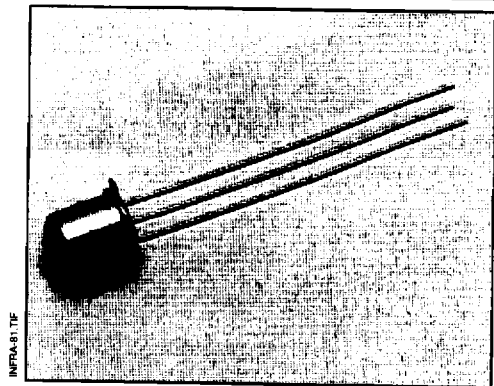


SD5600/5610

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



DESCRIPTION

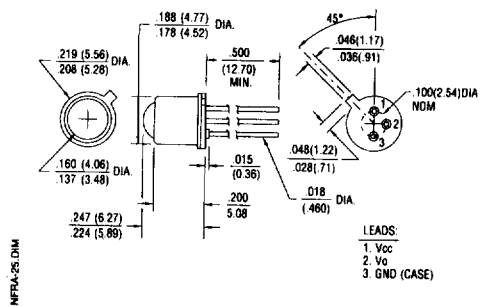
The SD5600/5610 series is a family of single chip Optoschmitt IC detectors mounted in a TO-46 metal can package. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with 10 k Ω (nominal) pull-up resistor. Output rise and fall times are 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 LO when input excitation is zero.
Inverter - Output is HI when input excitation is zero.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	$\pm 0.005(0.12)$
	2 plc decimals	$\pm 0.020(0.51)$



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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 ⁽¹⁾	E _{oT} (+)				mW/cm ²	V _{CC} =5 V
SD5600-001, SD5610-001			2.50			T _A =25°C
Hysteresis ⁽²⁾	HYST	5		30	%	
Supply Current	I _{CC}			12.0	mA	E _o =0 or 3.0 mW/cm ²
				15.0		V _{CC} =5 V
						V _{CC} =16 V
High Level Output Voltage	V _{OH}				V	V _{CC} =5 V, I _{OH} =0
SD5600		2.4				E _o =3.0 mW/cm ²
SD5610		2.4				E _o =0
Low Level Output Voltage	V _{OL}				V	V _{CC} =5 V, I _{OL} =12.8 mA
SD5600				0.4		E _o =0
SD5610				0.4		E _o =3.0 mW/cm ²
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	t _r		75		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

- 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.
- 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.

ABSOLUTE MAXIMUM RATINGS

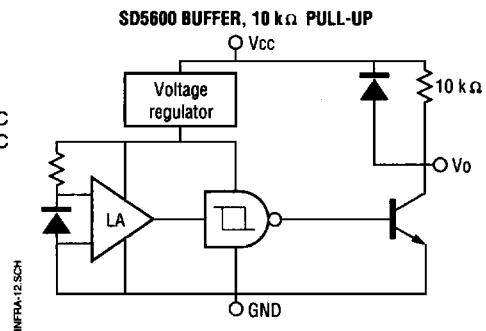
(25°C Free-Air Temperature unless otherwise noted)

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

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

SCHEMATIC



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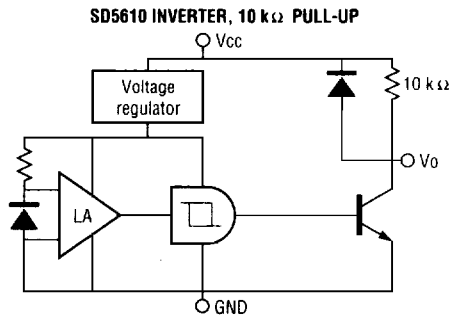
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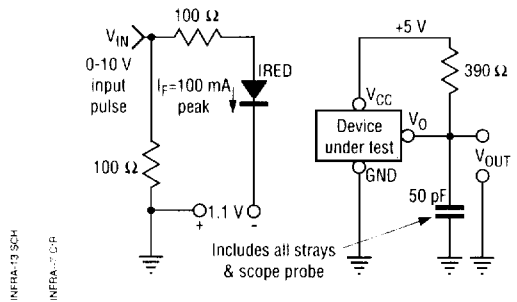
SD5600/5610

