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TSSP40..SS1XB

Vishay Semiconductors

IR Receiver Module for Light Barrier Systems



LINKS TO ADDITIONAL RESOURCES











DESCRIPTION

The TSSP40..SS1XB are compact infrared detector modules for presence sensing applications. They provide an active low output in response to infrared bursts at 940 nm. The TSSP40..SS1XB are 20 x less sensitive than the TSSP40.., for ease of use in reflective applications at less than 1 m range where high sensitivity is not needed and can complicate the design.

This component has not been qualified to automotive specifications.

FEATURES

 Presence sensor: up to 2 m distance, find more info at: www.vishay.com/doc?49009



 \bullet Light barrier: up to 12 m distance, TSAL6200 with $I_{\text{F}} = 50$ 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

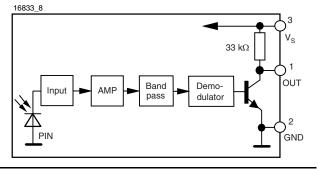
APPLICATIONS

- 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



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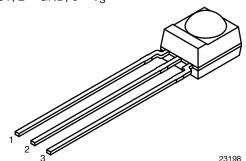
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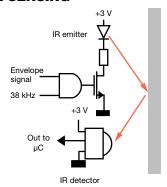
MECHANICAL DATA

Pinning:

 $1 = OUT, 2 = GND, 3 = V_S$



PRESENCE SENSING



ORDERING CODE

TSSP40..SS1XB - 2160 pieces in tubes

PARTS TABLE							
Carrier frequency	38 kHz	TSSP4038SS1XB					
	56 kHz	TSSP4056SS1XB					
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)		Vo	-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)		Io	5	mA				
Junction temperature		Tj	100	°C				
Storage temperature range		T _{stg}	-25 to +85	°C				
Operating temperature range		T _{amb}	-25 to +85	°C				
Soldering temperature	t ≤ 10 s, 1 mm from case	T _{sd}	260	°C				
Power consumption	T _{amb} ≤ 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



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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			
Supply current (pin 3)	$E_v = 40$ klx, sunlight	I _{SH}	-	0.45	-	mA			
Supply voltage		Vs	2.0	-	5.5	V			
Transmission distance	$E_v = 0$, test signal see Fig. 1, IR diode TSAL6200, $I_F = 50$ mA	d	-	2.4	-	m			
Output voltage low (pin 1)	$I_{OSL} = 0.5 \text{ mA}, E_e = 2 \text{ mW/m}^2,$ 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.}	-	7	14	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	Ψ1/2	-	± 45	-	deg			

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

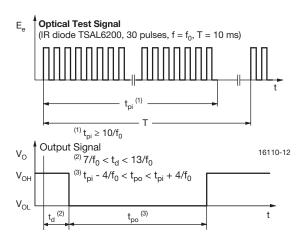
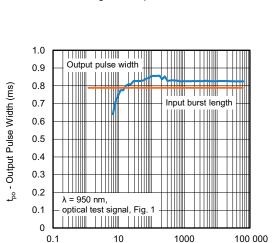
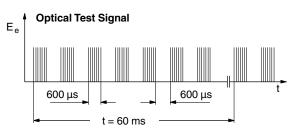


Fig. 1 - Output Active Low



 $\rm E_{\rm e} \mbox{-} Irradiance \mbox{ (mW/m}^2)$ Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



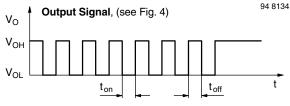


Fig. 3 - Output Function

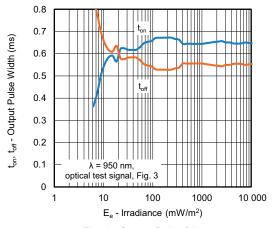


Fig. 4 - Output Pulse Diagram



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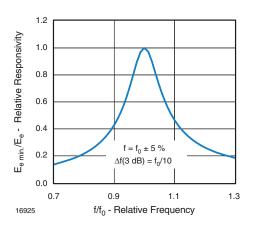


Fig. 5 - Frequency Dependence of Responsivity

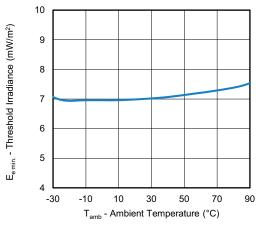


Fig. 6 - Sensitivity vs. Ambient Temperature

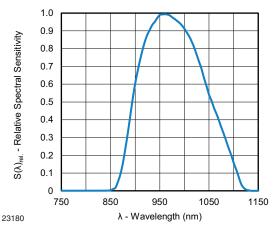


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

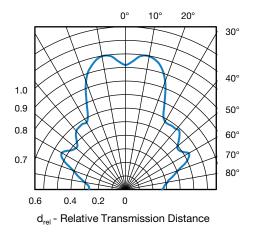


Fig. 8 - Horizontal Directivity

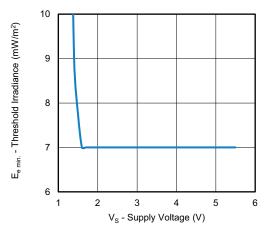
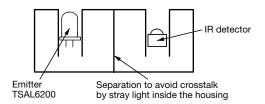


Fig. 9 - Sensitivity vs. Supply Voltage

The typical application of this device is a reflective or beam break sensor with active low "detect" or "no detect" information contained in its output. The TSSP40.. is also suitable for fast (~ 15 ms) proximity sensor applications for ranges between 10 cm and 2 m, if a burst pattern with variable intensity is used.

Example for a sensor hardware:



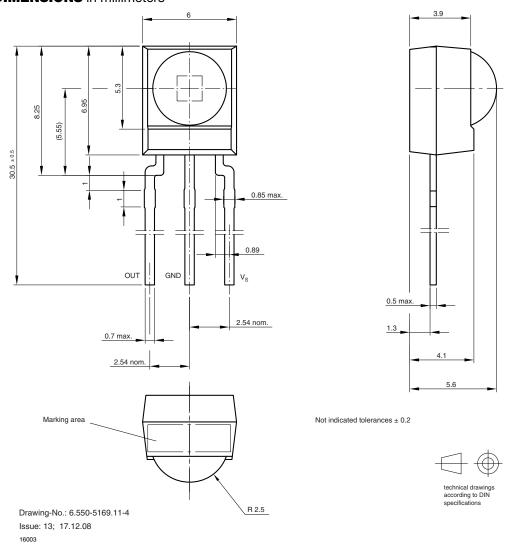
There should be no common window in front of the emitter and detector in order to avoid crosstalk via guided light through the window.



TSSP40..SS1XB

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PACKAGE DIMENSIONS in millimeters



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