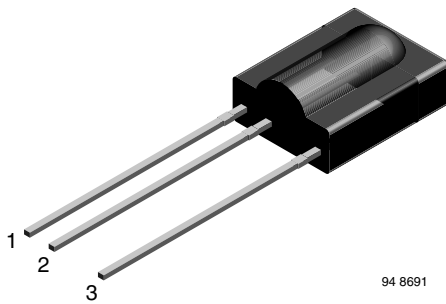


## IR Sensor Module for Remote Control Systems



### MECHANICAL DATA

#### Pinning:

1 = GND, 2 = Carrier OUT, 3 =  $V_s$

### FEATURES

- Photo detector and preamplifier in one package
- AC coupled response from 30 kHz to 55 kHz, all data formats
- If the IR signal strength is less than 300 mW/m<sup>2</sup> (distance more than 0.6 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

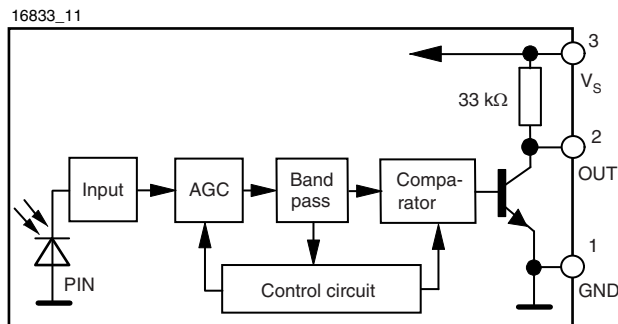
### DESCRIPTION

The TSMP1138 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.

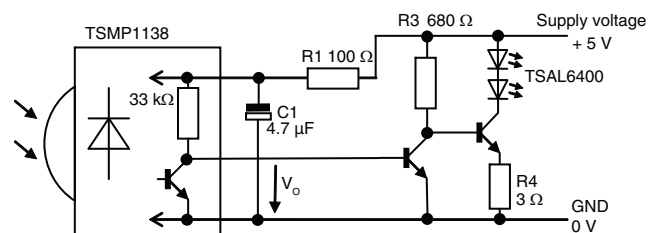
This component has not been qualified according to automotive specifications.

PARTS TABLE		TSMP1138
Carrier frequency	38 kHz	TSMP1138
Package		Cast
Pinning		1 = GND, 2 = Carrier OUT, 3 = $V_s$
Dimensions (mm)		10.0 W x 12.5 H x 5.8 D
Mounting		Leaded
Application		Repeater

### BLOCK DIAGRAM



### APPLICATION CIRCUIT



Recommended circuit for best sensitivity of the TSOP9x38 in repeater applications. It limits the output voltage swing  $V_o$  to about 0.7 V in order to avoid internal coupling.

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	$T_{amb} \leq 85\text{ °C}$	$P_{tot}$	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, $I_F = 400\text{ mA}$	$d$		30		m
Output voltage low (pin 2)	$I_{OSL} = 0.5\text{ mA}$ , $E_e = 0.7\text{ mW/m}^2$ , 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	$E_e\text{ min.}$		0.5	1	$\text{mW/m}^2$
Maximum irradiance	Less than 5 missing or 5 additional sub carrier pulses related to one burst	$E_e\text{ max.}$	30			$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 55$		deg

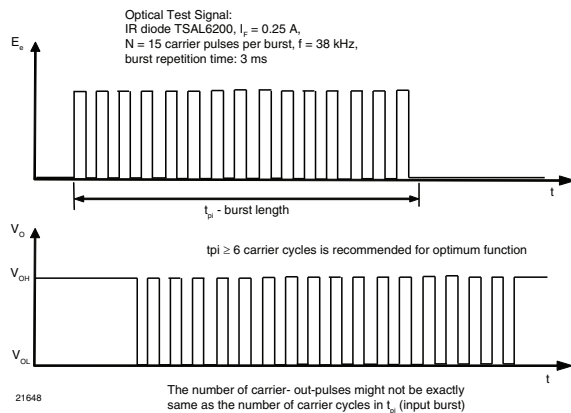
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)


