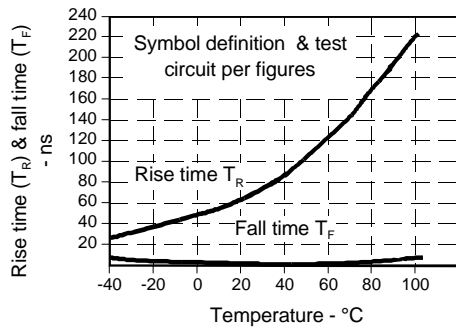Time (t_f) vs Temperature   gra_061.ds4

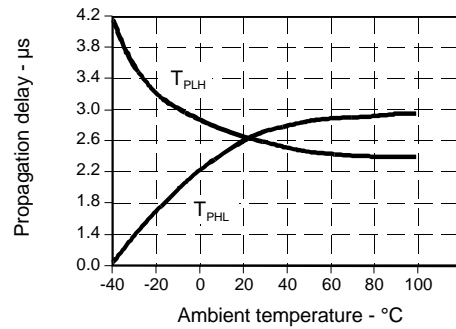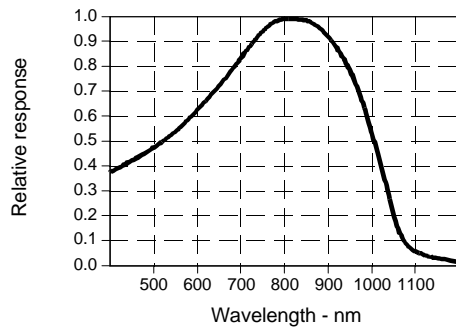Fig. 4   Delay Time vs Temperature   gra_062.ds4

Fig. 5   Spectral Responsivity   gra_063.ds4

All Performance Curves Show Typical Values

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