



IR Receiver Module for Light Barrier Systems



23196

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
- 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



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



Product Page



Marking



Packages



Holders



Bends and Cuts

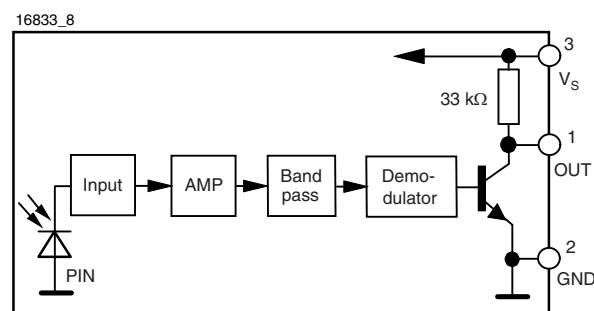
APPLICATIONS

- 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

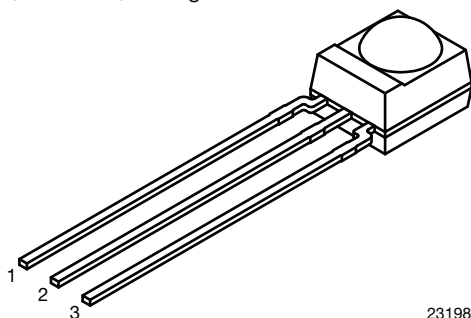




MECHANICAL DATA

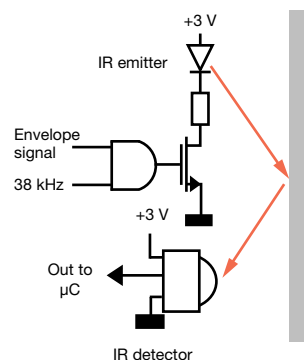
Pinning:

1 = OUT, 2 = GND, 3 = V_S



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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	<ul style="list-style-type: none"> 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
Soldering temperature	$t \leq 10$ s, 1 mm from case	T_{sd}	260	°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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current (pin 3)	$E_v = 0$, $V_S = 3.3\text{ V}$	I_{SD}	0.25	0.35	0.45	mA
	$E_v = 40\text{ klx}$, 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, $I_F = 50\text{ mA}$	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	$E_e\text{ min.}$	-	7	14	mW/m^2
Maximum irradiance	Pulse width tolerance: $t_{pi} - 4/f_0 < t_{po} < t_{pi} + 4/f_0$, test signal see Fig. 1	$E_e\text{ max.}$	30	-	-	W/m^2
Directivity	Angle of half transmission distance	$\phi_{1/2}$	-	± 45	-	deg

