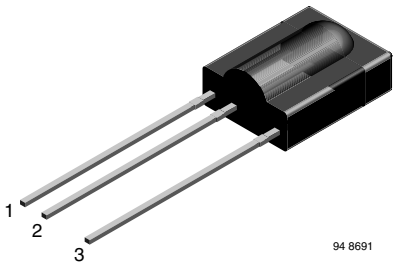
IR Sensor Module for Remote Control Systems



FEATURES

- Photo detector and preamplifier in one package
- AC coupled response from 30 kHz to 50 kHz, all data formats
- If the IR singal strength is less then 1 W/m² (distance more than 0.3 m with a typical IR remote control), the frequency range is up to 55 kHz
- If the IR singal strength is less then 8 mW/m² (distance more than 3.5 m with a typical IR remote control), the frequency range is up to 60 kHz
- Improved shielding against electrical field disturbance
- AGC to suppress ambient noise
- High sensitivity, long receiving range
- Supply voltage: 2.7 V to 5.5 V
- Carrier out signal for IR repeater applications
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

GREEN (5-2008)

MECHANICAL DATA

Pinning:

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

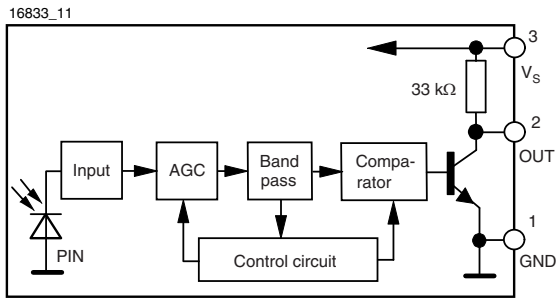
DESCRIPTION

The TSOP98138 is a miniaturized sensor for receiving the modulated signal of infrared remote control systems. A PIN diode and preamplifier are assembled on a lead frame, the epoxy package is designed as an IR filter. The modulated output signal, carrier out, can be used for repeater applications and code learning applications.

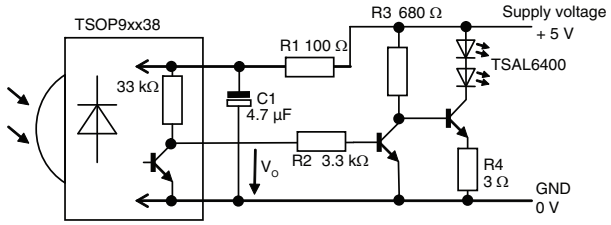
This component has not been qualified according to automotive specifications.

PARTS TABLE	
CARRIER FREQUENCY	CODE LEARNING APPLICATIONS
30 kHz to 50 kHz	TSOP98138

BLOCK DIAGRAM



APPLICATION CIRCUIT



Recommended circuit for best sensitivity of the TSOP9xx38 in repeater applications. It limits the output voltage swing V_o to about 1 V in order to avoid internal coupling. The high level output voltage V_o should never be pulled to a voltage lower than 0.85 V by the external circuit under any ambient condition.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage (pin 3)		V_S	- 0.3 to + 6	V
Supply current (pin 3)		I_S	5	mA
Output voltage (pin 2)		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 2)		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
Soldering temperature	t ≤ 10 s, 1 mm from case	T_{sd}	260	°C

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}	0.65	0.85	1.05	mA
	E_v = 40 klx, sunlight	I_{SH}		0.95		mA
Supply voltage		V_S	2.7		5.5	V
Transmission distance	E_v = 0, test signal see fig. 1, IR diode TSAL6200, I_F = 400 mA	d		30		m
Output voltage low (pin 2)	I_{OSL} = 0.5 mA, E_e = 0.7 mW/m², test signal see fig. 1	V_{OSL}			100	mV
Minimum irradiance	Less than 5 missing or 5 additional sub carrier pulses related to one burst	$E_{e\ min.}$		0.5	1	mW/m²
Maximum irradiance	Less than 5 missing or 5 additional sub carrier pulses related to one burst	$E_{e\ max.}$	30			W/m²
Directivity	Angle of half transmission distance	$\varphi_{1/2}$		± 55		deg

