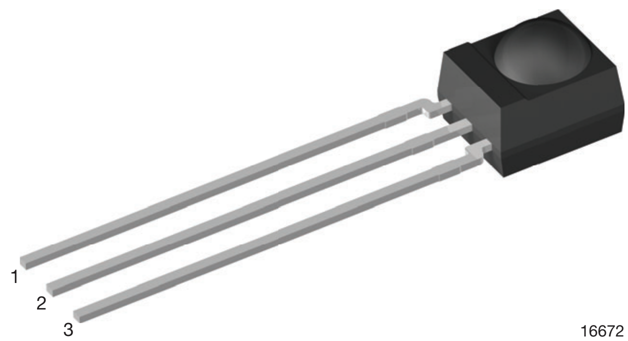
IR Receiver Module for Light Barrier Systems



DESIGN SUPPORT TOOLS AVAILABLE

3D Models

MECHANICAL DATA

Pinning:

1 = OUT, 2 = GND, 3 = V_S

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

- Constant gain for consistent results under any lighting condition
- Up to 1 m for presence sensing
- PIN diode and sensor IC in one package
- Low supply current
- Shielding against EMI
- Visible light is suppressed by IR filter
- Insensitive to supply voltage ripple and noise
- Supply voltage: 2.5 V to 5.5 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

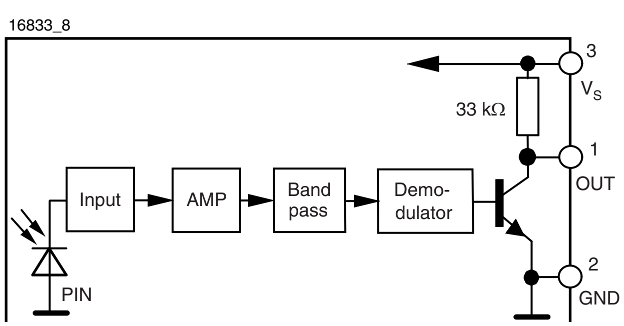
Pb-free
e3
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

APPLICATIONS

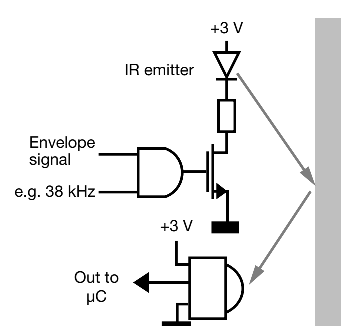
- Reflective sensors for hand dryers, towel or soap dispensers, water faucets, toilet flush
- Vending machine fall detection
- Security and pet gates
- Person or object vicinity activation

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

BLOCK DIAGRAM



PRESENCE SENSING



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 ≤ 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

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 = 5 V	I_{SD}	0.55	0.7	0.9	mA
	E_v = 40 klx, sunlight	I_{SH}	-	0.8	-	mA
Supply voltage		V_S	2.5	-	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 mA, E_e = 2 mW/m², test signal see Fig. 1	V_{OSL}	-	-	100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see Fig. 1	$E_{e\ min.}$	-	7	14	mW/m²
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see Fig. 1	$E_{e\ max.}$	50	-	-	W/m²
Directivity	Angle of half transmission distance	$\varphi_{1/2}$	-	± 45	-	deg

