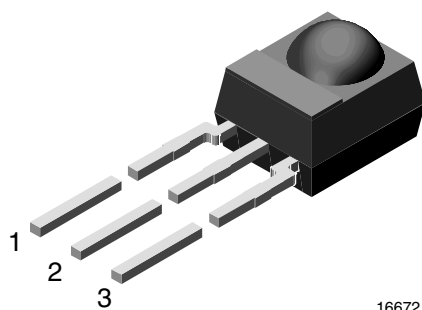


IR Sensor Module for Remote Control Systems



MECHANICAL DATA

Pinning:

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

FEATURES

- Photo detector and preamplifier in one package
- AC coupled response from 30 kHz to 50 kHz, all data formats
- If the IR signal strength is less than 2 W/m² (distance more than 0.2 m with a typical IR remote control), the frequency range is up to 55 kHz
- If the IR signal strength is less than 15 mW/m² (distance more than 2.5 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: 2.5 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



DESCRIPTION

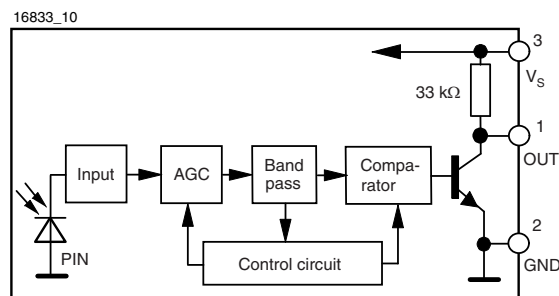
The TSMP4138 is a miniaturized sensor for receiving the modulated signal of infrared remote control systems. A pin diode and preamplifier are assembled on a lead frame, the epoxy package is designed as an IR filter. The modulated output signal, carrier out, can be used for repeater applications and code learning applications.

This component has not been qualified according to automotive specifications.

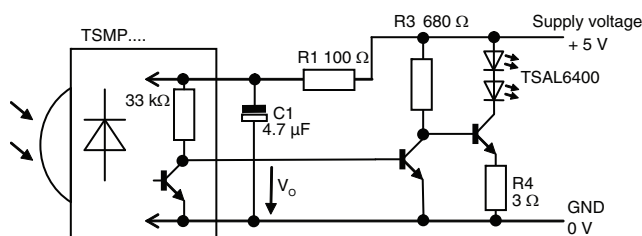
PARTS TABLE

Carrier frequency	38 kHz	TSMP4138
Package	Pinning	1 = carrier out, 2 = GND, 3 = V_S
	Dimensions (mm)	6.9 H x 5.6 W x 6.0 L
Mounting		Leaded
Application		Repeater

BLOCK DIAGRAM



APPLICATION CIRCUIT



Recommended circuit for best sensitivity of the TSMP.... in repeater applications. It limits the output voltage swing V_O to about 0.7 V in order to avoid internal coupling.

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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 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	$T_{amb} \leq 85\text{ °C}$	P_{tot}	10	mW
Soldering temperature	$t \leq 10\text{ s}$, 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 ($T_{amb} = 25\text{ °C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current (pin 3)	$E_v = 0$, $V_S = 5\text{ V}$	I_{SD}	0.55	0.7	0.9	mA
	$E_v = 40\text{ klx}$, 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, $I_F = 400\text{ mA}$	d		20		m
Output voltage low (pin 1)	$I_{OSL} = 0.5\text{ mA}$, $E_e = 0.7\text{ mW/m}^2$, 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	$E_{e\text{ min.}}$		0.6	1.2	mW/m ²
Maximum irradiance	Less than 5 missing or 5 additional sub carrier pulses related to one burst	$E_{e\text{ max.}}$	30			W/m ²
Directivity	Angle of half transmission distance	$\phi_{1/2}$		± 45		deg

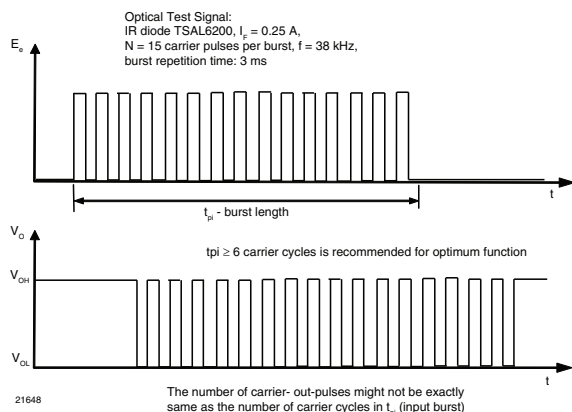
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)


