

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



DESCRIPTION

The TSSP53000 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. It is possible to evaluate the irradiance or proximity by using a variable carrier duty cycle and a variable carrier frequency.

This component has not been qualified according to automotive specifications.

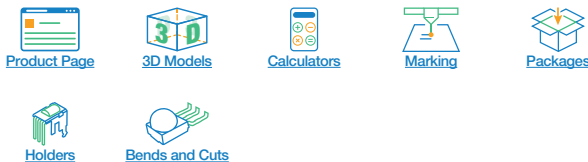
FEATURES

- Presence sensor: up to 2 m distance, find more info at: www.vishay.com/doc?49009
- Light barrier: up to 8 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?80345
- 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

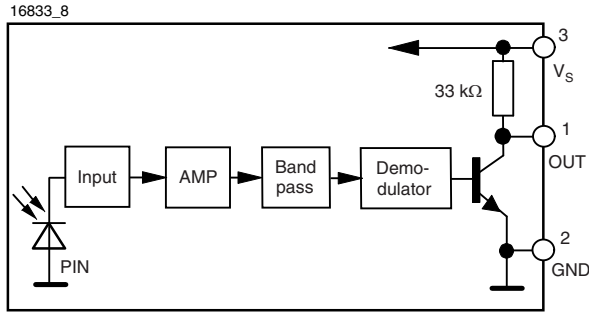


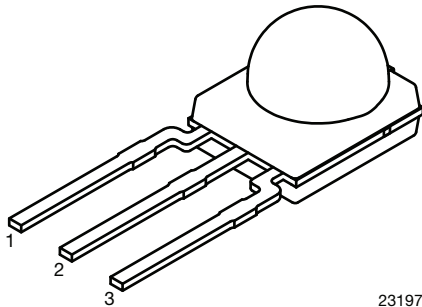
APPLICATIONS

- 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

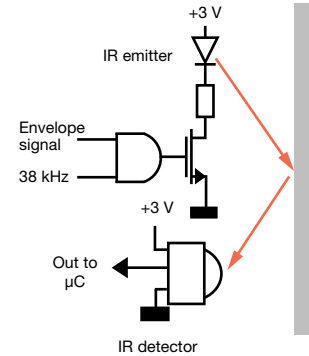
DESIGN SUPPORT TOOLS

- [3D models](#)
- [Window size calculator](#)
- [Vishay TSSP sensor kit](#)

BLOCK DIAGRAM

MECHANICAL DATA
Pinning:

 1 = OUT, 2 = GND, 3 = V_S

ORDERING CODE

TSSP53000 - 1800 pieces in bags

PRESENCE SENSING


PARTS TABLE		
Carrier frequency	56 kHz	TSSP53000
Package		Minimold
Pinning		1 = OUT, 2 = GND, 3 = V_S
Dimensions (mm)		5.4 W x 6.35 H x 4.9 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
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	-	8	-	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	$E_{e\text{ min.}}$	-	0.8	1.6	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	-	$^{\circ}$

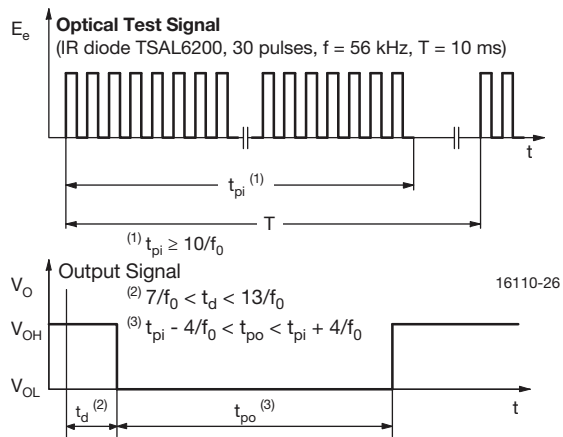
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Output Active Low

