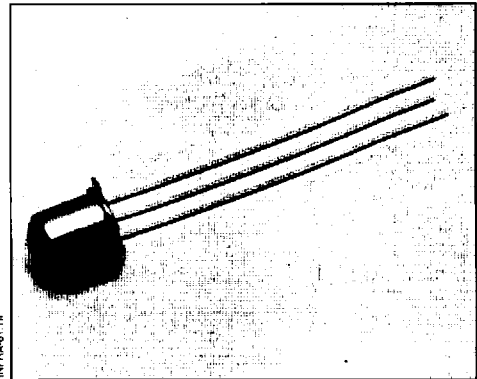


SD5620/5630

Optoschmitt Detector

FEATURES

- TO-46 metal can package
- 6° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- High noise immunity output
- Buffer (SD5620) or inverting (SD5630) logic available
- Two sensitivity ranges
- Mechanically and spectrally matched to SE3450/5450, SE3455/5455 and SE3470/5470 infrared emitting diodes



DESCRIPTION

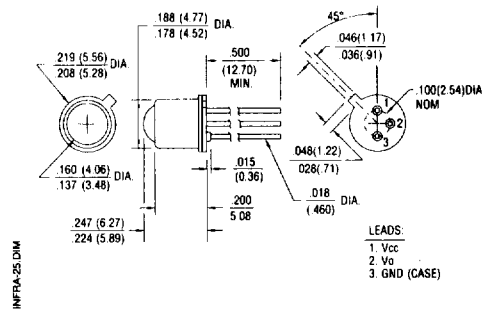
The SD5620/5630 series is family of single chip Optoschmitt IC detectors mounted in a TO-46 metal can package. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with a 10 k Ω (nominal) pull-up resistor. Output rise and fall times are independent of 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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SD5620/5630

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	$T_A=25^\circ\text{C}$
Turn-on Threshold Irradiance ⁽¹⁾	$E_{OT}(+)$				mW/cm ²	$V_{CC}=5\text{ V}$ $T_A=25^\circ\text{C}$
SD5620-001, SD5630-001				0.25		
SD5620-002, SD5630-002				0.13		
Hysteresis ⁽²⁾	HYST	5		30	%	
Supply Current	I_{CC}				mA	$E_o=0$ or 3.0 mW/cm^2 $V_{CC}=5\text{ V}$ $V_{CC}=16\text{ V}$
				12.0		
				15.0		
High Level Output Voltage	V_{OH}				V	$V_{CC}=5\text{ V}$, $I_{OH}=0$
SD5620		2.4				$E_o=3.0\text{ mW/cm}^2$
SD5630		2.4				$E_o=0$
Low Level Output Voltage	V_{OL}				V	$V_{CC}=5\text{ V}$, $I_{OL}=12.8\text{ mA}$
SD5620				0.4		$E_o=0$
SD5630				0.4		$E_o=3.0\text{ mW/cm}^2$
Internal Pull-Up Resistor	R_{INT}	5.0	10.0	20.0	k Ω	
Operate Point Temperature Coefficient			-0.76		%/ $^\circ\text{C}$	Emitter @ Constant Temperature
Output Rise Time	t_r		75		ns	$R_L=390\text{ }\Omega$, $C_L=50\text{ pF}$
Output Fall Time	t_f		15		ns	$R_L=390\text{ }\Omega$, $C_L=50\text{ pF}$
Propagation Delay, Low-High, High-Low	t_{PLH} , t_{PHL}		5.0		μs	$R_L=390\text{ }\Omega$, $C_L=50\text{ pF}$
Clock Frequency				100	kHz	$R_L=390\text{ }\Omega$, $C_L=50\text{ pF}$

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

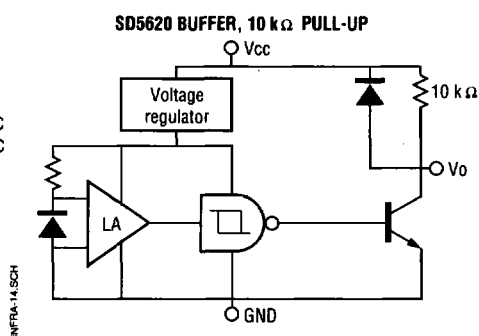
(25°C Free-Air Temperature unless otherwise noted)