Fig. 1 - Output Function

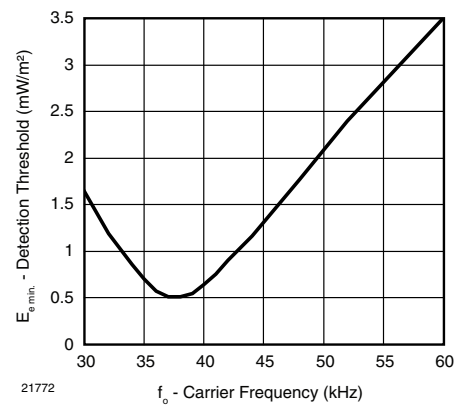


Fig. 2 - Frequency Dependence of Sensitivity

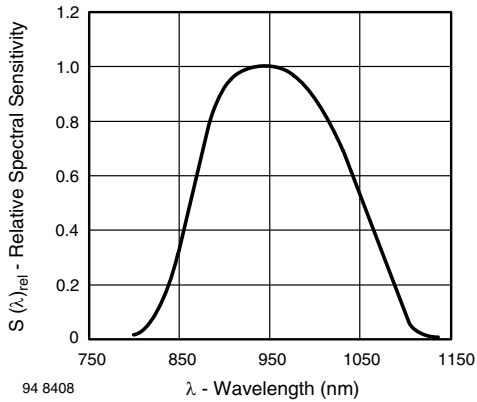


Fig. 3 - Relative Spectral Sensitivity vs. Wavelength

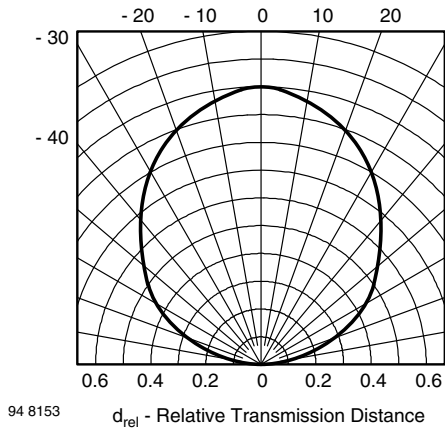


Fig. 4 - Horizontal Directivity  $\phi_x$

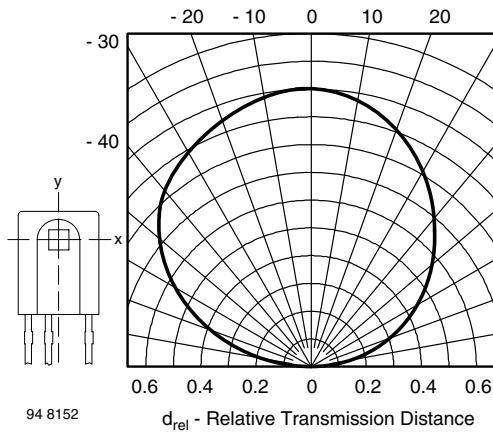
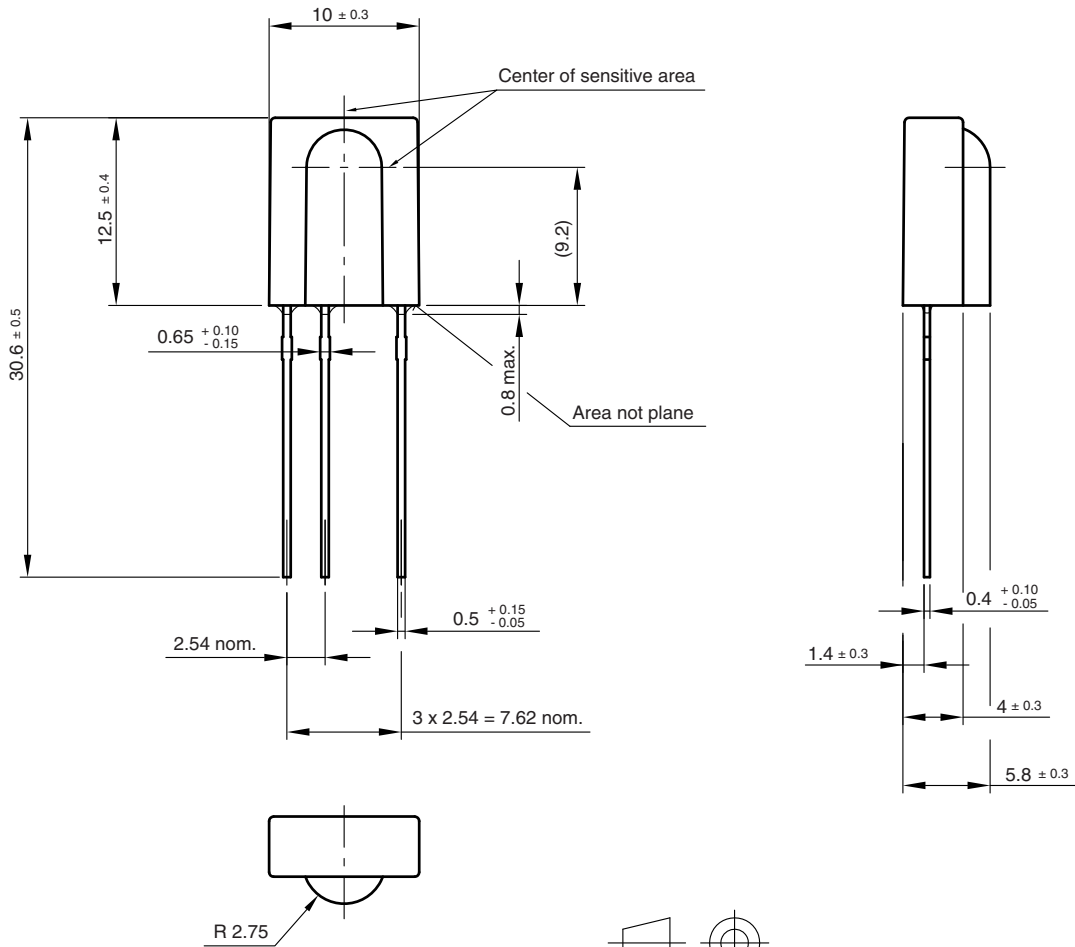


Fig. 5 - Vertical Directivity  $\phi_y$



**PACKAGE DIMENSIONS** in millimeters



technical drawings according to DIN specifications

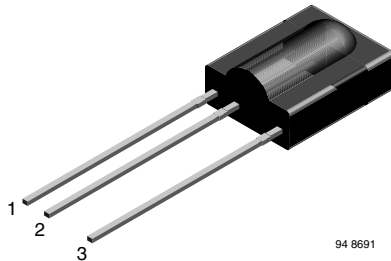
Drawing-No.: 6.550-5095.01-4  
 Issue: xx; 20.05.09  
 96 12116-1



## IR Receiver Modules for Remote Control Systems

Vishay offers stock Cast IR Receivers in three different packages:

- Loose packed in tubes and mounted on tape for reel or ammopack
- Vishay IR receiver with plastic holders are packed in plastic tubes