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

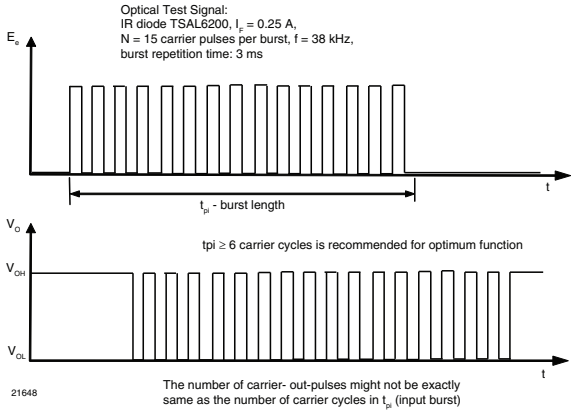


Fig. 1 - Output Function

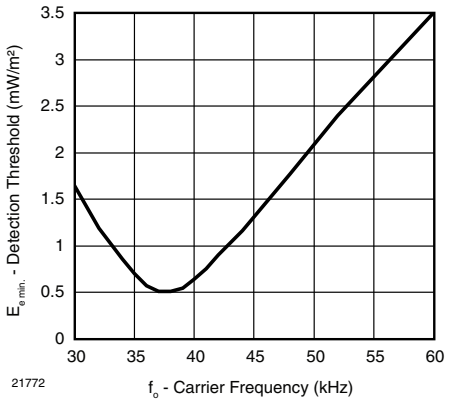


Fig. 2 - Frequency Dependence of Sensitivity

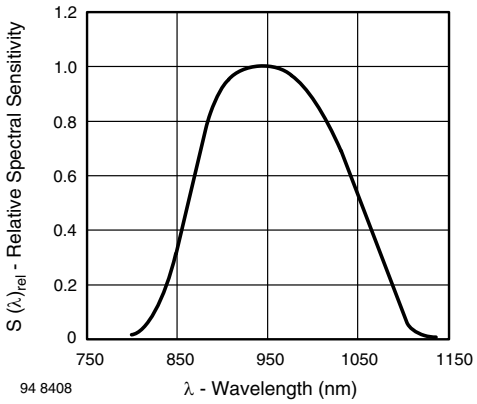


Fig. 3 - Relative Spectral Sensitivity vs. Wavelength