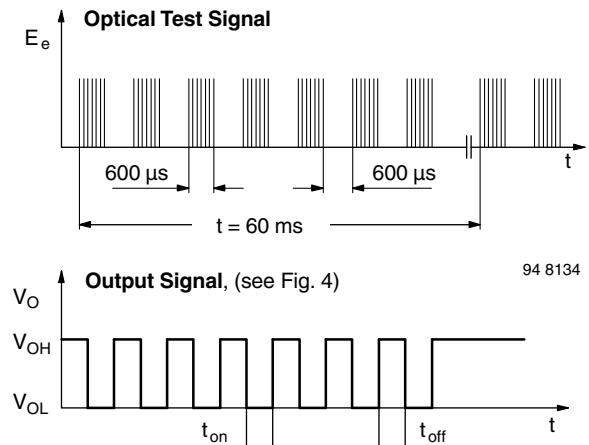


Fig. 3 - Output Function

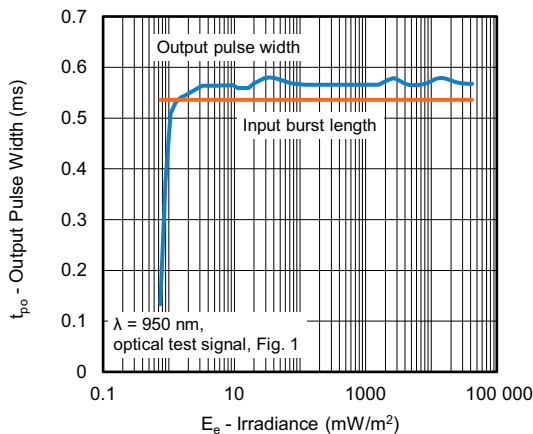


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

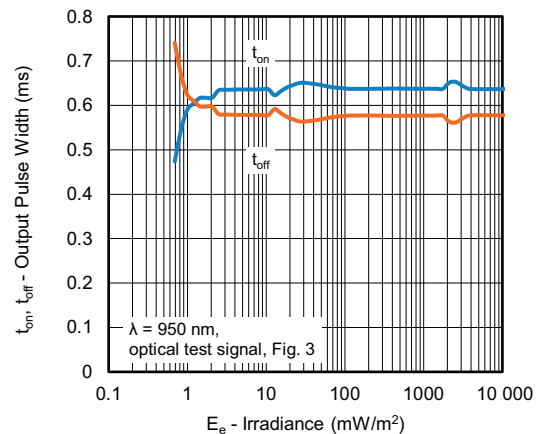


Fig. 4 - Output Pulse Diagram

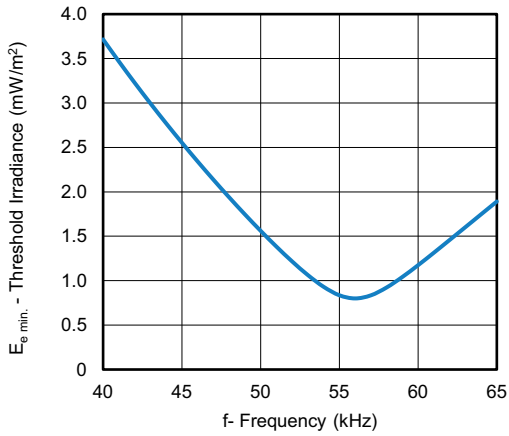


Fig. 5 - Threshold Irradiance vs. Frequency

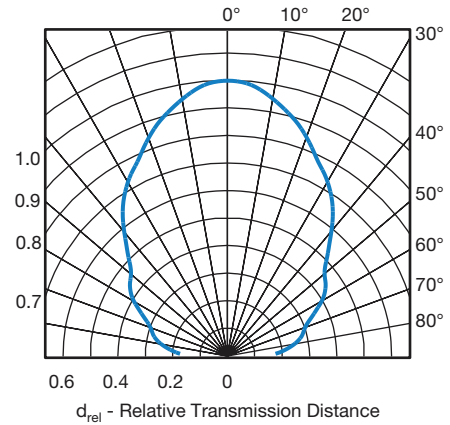


Fig. 8 - Directivity

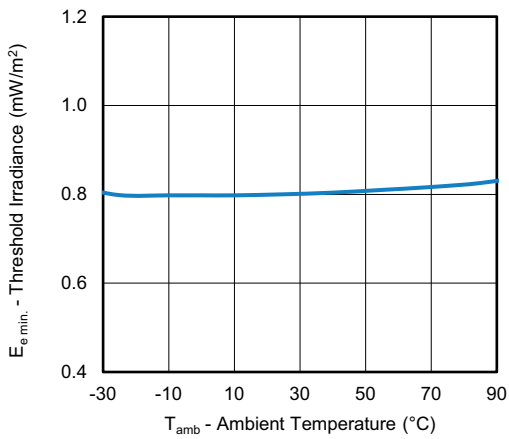


