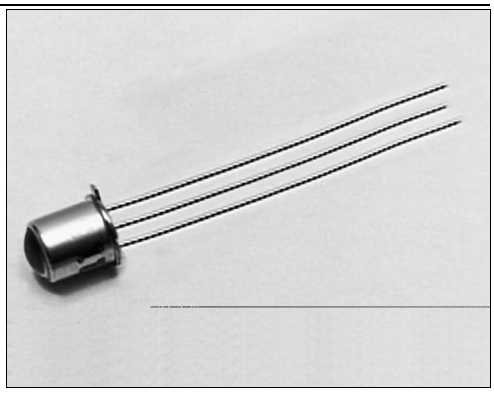
SD5600/5610

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



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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.

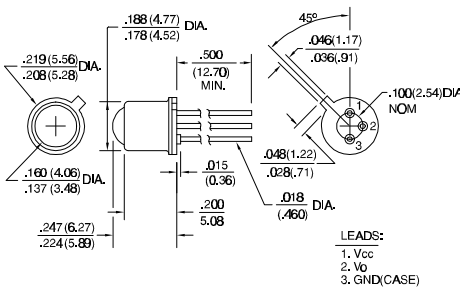
Device Polarity:

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)



DIM_025.cdr

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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 [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

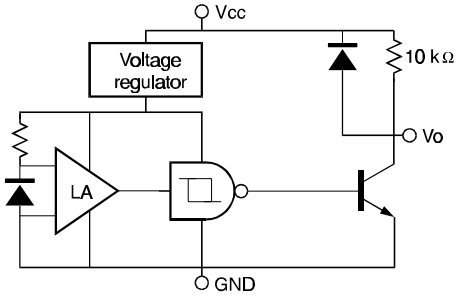
(25°C Free-Air Temperature unless otherwise noted)

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



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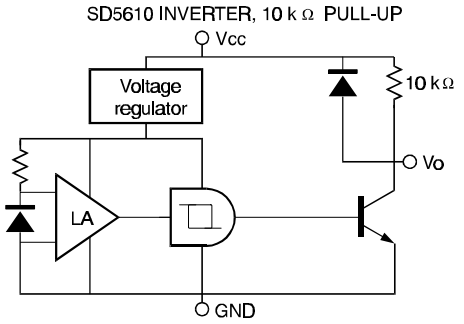
SD5600/5610

Optoschmitt Detector

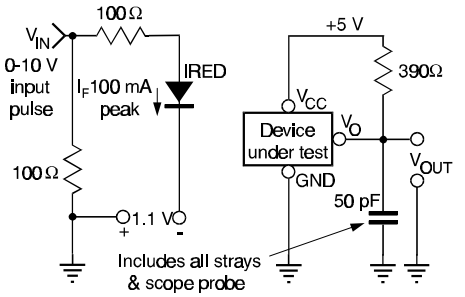
SCHEMATIC

SCH_013.cdr



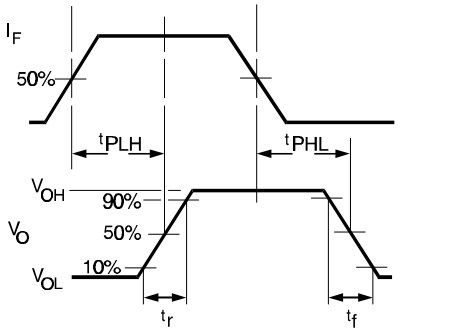
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

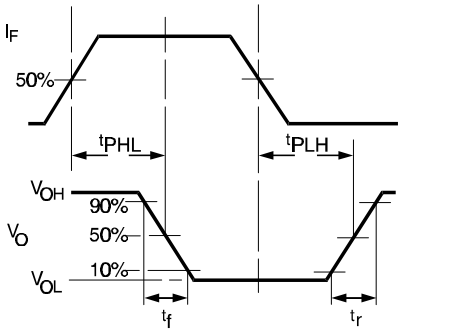


Fig. 1 Responsivity vs Angular Displacement

gra_064.ds4

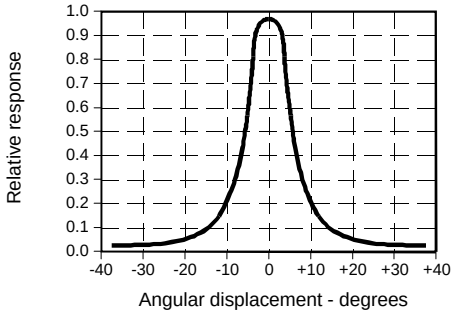
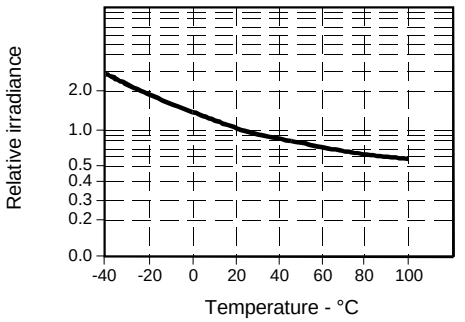


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



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SD5600/5610

Optoschmitt Detector

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

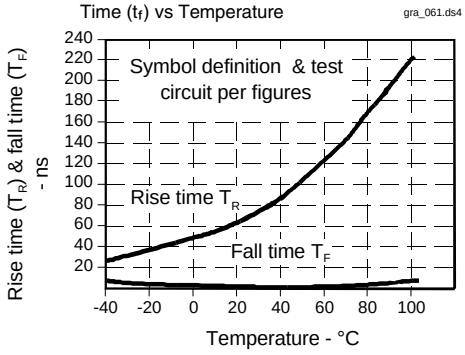


Fig. 4 Delay Time vs Temperature

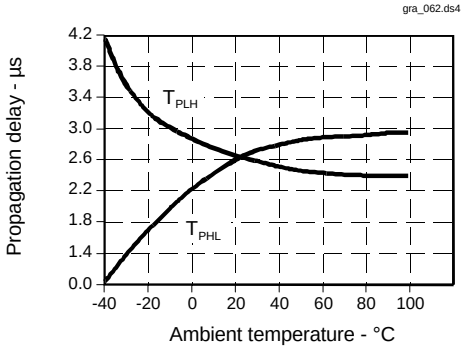
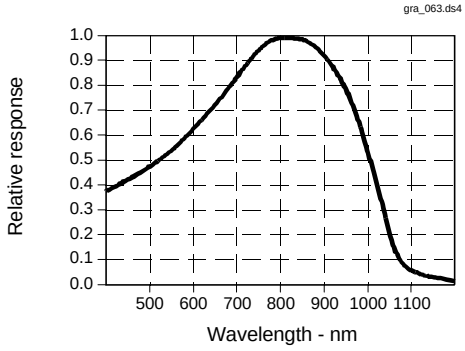


Fig. 5 Spectral Responsivity



All Performance Curves Show Typical Values

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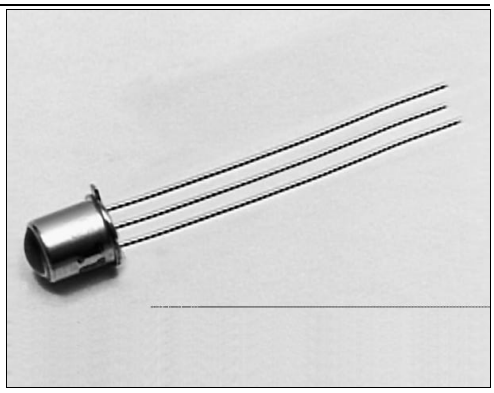
SD5620/5630

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



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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 kΩ (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.