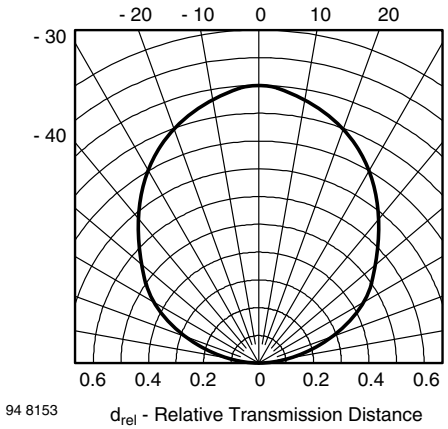


Fig. 4 - Horizontal Directivity φ_x

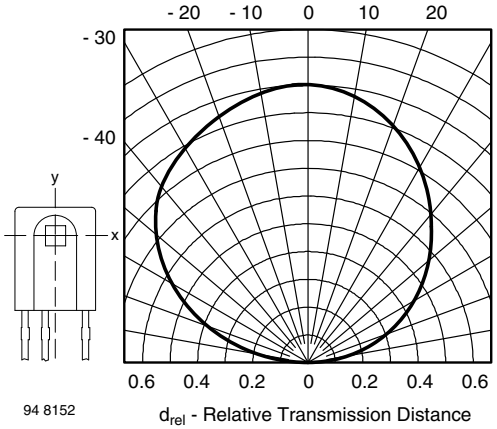
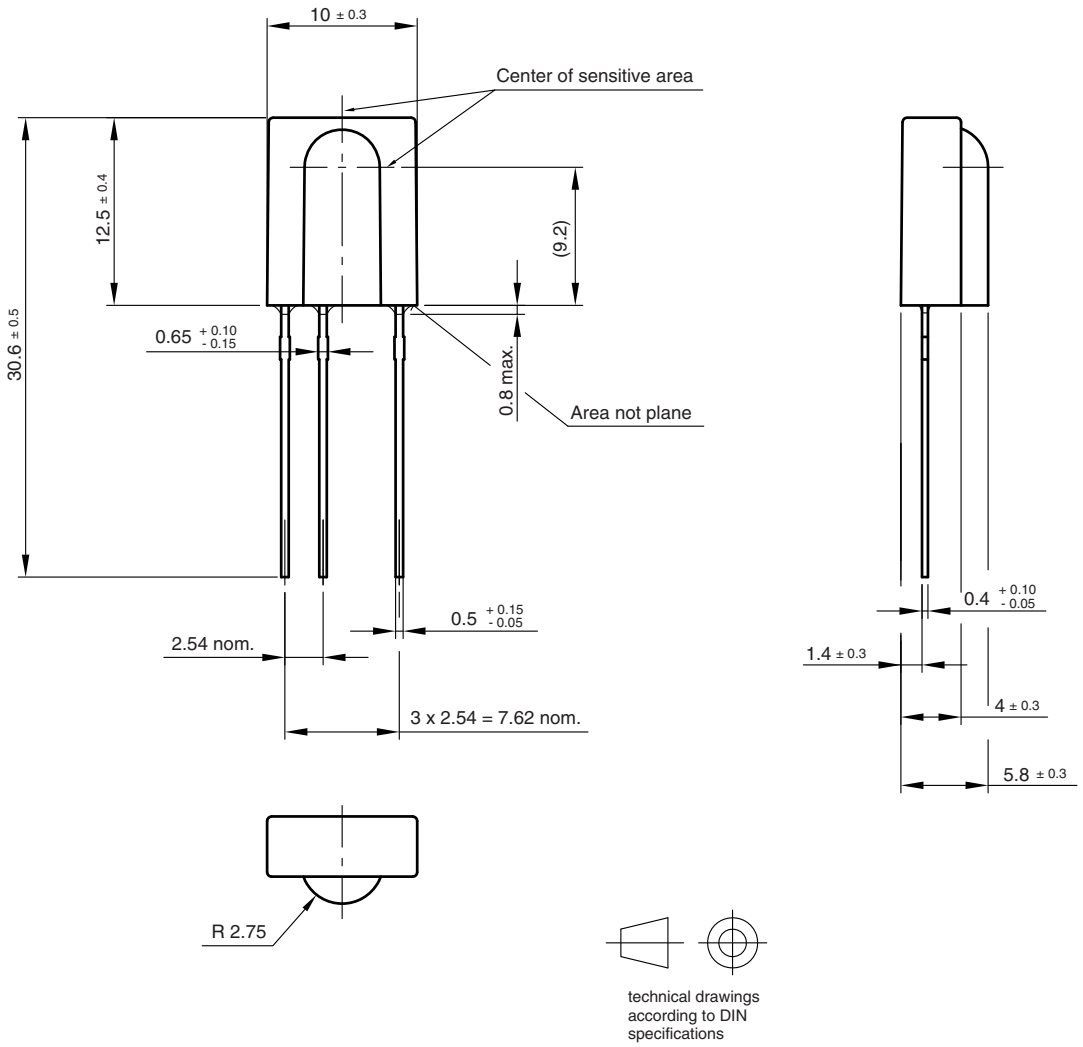


Fig. 5 - Vertical Directivity φ_y

PACKAGE DIMENSIONS in millimeters



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