Fig. 6 - Sensitivity vs. Ambient Temperature

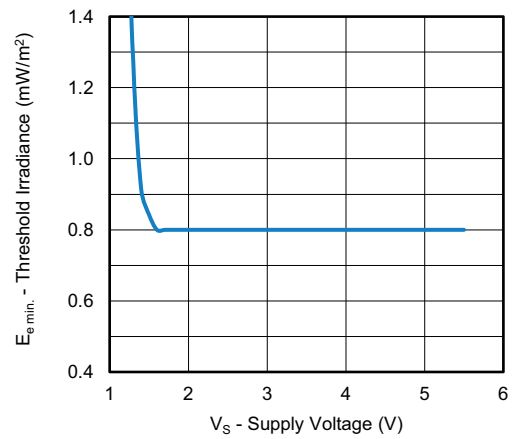


Fig. 9 - Sensitivity vs. Supply Voltage

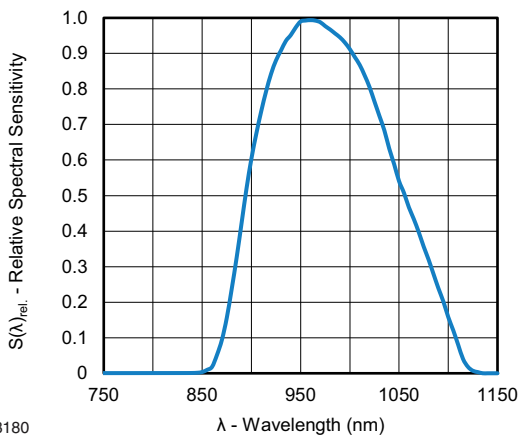


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

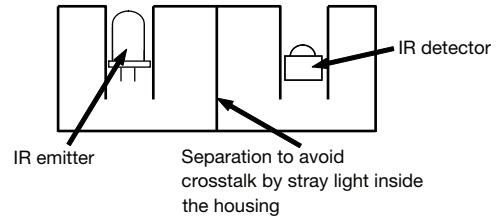
23180



The TSSP53000 is suitable for fast (~ 5 ms) proximity sensor applications for ranges between 10 cm and 2 m.

Please, see application note "Vishay TSSP Sensor Kit" (www.vishay.com/doc?80345).