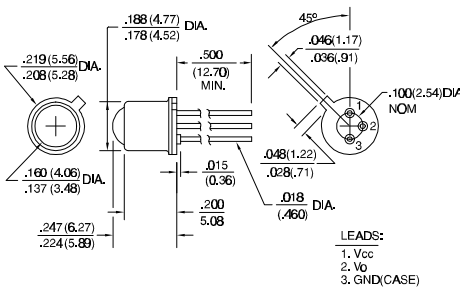
Device Polarity:

Buffer - Output is 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)



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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°C
Turn-on Threshold Irradiance (2)	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SD5620-001, SD5630-001				0.25		T_A=25°C
SD5620-002, SD5630-002				0.13		
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
SD5620		2.4				E_e=3.0 mW/cm²
SD5630		2.4				E_e=0
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SD5620				0.4		E_e=0
SD5630				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

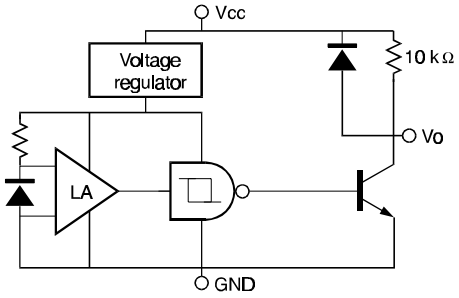
(25°C Free-Air Temperature unless otherwise noted)

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

SD5620 BUFFER, 10 k Ω PULL-UP



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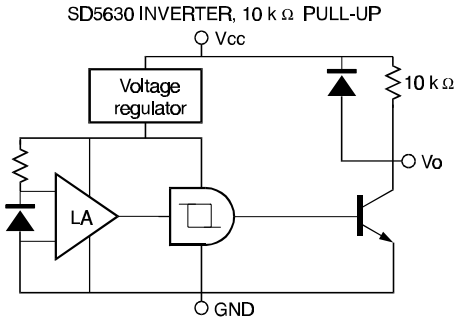
SD5620/5630

Optoschmitt Detector

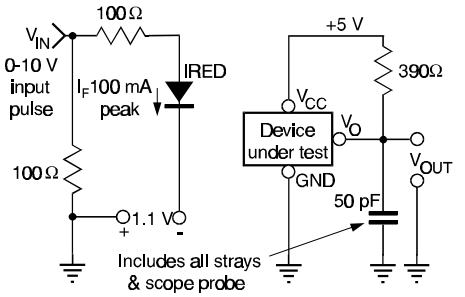
SCHEMATIC

SCH_015.cdr



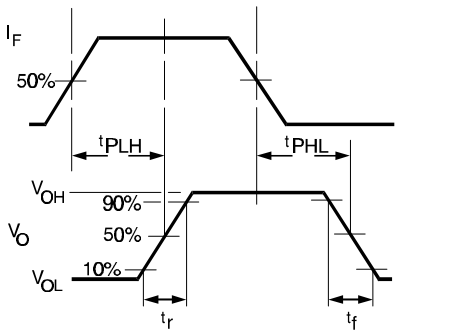
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

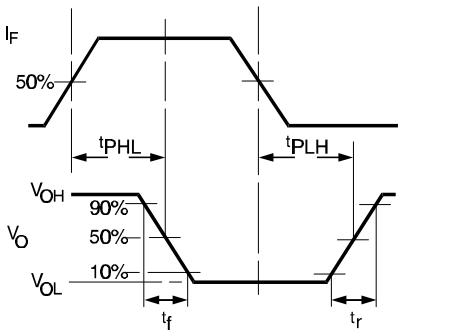


Fig. 1 Responsivity vs Angular Displacement

gra_064.ds4

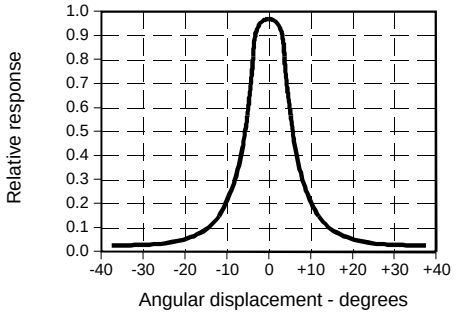


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4

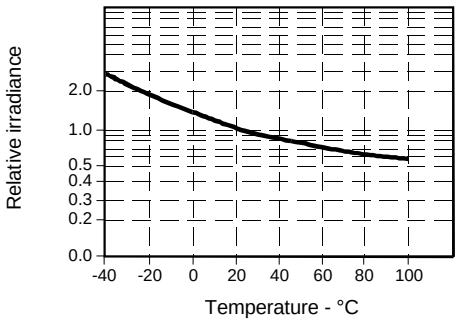


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Fig. 3 Output Rise Time (t_r) and Output Fall Time (t_f) vs Temperature

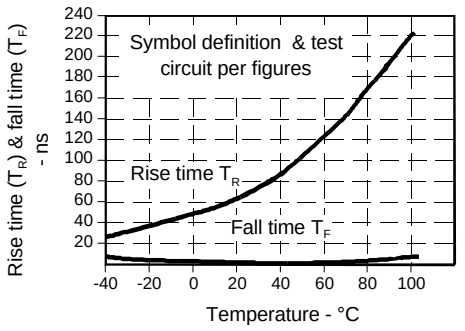


Fig. 4 Delay Time vs Temperature

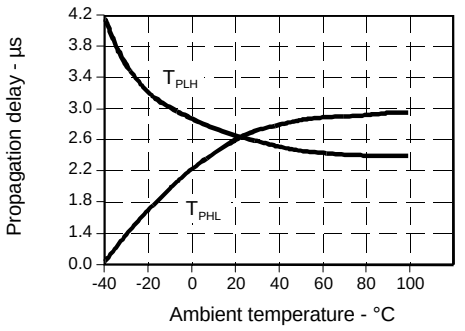
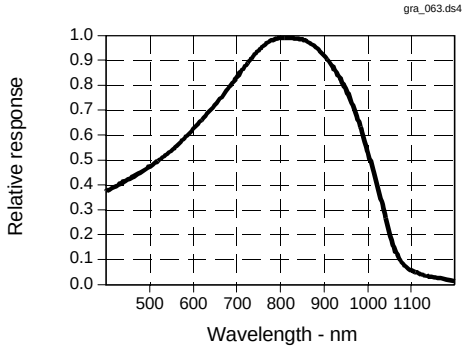