Fig. 1 - Output Function

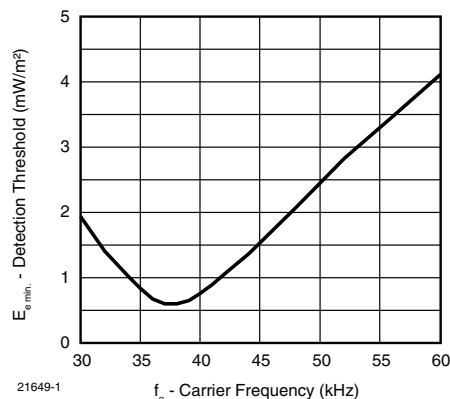


Fig. 2 - Frequency Dependence of Sensitivity

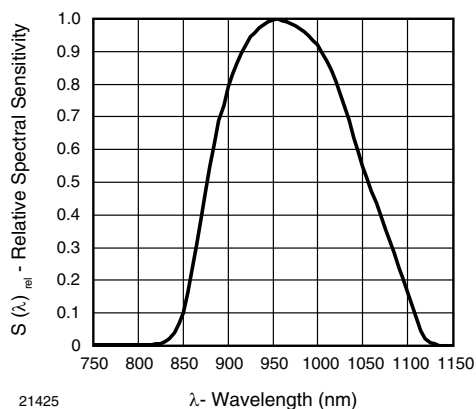


Fig. 3 - Relative Spectral Sensitivity vs. Wavelength

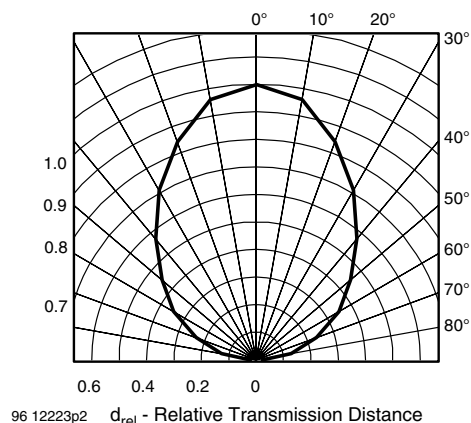
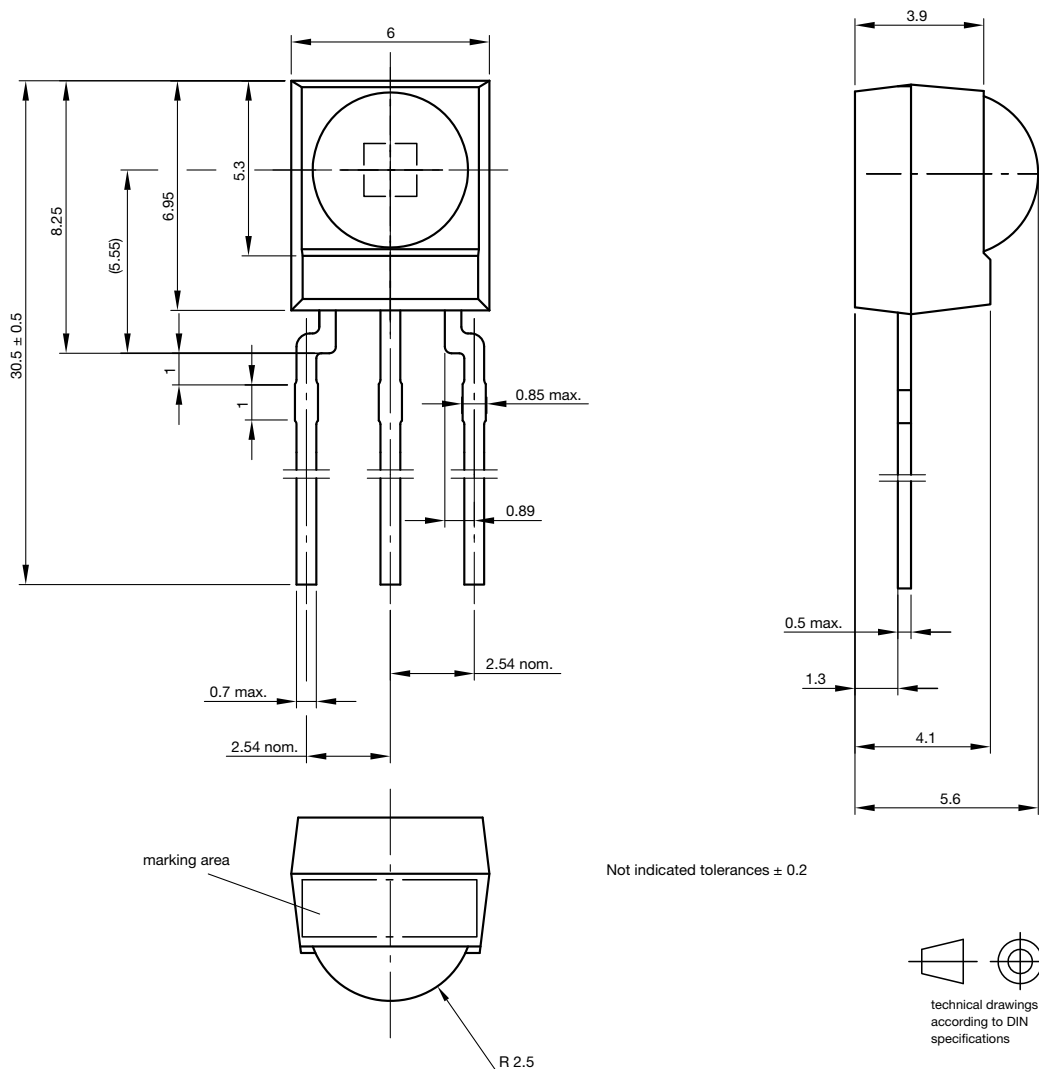


Fig. 4 - Horizontal Directivity

PACKAGE DIMENSIONS in millimeters


Drawing-No.: 6.550-5169.01-4
Issue: 9; 03.11.10

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