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

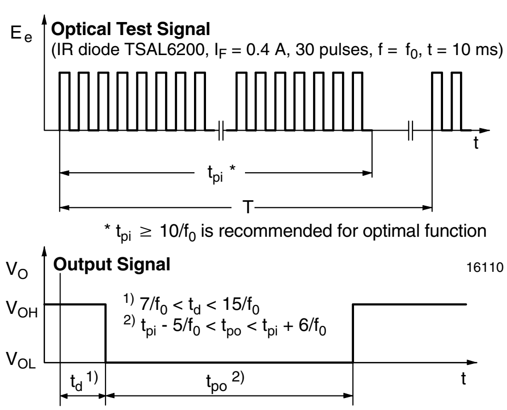


Fig. 1 - Output Active Low

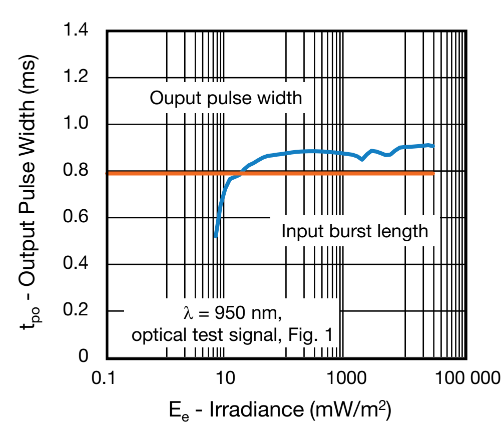


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

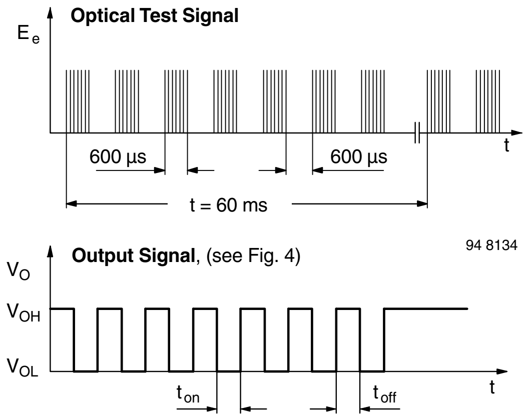


Fig. 3 - Output Function

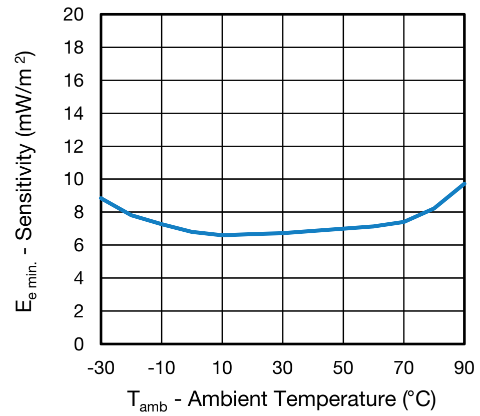


Fig. 6 - Sensitivity vs. Ambient Temperature

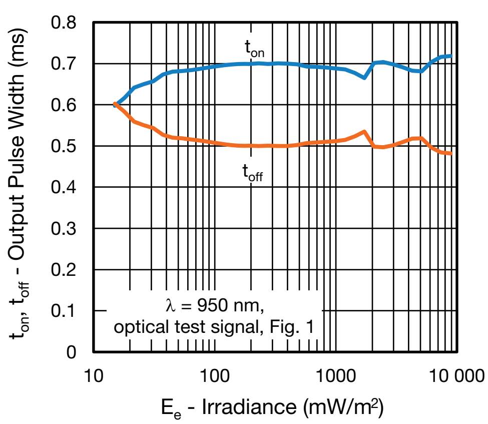


Fig. 4 - Output Pulse Diagram

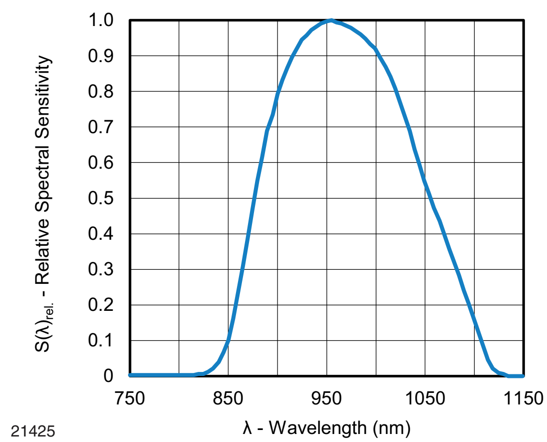


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

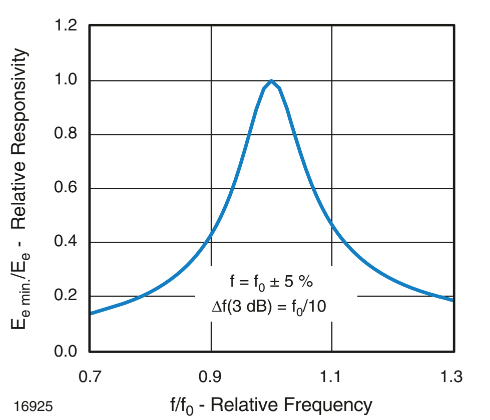


Fig. 5 - Frequency Dependence of Responsivity

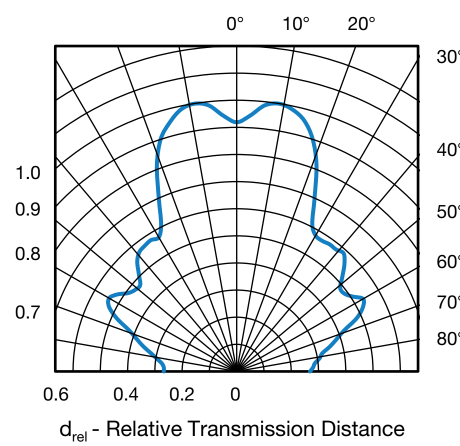