Fig. 5 Spectral Responsivity



All Performance Curves Show Typical Values

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SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		7.0	V	T_A=25°C
Turn-on Threshold Irradiance (2)	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SDP8004-301, SDP8014-301		0.06		0.37		T_A=25°C
Hysteresis (3)	HYST	33		67	%	
Supply Current	I_{CC}			15.0	mA	V_{CC}=5.5 V E_e=0 Or 3.0 mW/cm²
High Level Output Voltage	V_{OH}				V	V_{CC}=4.5 V, I_{OH}=0.8 mA
SDP8004		2.4				E_e=3.0 mW/cm²
SDP8014		2.4				E_e=0
Low Level Output Voltage	V_{OL}				V	V_{CC}=5.5 V, I_{OL}=12.8 mA
SDP8004				0.4		E_e=0
SDP8014				0.4		E_e=3.0 mW/cm²
Short Circuit Output Current	I_{OS}				mA	V_{CC}=5.5 V, Output=GND
SDP8004		-20		-100		E_e=3.0 mW/cm²
SDP8014		-20		-100		E_e=0
Operate Point Temperature Coefficient	O_{PTC}		-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=8 TTL Loads
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		2.5	5.0	µs	V_{CC}=5 V, T_A=25°C E_e=0.5 mW/cm² f=10.0 kHz, D.C.=50% R_L=8 TTL Loads
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

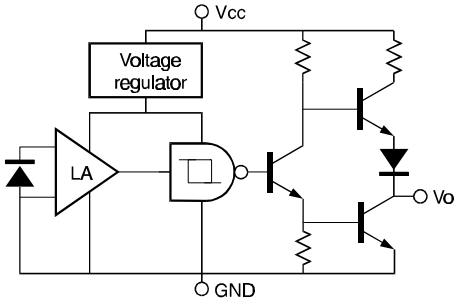
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	7 V (1)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
High Level Output Current	1.0 mA
Irradiance	25 mW/cm²
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8004 BUFFER, TOTEM-POLE



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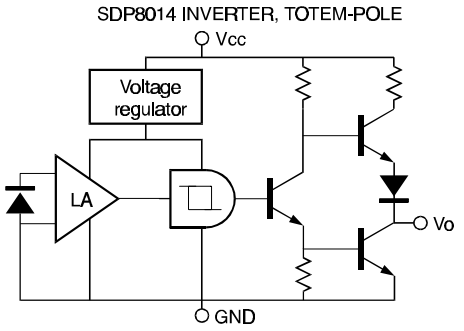
SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

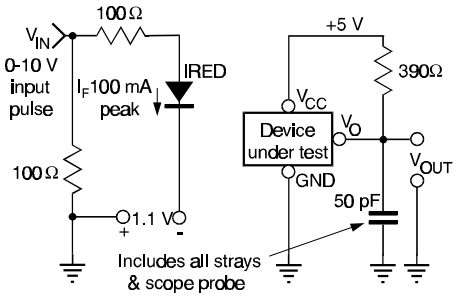
SCHEMATIC

SCH_017.cdr



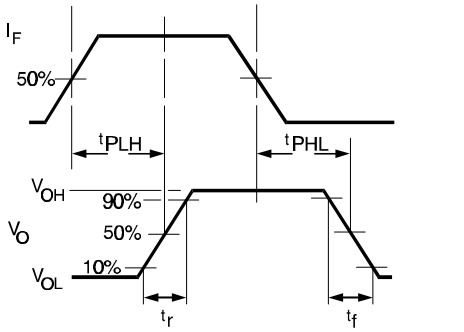
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

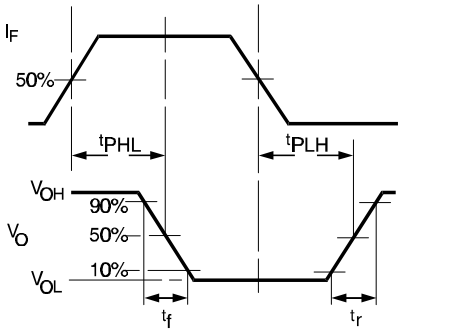


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

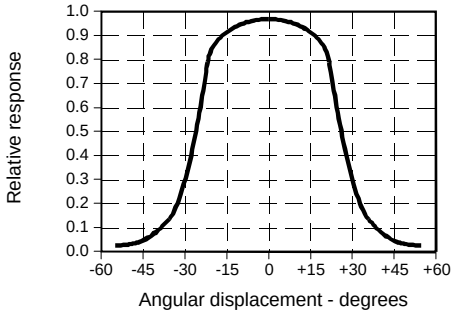
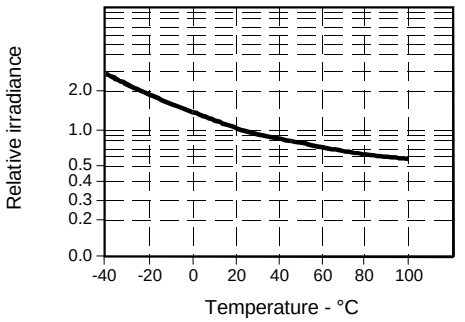


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



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SDP8004/8014

Optoschmitt Detector
Totem-Pole Output

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

gra_061.ds4

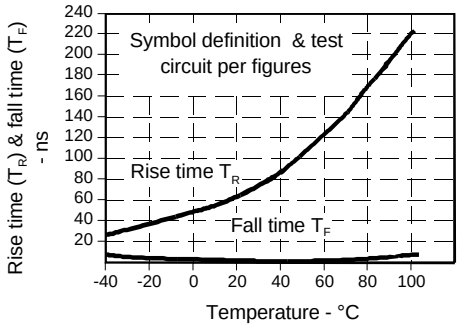


Fig. 4 Delay Time vs Temperature

gra_062.ds4

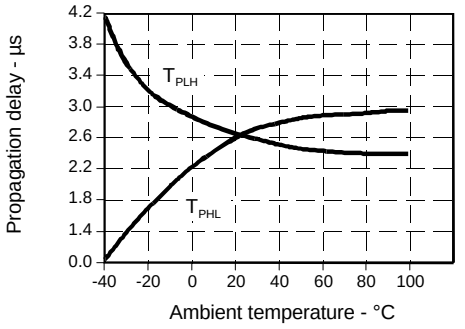
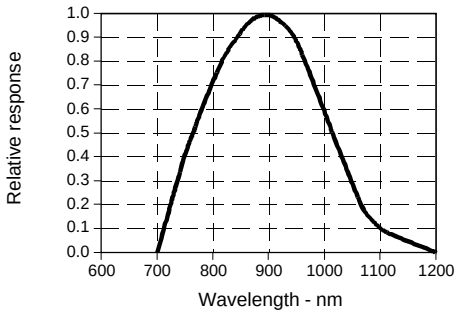