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

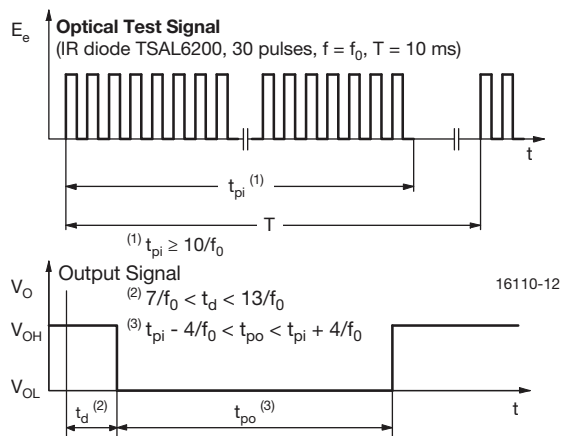


Fig. 1 - Output Active Low

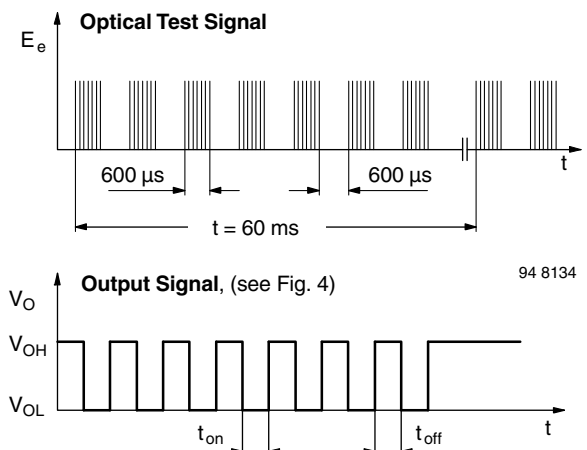


Fig. 3 - Output Function

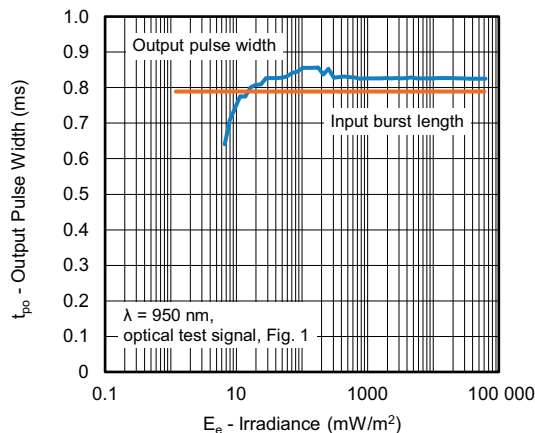


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

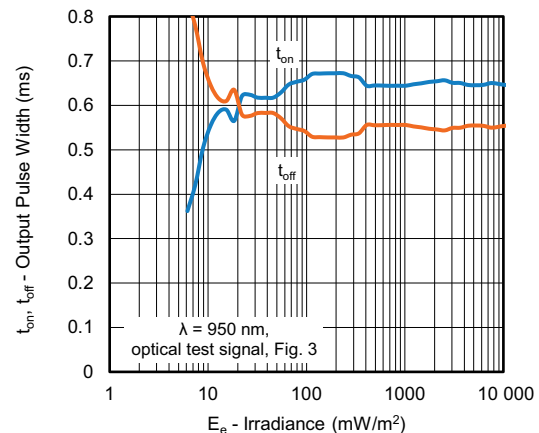


Fig. 4 - Output Pulse Diagram

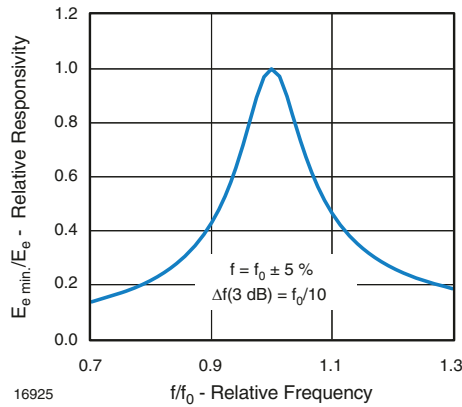


Fig. 5 - Frequency Dependence of Responsivity

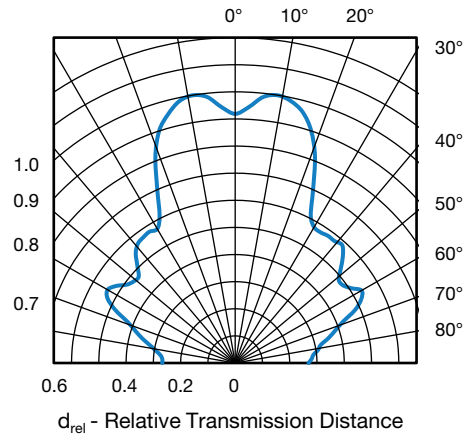


Fig. 8 - Horizontal Directivity

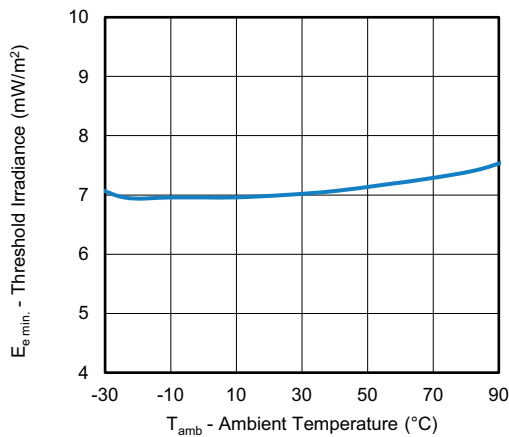


Fig. 6 - Sensitivity vs. Ambient Temperature

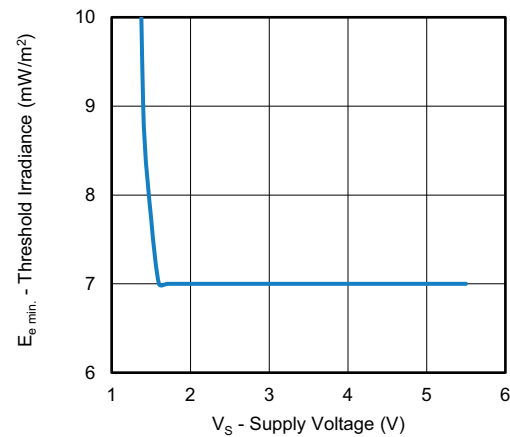


Fig. 9 - Sensitivity vs. Supply Voltage

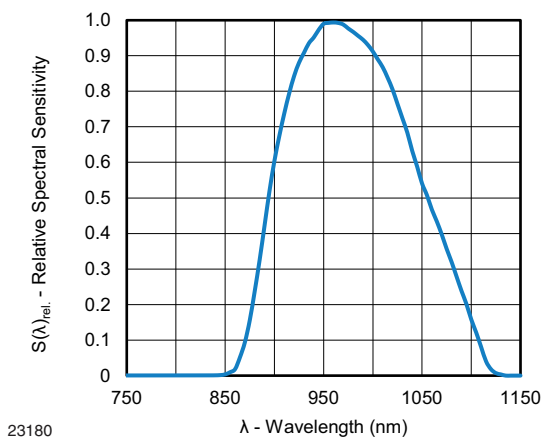
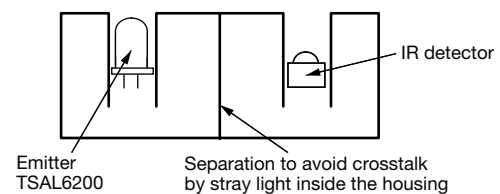


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

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.

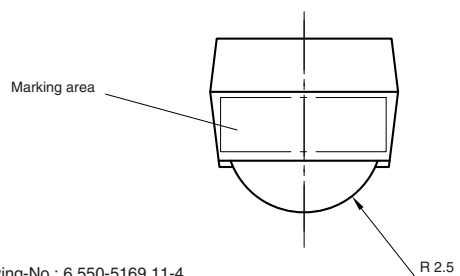
Example for a sensor hardware:



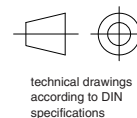
There should be no common window in front of the emitter and detector in order to avoid crosstalk via guided light through the window.

Top view of the package showing dimensions and pin locations. The package is square with a side length of 6. The pin pitch is 2.54 mm (nominal). The pin locations are defined by the following dimensions:

- Pin 1 (OUT) is located at a distance of 8.25 mm from the top-left corner.
- Pin 2 (GND) is located at a distance of 6.95 mm from the top-left corner.
- Pin 3 (V_S) is located at a distance of 5.3 mm from the top-left corner.
- The distance between Pin 1 and Pin 2 is 5.55 mm.
- The distance between Pin 2 and Pin 3 is 1 mm.
- The distance between Pin 1 and Pin 3 is 1 mm.
- The distance between Pin 1 and Pin 2 is 0.7 mm (maximum).
- The distance between Pin 2 and Pin 3 is 0.85 mm (maximum).
- The distance between Pin 1 and Pin 3 is 0.89 mm (maximum).
- The distance between Pin 1 and Pin 2 is 2.54 mm (nominal).
- The distance between Pin 2 and Pin 3 is 2.54 mm (nominal).



Not indicated tolerances ± 0.2





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