Fig. 8 - Horizontal Directivity

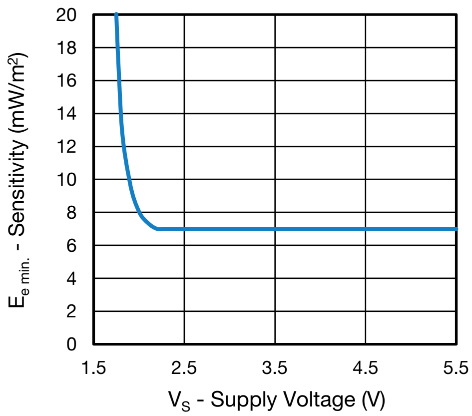
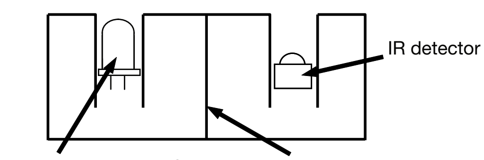


Fig. 9 - Sensitivity vs. Supply Voltage

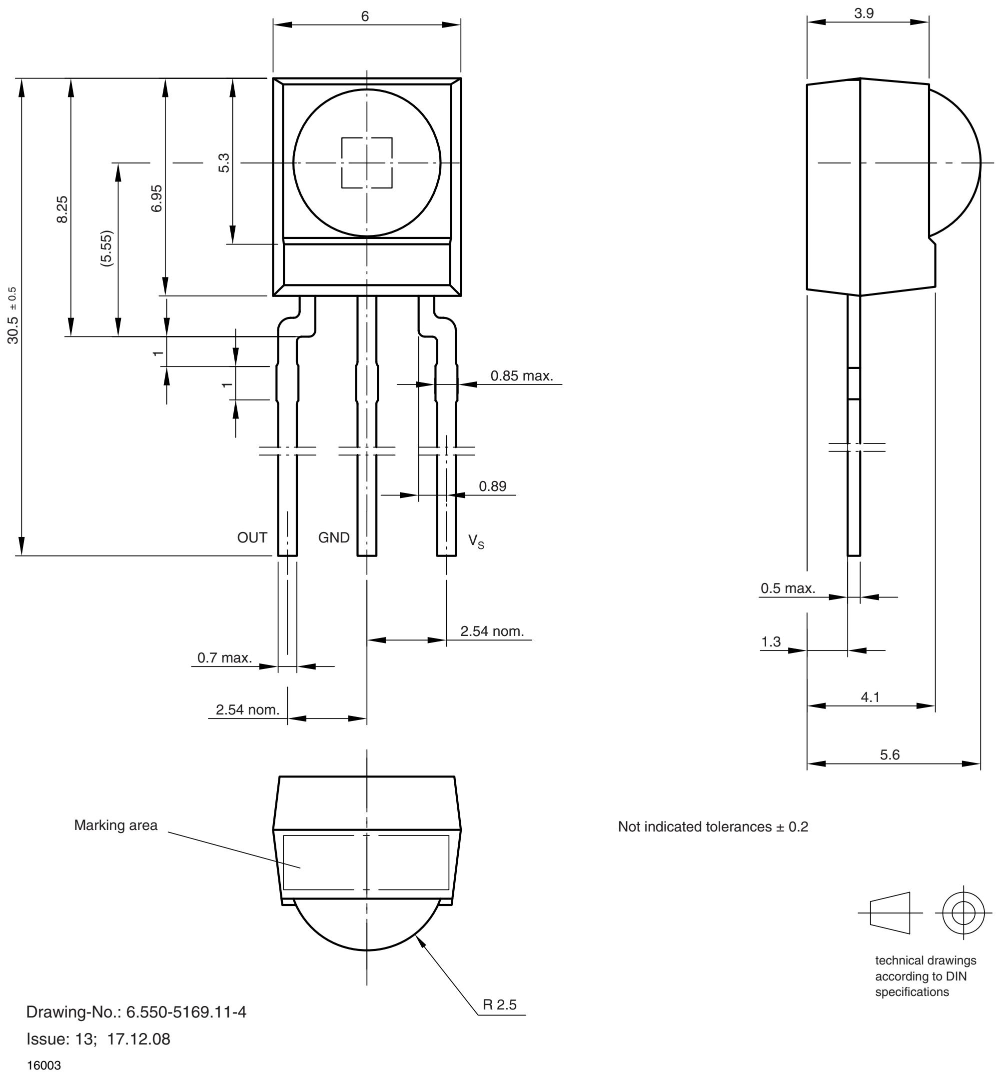
The typical application of this device is a reflective or beam break sensor with active low “detect” or “no detect” information contained in its output. Applications requiring up to 1 m beam break or 0.5 m reflective range benefit from the lower gain of these sensors because they are less sensitive to stray signal from the emitter, simplifying the mechanical design.

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



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