Fig. 5 Spectral Responsivity

gra_050.ds4



All Performance Curves Show Typical Values

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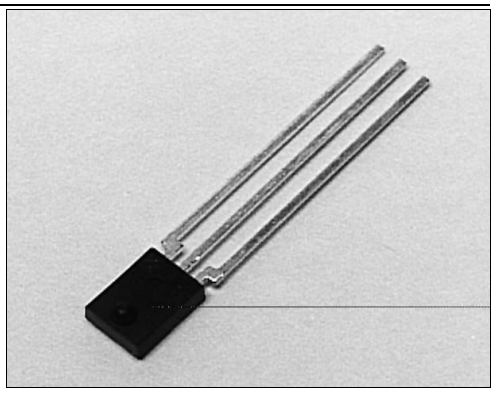
SDP8304/8314

Optoschmitt Detector
Open-Collector Output

FEATURES

- Side-looking plastic package
- 55° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- Open collector output
- Buffer (SDP8304) or inverting (SDP8314) logic available
- High noise immunity output
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--8.TIF

DESCRIPTION

The SDP8304/8314 series consists of a high speed IC molded in a side-looking black plastic package to minimize the effect of visible ambient light. The detector incorporates a Schmitt trigger which provides pulse shaping and hysteresis for noise immunity. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. The output stage is an open collector NPN transistor. This configuration allows the sensor to interface with circuit elements driven by supply voltages other than the V_{CC} supply. For additional output configuration options refer to SDP8004/8014 and SDP8604/8614.

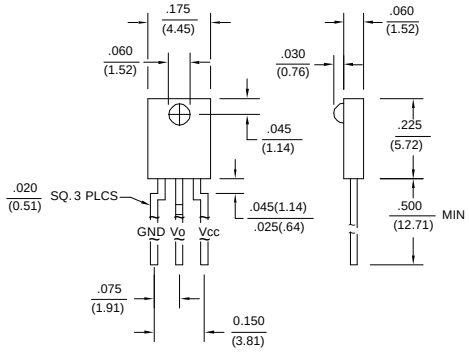
Device Polarity:

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)



DIM_026.ds4

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SDP8304/8314

Optoschmitt Detector
Open-Collector Output

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		12.0	V	T_A=25°C
Turn-on Threshold Irradiance (2)	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SDP8304-301, SDP8314-301		0.06		0.37		T_A=25°C
Hysteresis (3)	HYST	33		67	%	
Supply Current	I_{CC}			15.0	mA	V_{CC}=12 V E_e=0 Or 3.0 mW/cm²
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SDP8304				0.4		E_e=0
SDP8314				0.4		E_e=3.0 mW/cm²
High Level Output Current	I_{OH}				µA	V_{CC}=4.5 V V_{OH}=30 V
SDP8304				100		E_e=3.0 mW/cm²
SDP8314				100		E_e=0
Operate Point Temperature Coefficient			-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t_r, t_f		7.0		ns	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		2.5	5.0	µs	V_{CC}=5 V, T_A=25°C E_e=0.5 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
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

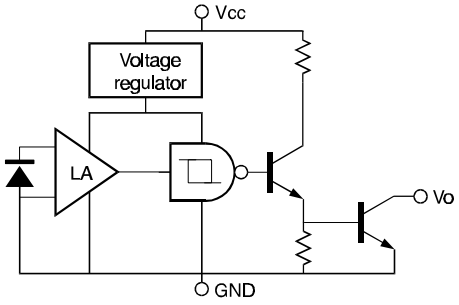
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	12 V (1)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Applied Output Voltage	35 V
Low Level Output Current	16 mA
Irradiance	25 mW/cm²
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8304 BUFFER, OPEN-COLLECTOR



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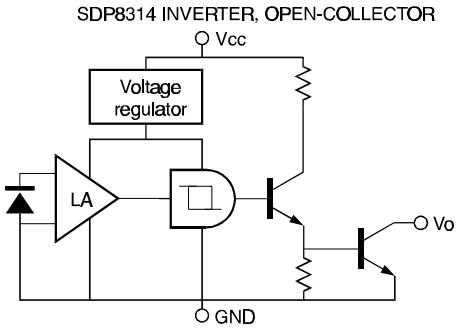
SDP8304/8314

Optoschmitt Detector
Open-Collector Output

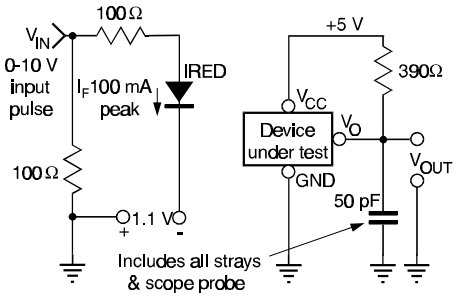
SCHEMATIC

SCH_019.cdr



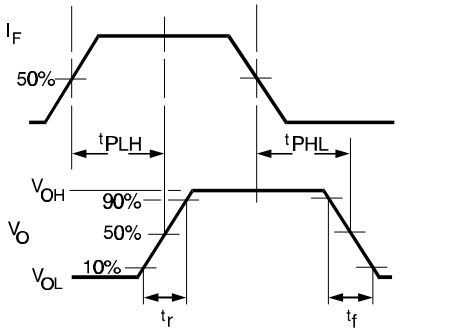
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

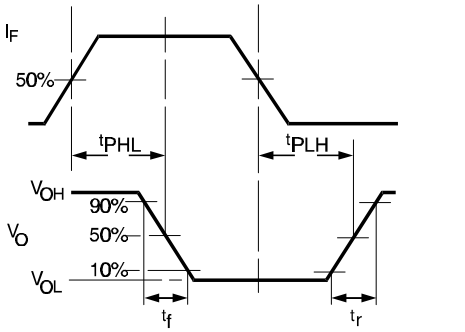


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

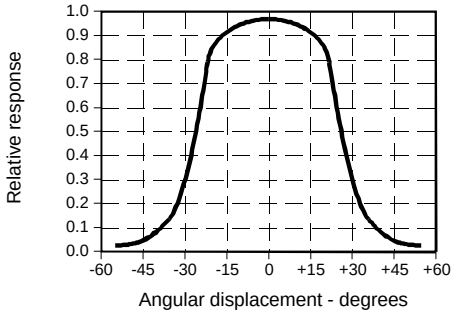
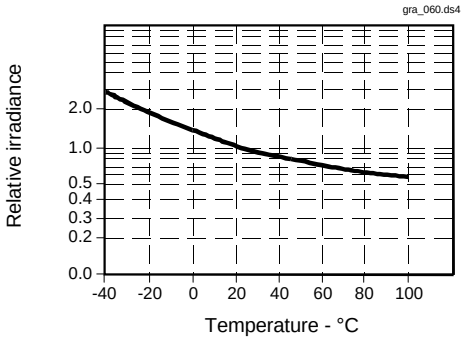


