IR Sensor Module For Reflective Sensor, Light Barrier, And Fast Proximity Applications

23196

LINKS TO ADDITIONAL RESOURCES

Product Page | Marking | Packages | Holders | Bends and Cuts

DESCRIPTION

The TSSP40.. series are compact infrared detector modules for presence and fast proximity sensing applications. They provide an active low output in response to infrared bursts at 940 nm. The frequency of the burst should correspond to the carrier frequency shown in the parts table.

This component has not been qualified according to automotive specifications.

FEATURES

- Presence sensor: up to 2 m distance, find more info at: www.vishay.com/doc?49009
- Light barrier: up to 12 m distance, TSAL6200 with I_F = 50 mA, find more info at: www.vishay.com/doc?49650
- Fast proximity: up to 2 m range at 5 ms response time, find more info at: www.vishay.com/doc?82741
- Supply voltage: 2.0 V to 5.5 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

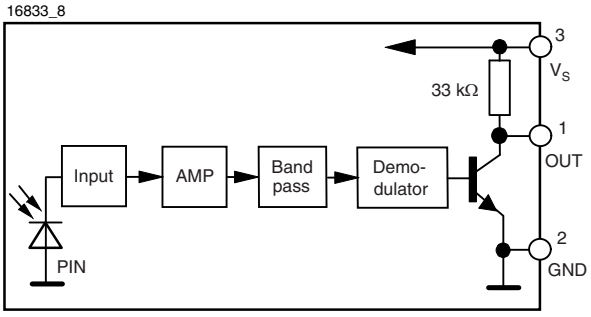
APPLICATIONS

- Reflective sensors for hand dryers, towel or soap dispensers, water faucets, toilet flush
- Vending machine fall detection
- Security and pet gates
- Person or object vicinity switch
- Fast proximity sensors for toys, robotics, drones, and other consumer and industrial uses

DESIGN SUPPORT TOOLS

- 3D models
- Window size calculator

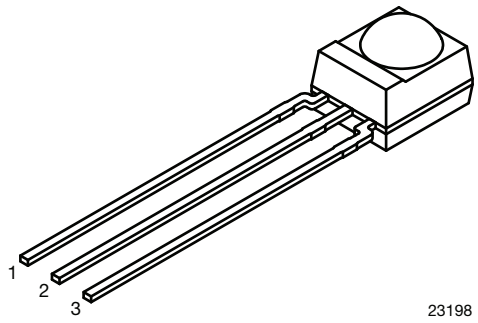
BLOCK DIAGRAM



MECHANICAL DATA

Pinning:

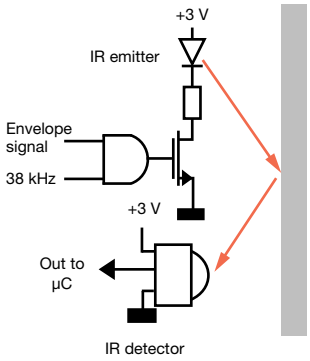
1 = OUT, 2 = GND, 3 = V_S



ORDERING CODE

TSSP40.. - 2160 pieces in tubes

PRESENCE SENSING



PARTS TABLE		
Carrier frequency	38 kHz	TSSP4038
	56 kHz	TSSP4056
Package		Mold
Pinning		1 = OUT, 2 = GND, 3 = V_S
Dimensions (mm)		6.0 W x 6.95 H x 5.6 D
Mounting		Leaded
Application		Presence sensors, fast proximity sensors
Special options		• Narrow optical filter: www.vishay.com/doc?81590 • Wide optical filter: www.vishay.com/doc?82726

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Supply voltage (pin 3)		V_S	-0.3 to +6.0	V
Supply current (pin 3)		I_S	5	mA
Output voltage (pin 1)		V_O	-0.3 to 5.5	V
Voltage at output to supply		$V_S - V_O$	-0.3 to (V_S + 0.3)	V
Output current (pin 1)		I_O	5	mA
Junction temperature		T_j	100	°C
Storage temperature range		T_{stg}	-25 to +85	°C
Operating temperature range		T_{amb}	-25 to +85	°C
Power consumption	$T_{amb} \leq 85$ °C	P_{tot}	10	mW