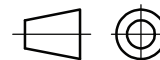
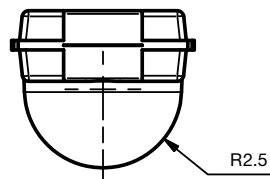
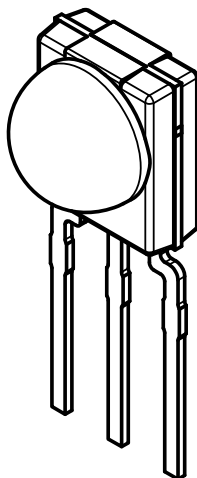
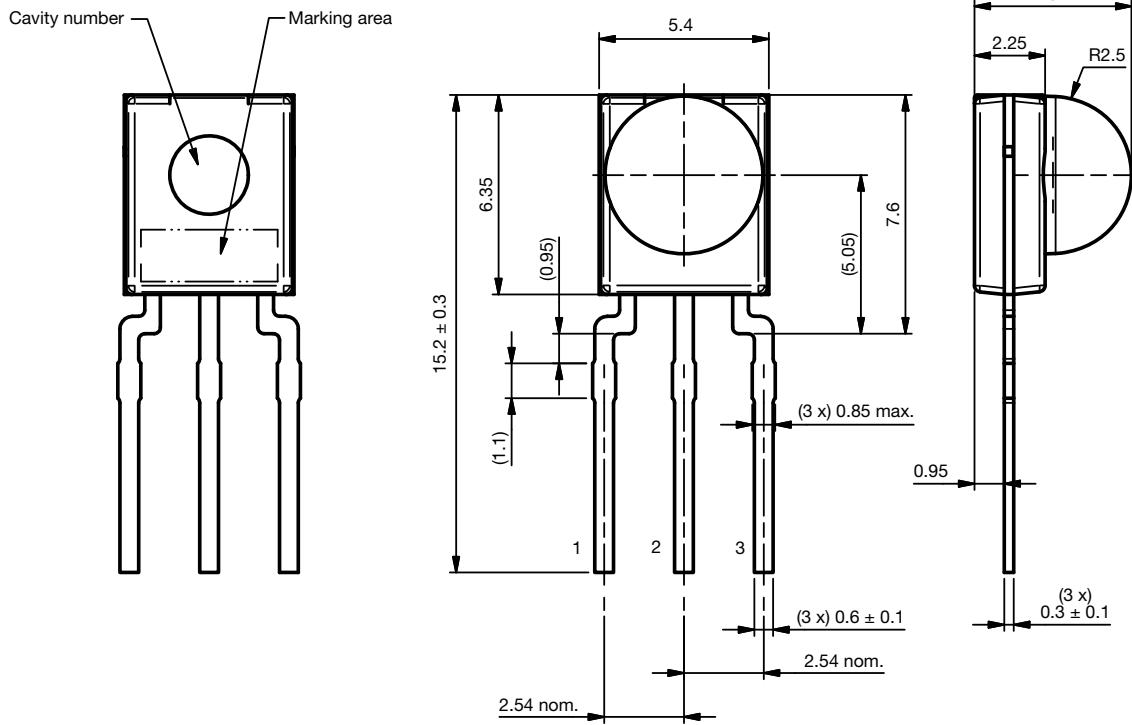
Example for a sensor hardware:



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

Cavity number Marking area



Technical drawings according to DIN specifications

Not indicated tolerances ± 0.2

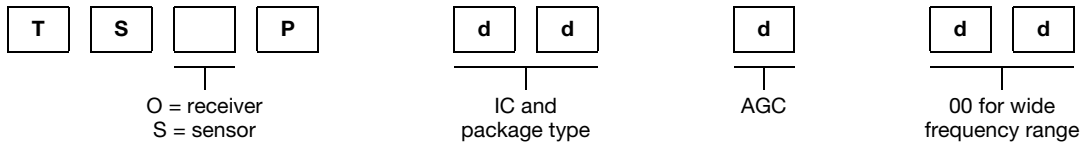
Drawing-No.: 6.550-5335.01-4
Issue: 2; 02.07.19



BULK PACKAGING

Standard shipping for minimold is in conductive plastic bags. The packing quantity is determined by weight and a maximum of 0.3 % of the components per carton may be missing.

ORDERING INFORMATION



Note

- d = "digit", please consult the list of available series on the previous page to create a valid part number

Examples: TSSP53000

PACKAGING QUANTITY

- 300 pieces per bag (each bag is individually boxed)
- 6 bags per carton



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