Optoschmitt Detector

SCHEMATIC



SWITCHING TIME TEST CIRCUIT



SWITCHING WAVEFORM FOR BUFFERS

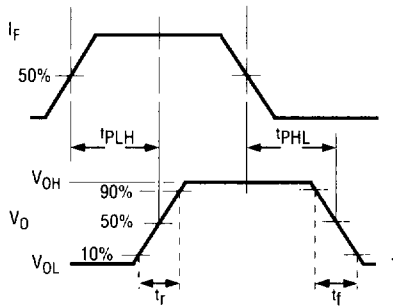
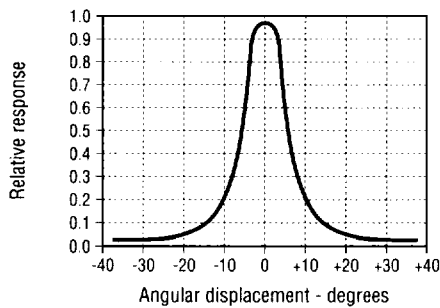


Fig. 1 Responsivity vs Angular Displacement



All Performance Curves Show Typical Values



SWITCHING WAVEFORM FOR INVERTERS

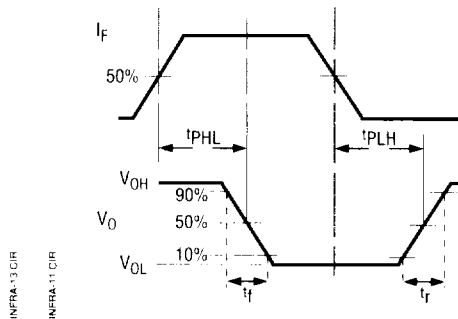
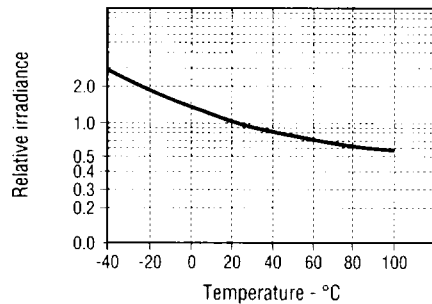


Fig. 2 Threshold Irradiance vs Temperature



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SD5600/5610

Optoschmitt Detector

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

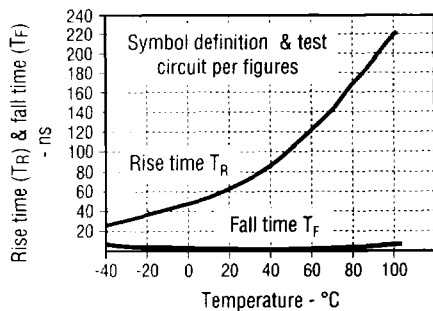


Fig. 4 Delay Time vs Temperature

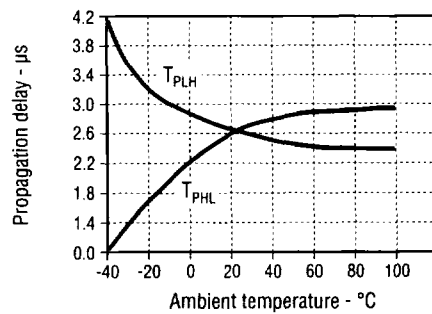
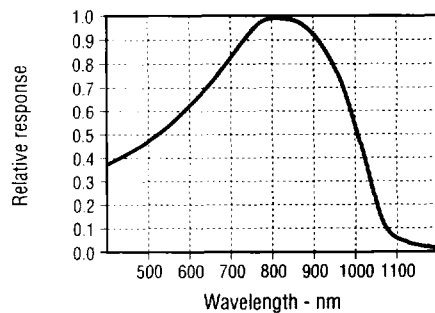


Fig. 5 Spectral Responsivity



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