Note

- Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect the device reliability

ELECTRICAL AND OPTICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Supply current (pin 3)	E_v = 0, V_S = 3.3 V	I_{SD}	0.25	0.35	0.45	mA
	E_v = 40 klx, sunlight	I_{SH}	-	0.45	-	mA
Supply voltage		V_S	2.0	-	5.5	V
Transmission distance	E_v = 0, test signal see Fig. 1, IR diode TSAL6200, I_F = 50 mA	d	-	12	-	m
Output voltage low (pin 1)	I_{OSL} = 0.5 mA, E_e = 2 mW/m², test signal see Fig. 1	V_{OSL}	-	-	100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 4/f_0 < t_{po} < t_{pi} + 4/f_0$, test signal see Fig. 1	$E_{e\,min.}$	-	0.4	0.7	mW/m²
Maximum irradiance	Pulse width tolerance: $t_{pi} - 4/f_0 < t_{po} < t_{pi} + 4/f_0$, test signal see Fig. 1	$E_{e\,max.}$	30	-	-	W/m²
Directivity	Angle of half transmission distance	$\varphi_{1/2}$	-	± 45	-	°

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

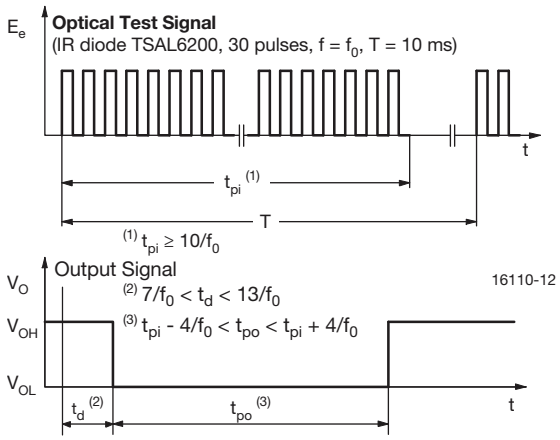


Fig. 1 - Output Active Low

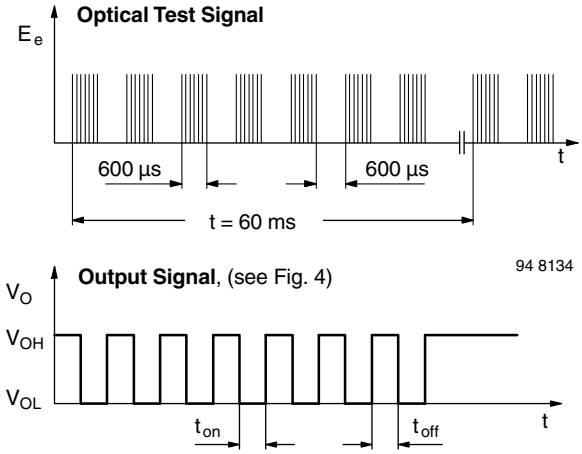


Fig. 3 - Output Function

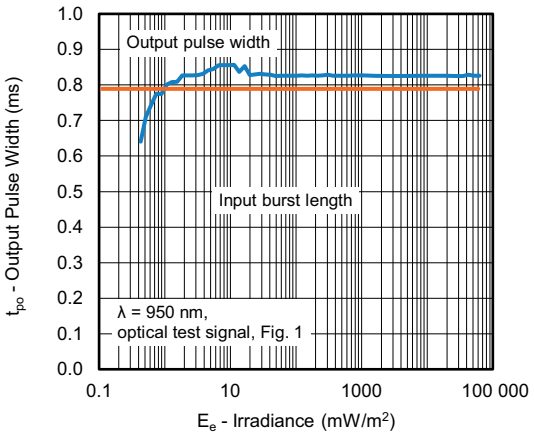


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

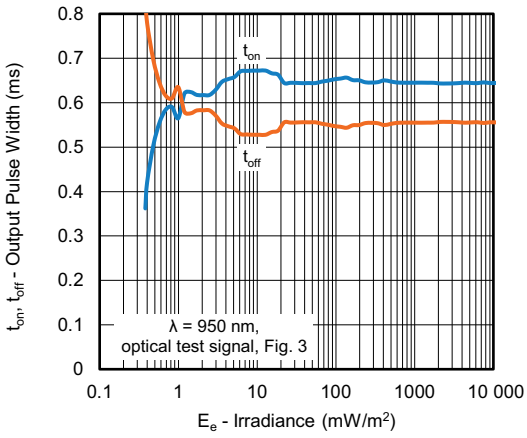


Fig. 4 - Output Pulse Diagram

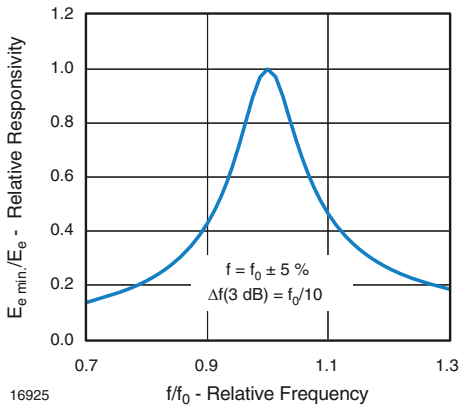


Fig. 5 - Frequency Dependence of Responsivity

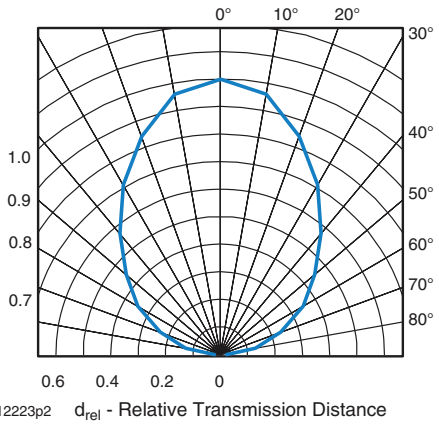


Fig. 8 - Directivity

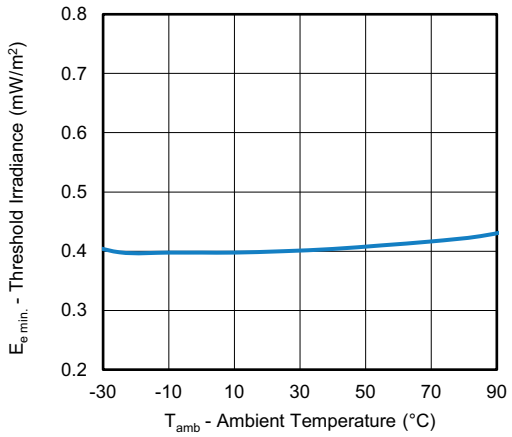


Fig. 6 - Sensitivity vs. Ambient Temperature

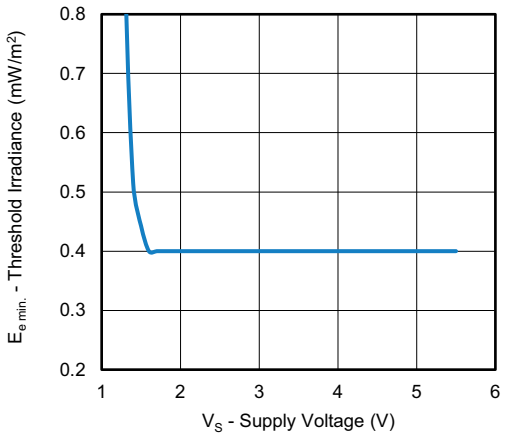


Fig. 9 - Sensitivity vs. Supply Voltage

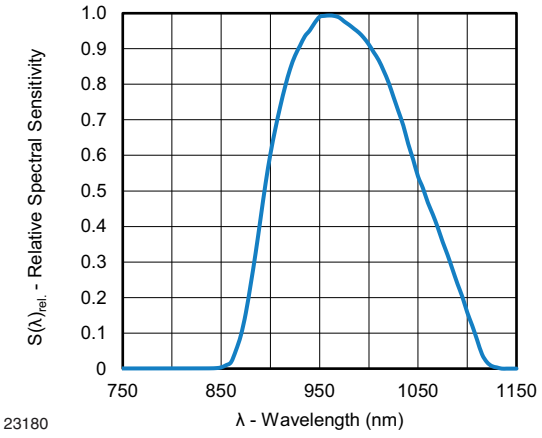
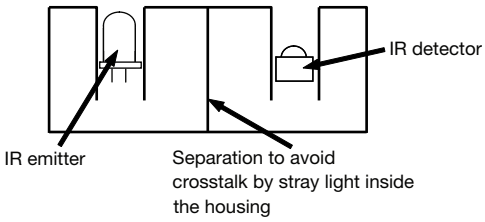


