IR Sensor Module for Reflective Sensor, Light Barrier, and Fast Proximity Applications

FEATURES

- Up to 2 m for presence and proximity sensing
- Uses modulated bursts of infrared light
- 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)

LINKS TO ADDITIONAL RESOURCES

3D Models

MECHANICAL DATA

Pinning:

1 = OUT, 2 = GND, 3 = V_S

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
- Fast proximity sensors for toys, robotics, drones, and other consumer and industrial uses

DESCRIPTION

The TSSP530.. 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.

PARTS TABLE		
Carrier frequency	38 kHz	TSSP53038
	56 kHz	TSSP53056
Package		Minimold
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

BLOCK DIAGRAM

PRESENCE SENSING

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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 = 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	-	12	-	m
Output voltage low (pin 1)	I_{OSL} = 0.5 mA, E_e = 2 mW/m^2, 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	$E_{e\ min.}$	-	0.4	0.7	mW/m^2
Maximum irradiance	t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0, test signal see Fig. 1	$E_{e\ max.}$	50	-	-	W/m^2
Directivity	Angle of half transmission distance	$\varphi_{1/2}$	-	± 45	-	deg

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

Fig. 1 - Output Active Low

Fig. 4 - Output Pulse Diagram

Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

Fig. 5 - Frequency Dependence of Responsivity

Fig. 3 - Output Function

Fig. 6 - Sensitivity vs. Ambient Temperature

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Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

Fig. 9 - Sensitivity vs. Supply Voltage

Fig. 8 - Directivity

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 TSSP53056 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.

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PACKAGE DIMENSIONS in millimeters

Technical drawings according to DIN specifications

Not indicated tolerances ± 0.2

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

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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: **TSOP53038**
TSOP53056

PACKAGING QUANTITY

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

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