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



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SDP8304/8314

Optoschmitt Detector
Open-Collector Output

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

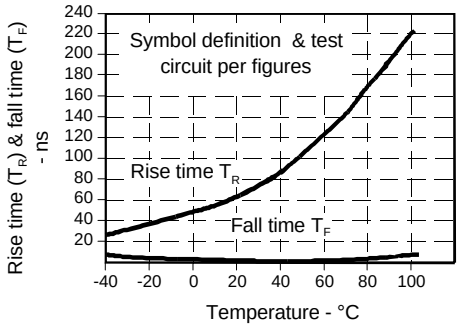


Fig. 4 Delay Time vs Temperature

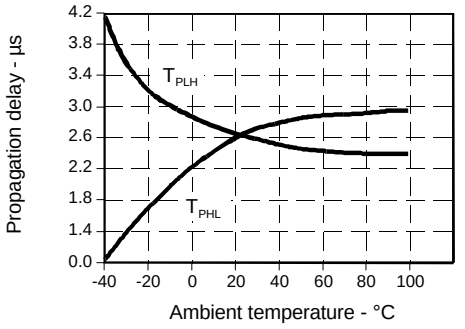
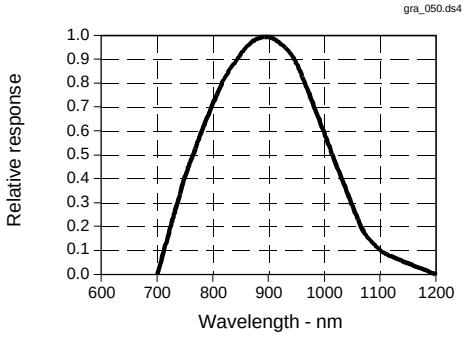


Fig. 5 Spectral Responsivity



All Performance Curves Show Typical Values

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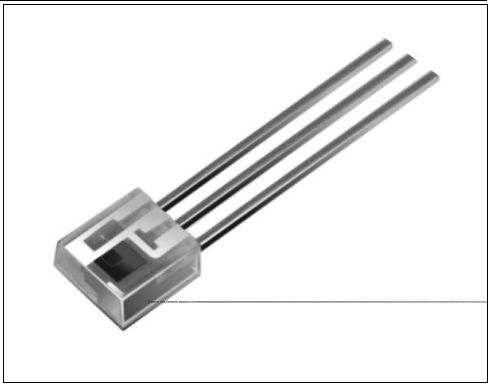
SDP8371

Precision Optoschmitt Detector

FEATURES

- Side-looking plastic package
- 180° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- Precision laser- trimmed switch points
- Highly sensitive, no lens necessary
- Wide field of view
- 30 kHz frequency range
- Spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



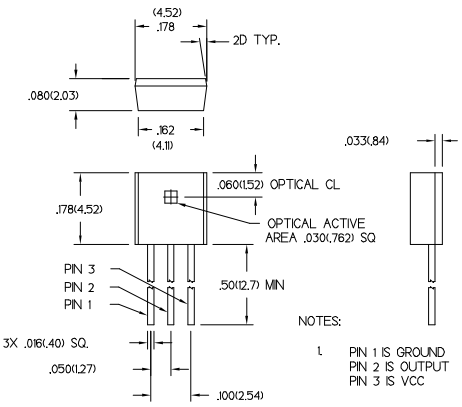
INFRA-72.TIF

DESCRIPTION

The SDP8371 is a precision Optoschmitt detector molded in a side-looking clear plastic package. The detector is a monolithic IC, consisting of a 0.030 in.(0.762 mm) square photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN open-collector output transistor. The output is a buffer logic type, switching from low to high when illumination is increased to the threshold irradiance. Detector sensitivity has been internally temperature compensated and laser trimmed for narrow sensitivity range.

OUTLINE DIMENSIONS in inches (mm)

Tolerance	3 plc decimals	±0.005(0.12)
	2 plc decimals	±0.020(0.51)



DIM_027.cdr

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SDP8371

Precision Optoschmitt Detector

ELECTRICAL CHARACTERISTICS (-40°C to +70°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.0		15.0	V	T_A=25°C
Supply Current	I_{CC}		4.0	8.0	mA	V_{CC}=5.5 V
High Level Output Current	I_{OH}			1.0	µA	V_{CC}=5 V E_e=.1mW/cm², V_{OH}=5 V
Low Level Output Voltage	V_{OL}			0.5	V	V_{CC}=5 V, I_{OL}=15 mA E_e=0
Release Point SDP8371-001	R_P	45	55	65	µW/cm²	V_{CC}=5 V (2)
Operate Point	O_P		62		µW/cm²	V_{CC}=5 V (2)
Hysteresis (3)	HYST	8	12	20	%	
Operate Point Temperature Coefficient			-1.0		%/°C	Emitter @ Constant Temperature
Output Rise Time	t_r		200		ns	R_L=390 Ω, C_L=50 pF
Output Fall Time	t_f		200		ns	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 880 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

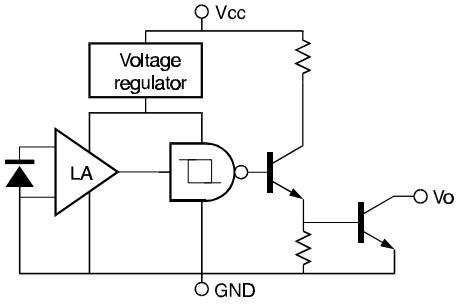
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	15 V (1)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Applied Output Voltage	15 V
Output Current	25 mA
Operating Temperature Range	-40°C to 70°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 70°C.

SCHEMATIC

SDP8371 BUFFER, OPEN-COLLECTOR



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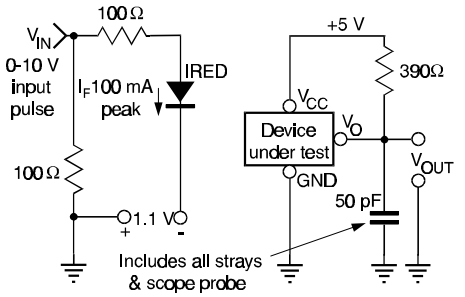
SDP8371