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



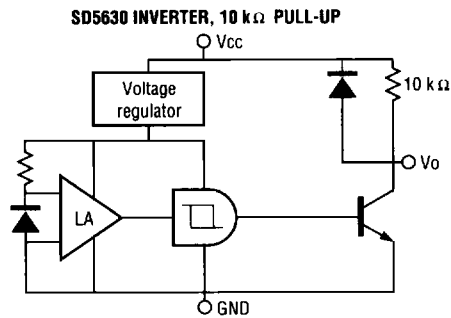
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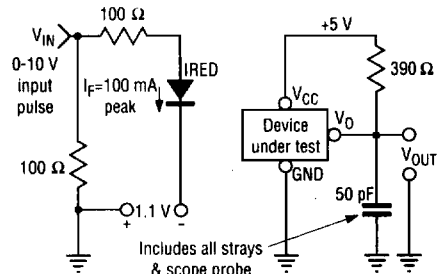
SD5620/5630

Optoschmitt Detector

SCHEMATIC



SWITCHING TIME TEST CIRCUIT



SWITCHING WAVEFORM FOR BUFFERS

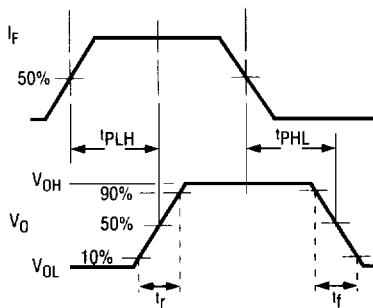
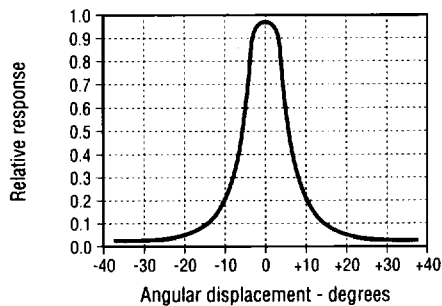


Fig. 1 Responsivity vs Angular Displacement



All Performance Curves Show Typical Values



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SWITCHING WAVEFORM FOR INVERTERS

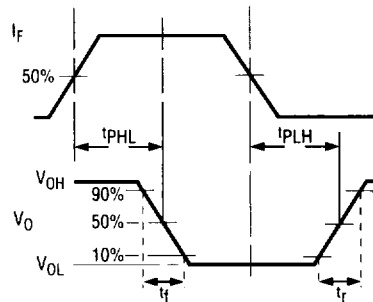
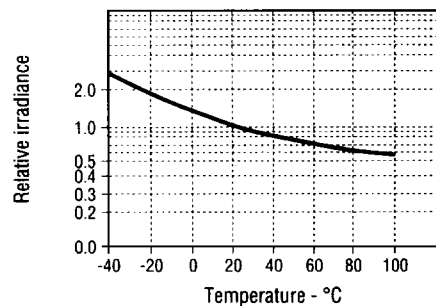


Fig. 2 Threshold Irradiance vs Temperature



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SD5620/5630

Optoschmitt Detector

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

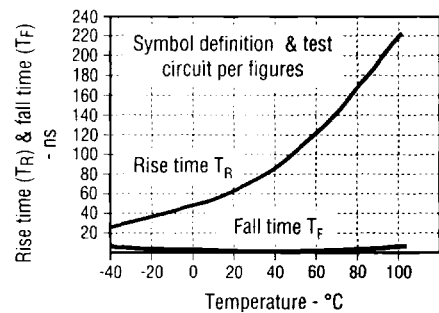


Fig. 4 Delay Time vs Temperature

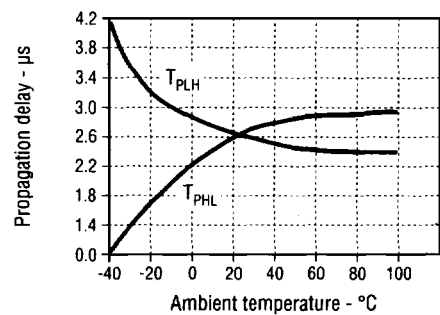
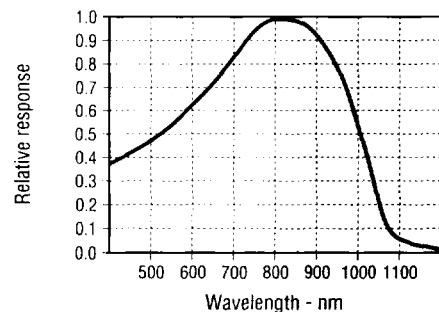


Fig. 5 Spectral Responsivity



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