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

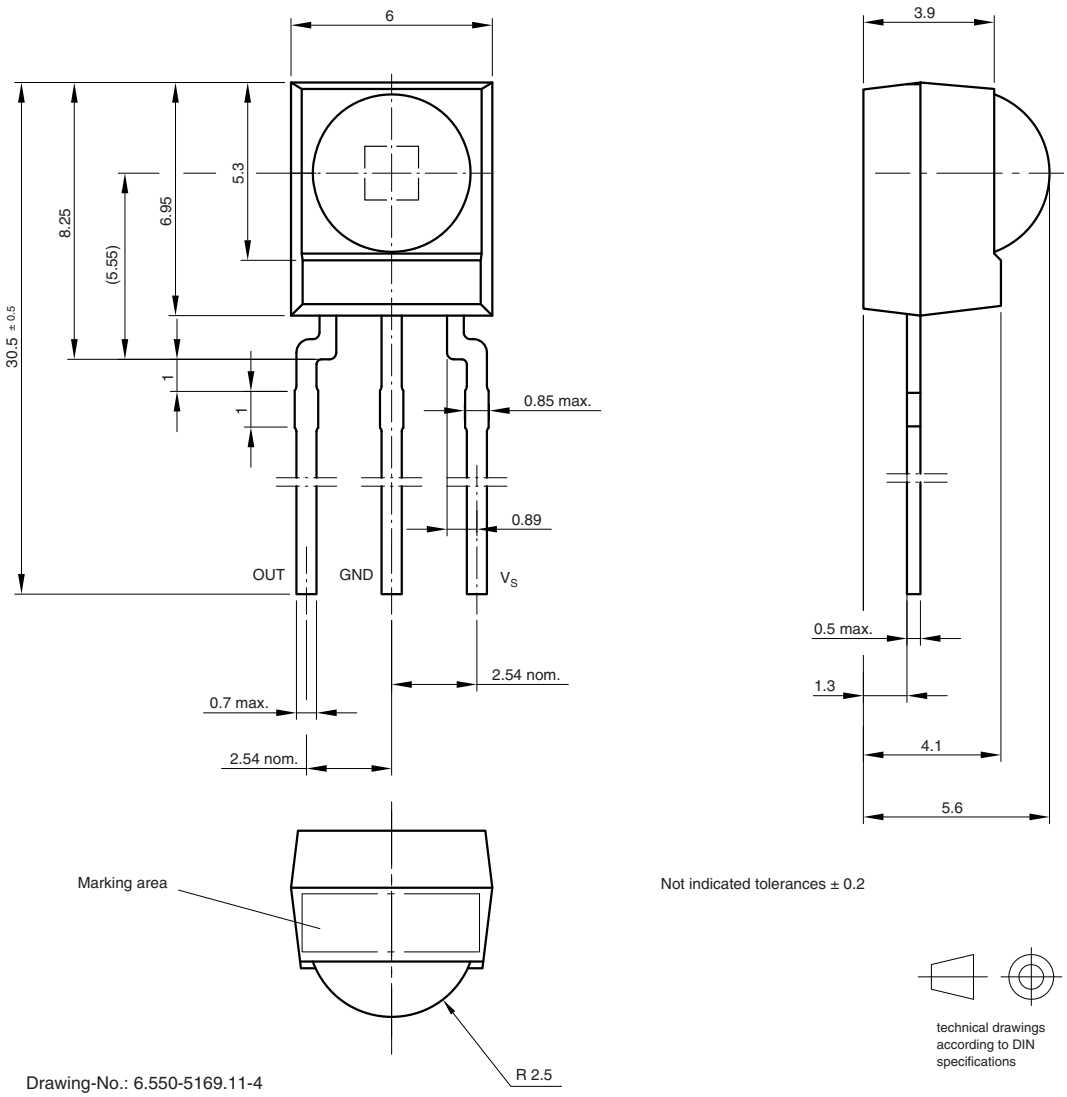
The typical application of these devices is a reflective or beam break sensor with active low “detect” or “no detect” information contained in its output. The TSSP4056 is also suitable for fast (~ 5 ms) proximity sensor applications for ranges between 10 cm and 2 m. Please see application note “Vishay’s TSSP4056 Sensor for Fast Proximity Sensing” (www.vishay.com/doc?82741).

Example for a sensor hardware:



There should be no common window in front of the emitter and detector in order to avoid crosstalk via guided light through the window.

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.11-4
Issue: 13; 17.12.08
16003

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