Precision Optoschmitt Detector

SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM

cir_013.cdr

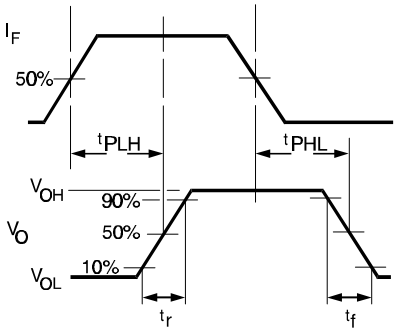


Fig. 1 Responsivity vs Angular Displacement

gra_066.ds4

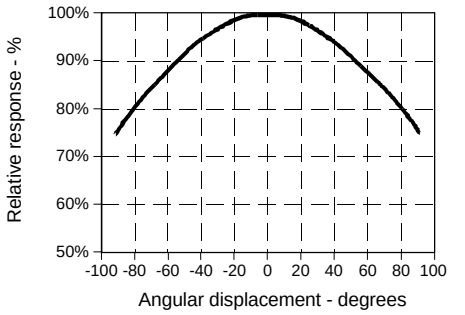


Fig. 2 Propagation Delay as a Function of Illumination Intensity

gra_067.ds4

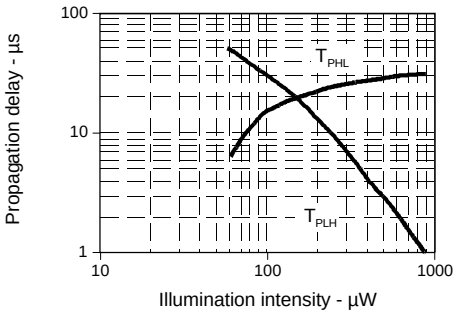


Fig. 3 Low Level Output Voltage vs Temperature

gra_068.ds4

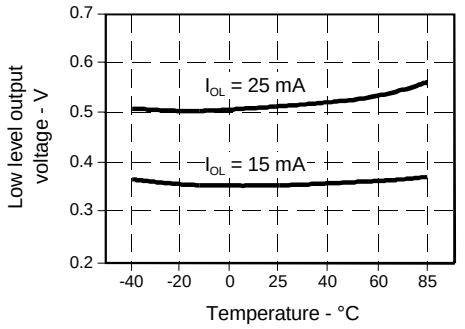
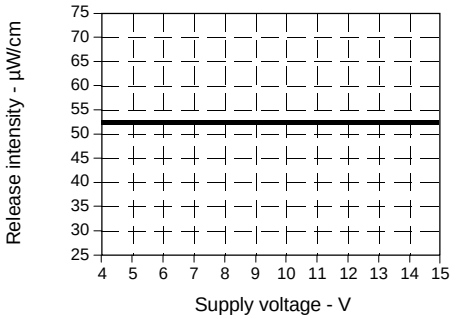


Fig. 4 Sensitivity vs Supply Voltage

gra_069.ds4



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SDP8371

Precision Optoschmitt Detector

Fig. 5 Spectral Responsivity

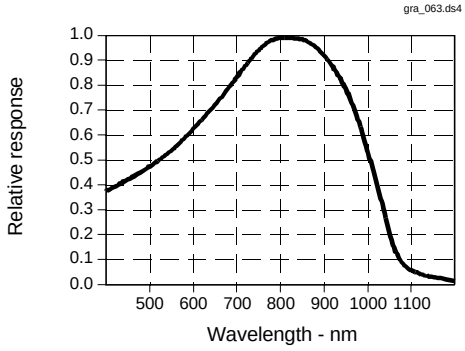
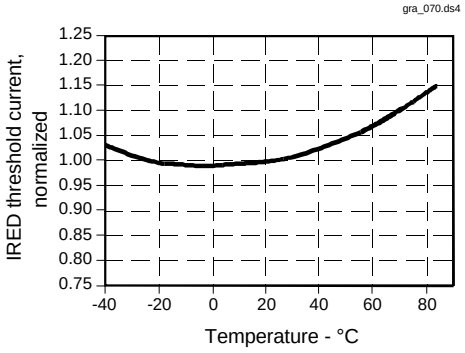


Fig. 6 Sensitivity vs Temperature



All Performance Curves Show Typical Values

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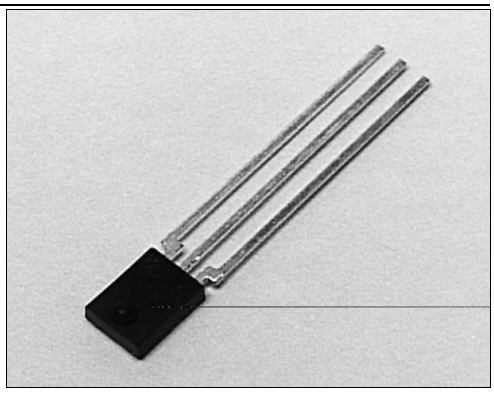
SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

FEATURES

- Side-looking plastic package
- 55° (nominal) acceptance angle
- TTL/LSTTL/CMOS compatible
- 10Ω pull- up output
- Buffer or inverting logic available
- High noise immunity output
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--8.TIF

DESCRIPTION

The SDP8604/8614 series consists of a high speed IC molded in a side-looking black plastic package to minimize the effect of visible ambient light. The detector incorporates a Schmitt trigger which provides pulse shaping and hysteresis for noise immunity. Detector output is an NPN silicon transistor with a 10 kΩ (nominal) pull-up resistor. This option eliminates the need for an external load resistor to generate an output signal voltage. Output rise and fall times are independent of rate of change of incident light. Detector sensitivity has been internally temperature compensated. For additional output configuration options refer to SDP8004/8014 and SDP8304/8314.

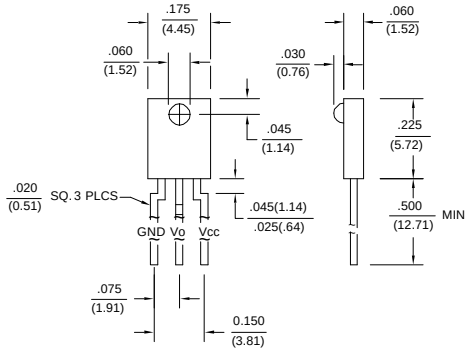
Device Polarity:

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)



DIM_026.ds4

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SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		12.0	V	T_A=25°C
Turn-on Threshold Irradiance (2)	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SDP8604-301, SDP8614-301		0.06		0.37		T_A=25°C
Hysteresis (3)	HYST	33		67	%	
Supply Current	I_{CC}			15.0	mA	V_{CC}=12 V E_e=0 Or 3.0 mW/cm²
High Level Output Voltage	V_{OH}				V	V_{CC}=4.5 V, I_{OH}=0
SDP8604		2.4				E_e=3.0 mW/cm²
SDP8614		2.4				E_e=0
Low Level Output Voltage	V_{OL}				V	V_{CC}=4.5 V, I_{OL}=12.8 mA
SDP8604				0.4		E_e=0
SDP8614				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			-0.76		%/°C	Emitter @ Constant Temperature
Output Rise Time, Output Fall Time	t_r, t_f		70		ns	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
Propagation Delay, Low-High, High-Low	t_{PLH}, t_{PHL}		2.5	5.0	µs	V_{CC}=5 V, T_A=25°C E_e=0 or 3.0 mW/cm² f=10.0 kHz, D.C.=50% R_L=390 Ω
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

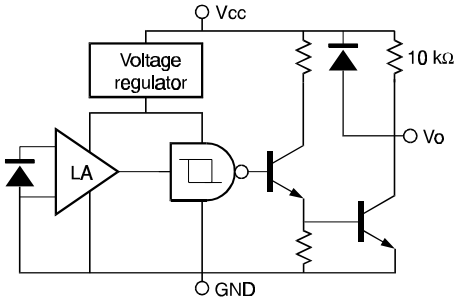
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	12 V (1)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Low Level Output Current	16.0 mA
Irradiance	25 mW/cm²
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8604 BUFFER, 10 k Ω PULL-UP



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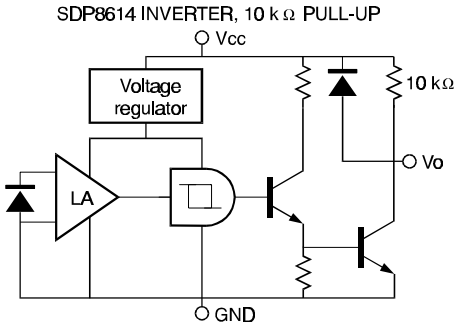
SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

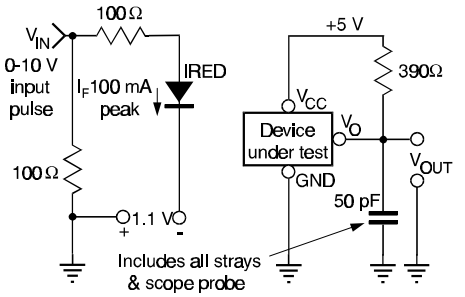
SCHEMATIC

SCH_021.cdr



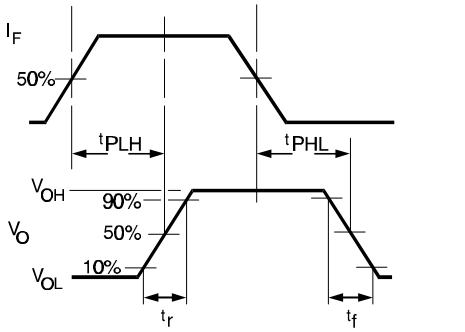
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

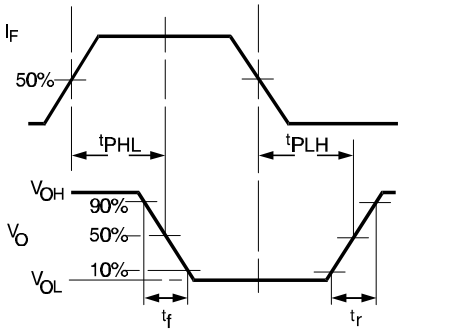


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

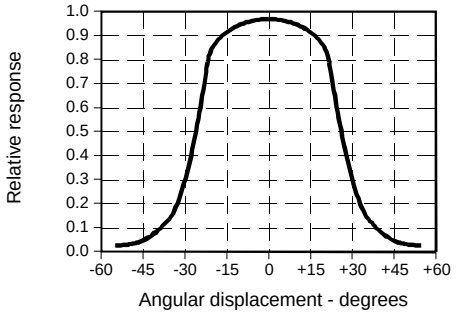
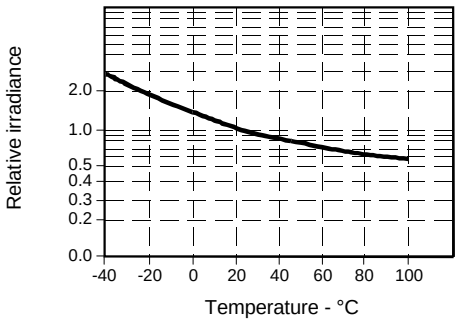


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



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SDP8604/8614

Optoschmitt Detector
10 k Ohm Pull-Up Output

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

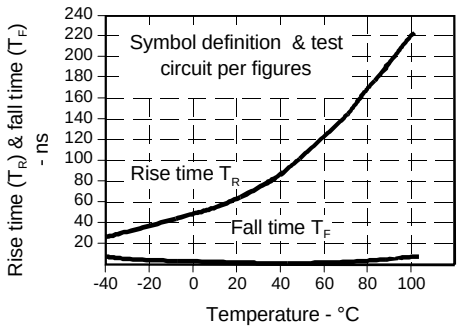


Fig. 4 Delay Time vs Temperature

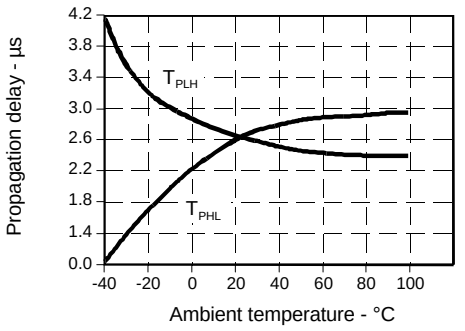
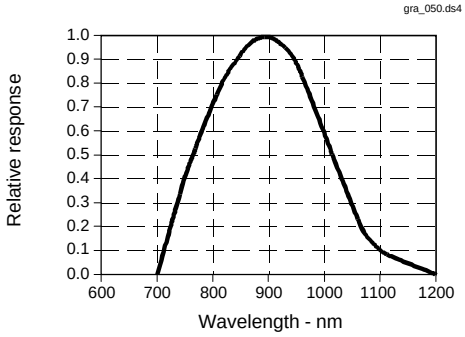


Fig. 5 Spectral Responsivity



All Performance Curves Show Typical Values

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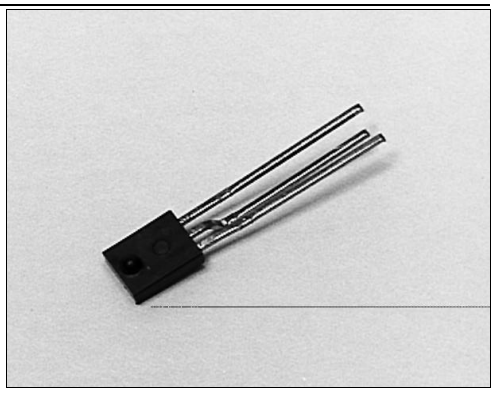
SDP86XX

Optoschmitt Detector

FEATURES

- Side-looking plastic package
- 55° (nominal) acceptance angle
- Wide sensitivity ranges
- TTL/LSTTL/CMOS compatible
- Buffer (SDP8600/8601/8602) or inverting (SDP8610/8611/8612) logic available
- Three different lead spacing arrangements
- Mechanically and spectrally matched to SEP8506 and SEP8706 infrared emitting diodes



INFRA--6.TIF

DESCRIPTION

The SDP86XX series is a family of single chip Optoschmitt IC detectors molded in a side-looking black plastic package to minimize the effect of visible ambient light. The photodetector consists of a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor with a 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. Flexibility of use is enhanced by a choice of three different lead configurations; in-line (SDP8601/8611), 0.05 in.(1.27 mm) offset pin circle (SDP8600/8610) and 0.10 in. (2.54 mm) offset center lead (SDP8602/8612).

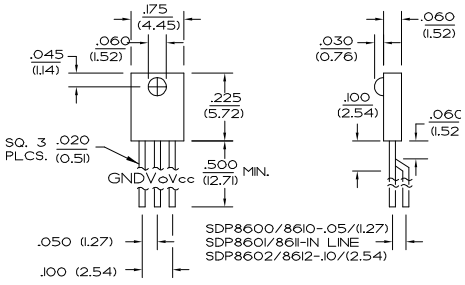
Device Polarity:

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)



DIM_028.cdr

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SDP86XX

Optoschmitt Detector

ELECTRICAL CHARACTERISTICS (-40°C to +85°C unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		12.0	V	T_A=25°C
Turn-on Threshold Irradiance	$E_{eT(+)}$				mW/cm²	V_{CC}=5 V
SDP86XX-001				2.5		T_A=25°C
SDP86XX-002				1.2		(2)
SDP86XX-003				0.6		
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}=12 V
High Level Output Voltage	V_{OH}				V	V_{CC}=5 V, I_{OH}=0
SDP8600/8601/8602		2.4				E_e=3.0 mW/cm²
SDP8610/8611/8612		2.4				E_e=0
Low Level Output Voltage	V_{OL}				V	V_{CC}=5 V, I_{OL}=12.8 mA
SDP8600/8601/8602				0.4		E_e=0
SDP8610/8611/8612				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

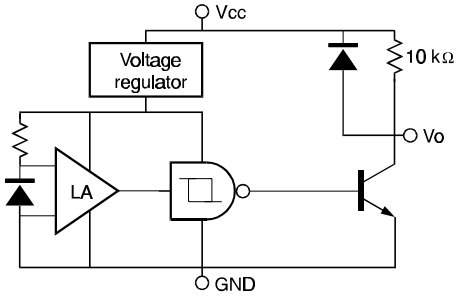
(25°C Free-Air Temperature unless otherwise noted)

Supply Voltage	12 V (1)
Duration of Output	
Short to V_{CC} or Ground	1.0 sec
Output Current	18 mA
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-40°C to 85°C
Soldering Temperature (5 sec)	240°C

Notes
1. Derate linearly from 25°C to 5.5 V at 85°C.

SCHEMATIC

SDP8600/8601/8602 BUFFER, 10 kΩ PULL-UP



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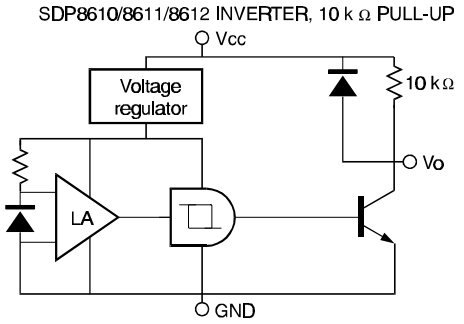
SDP86XX

Optoschmitt Detector

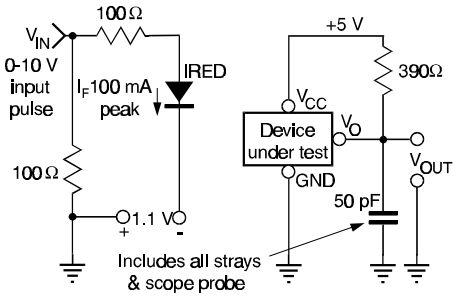
SCHEMATIC

SCH_024.cdr



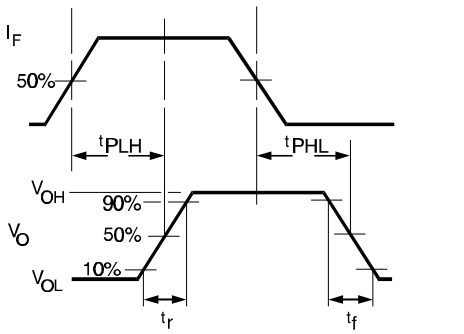
SWITCHING TIME TEST CIRCUIT

cir_007.cdr



SWITCHING WAVEFORM FOR BUFFERS

cir_013.cdr



SWITCHING WAVEFORM FOR INVERTERS

cir_011.cdr

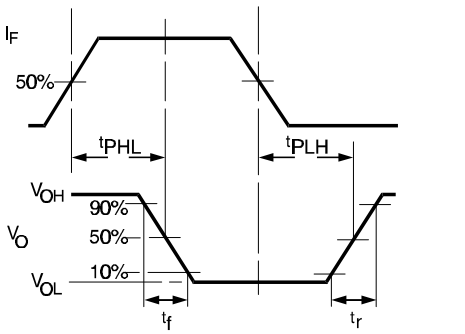


Fig. 1 Responsivity vs Angular Displacement

gra_065.ds4

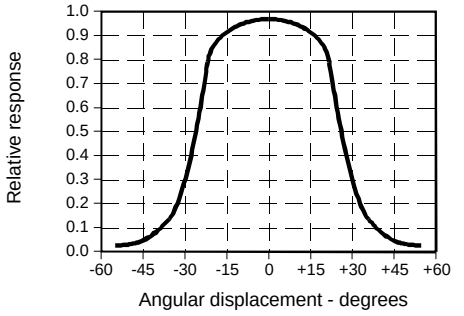
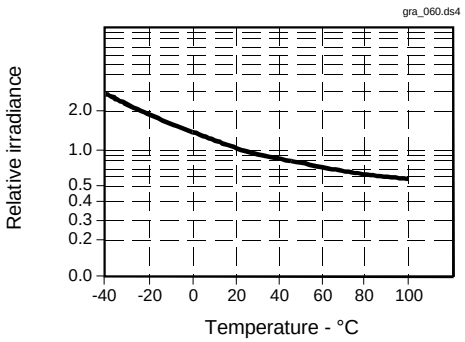


Fig. 2 Threshold Irradiance vs Temperature

gra_060.ds4



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SDP86XX

Optoschmitt Detector

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

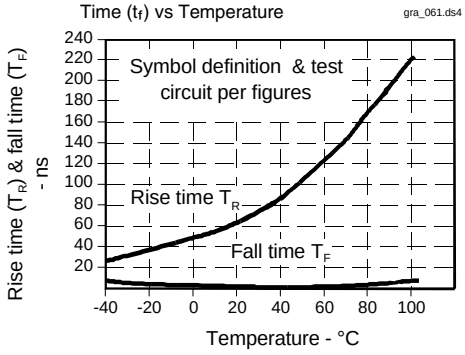


Fig. 4 Delay Time vs Temperature

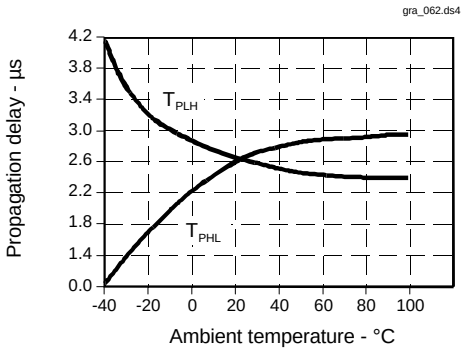
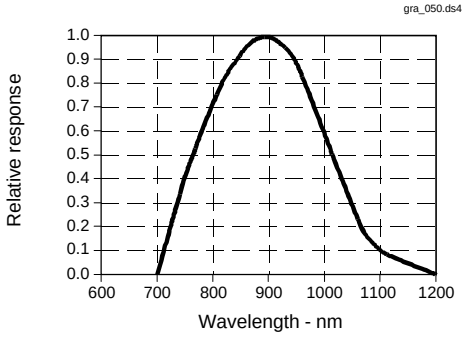


Fig. 5 Spectral Responsivity



All Performance Curves Show Typical Values

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