### FEATURES

- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

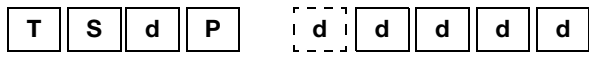


### AVAILABLE FOR

- TSOP312..
- TSOP311..
- TSOP12...
- TSOP11...
- TSOP13...
- TSOP313..
- TSOP314..
- TSOP315..
- TSMP1138

### LOOSE PACKED IN TUBE

#### ORDERING INFORMATION



2 or 3 digit product series      2 digit frequency

O = for IR receiver applications  
M = for repeater/learning applications

#### Note

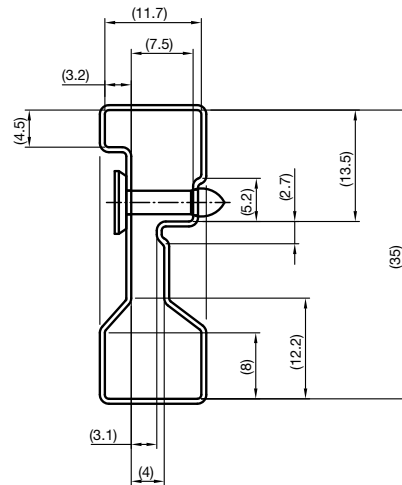
- d = "digit", please consult the list of available devices create a valid part number.

EXAMPLE: TSOP1238

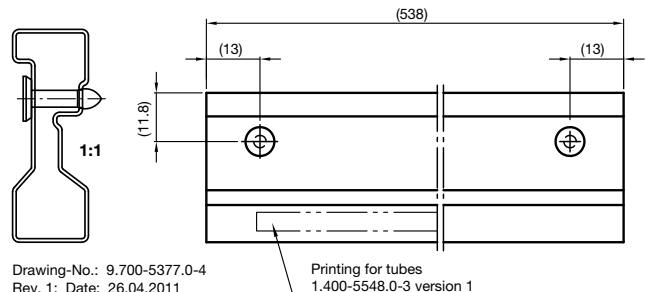
#### PACKAGING QUANTITY

- 50 pieces per tube
- 20 tubes per carton

### PACKAGING DIMENSIONS in millimeters



Wall thickness: 0.6



Drawing-No.: 9.700-5377.0-4  
Rev. 1; Date: 26.04.2011

Printing for tubes  
1.400-5548.0-3 version 1

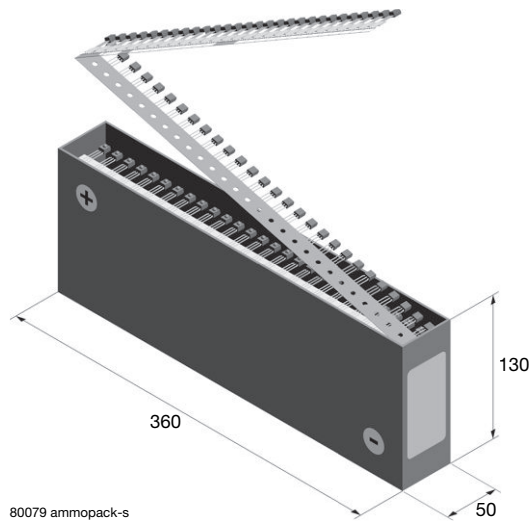
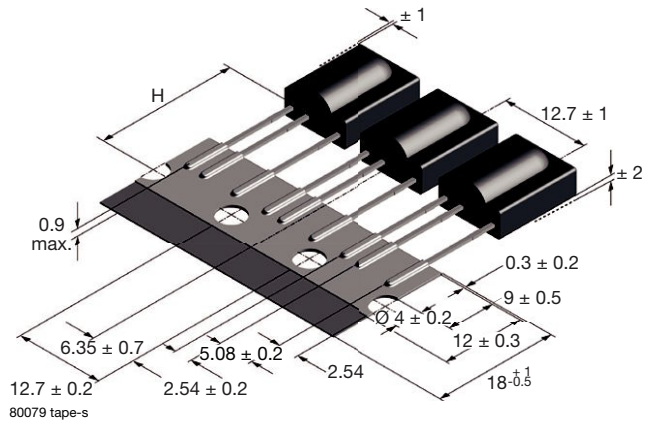
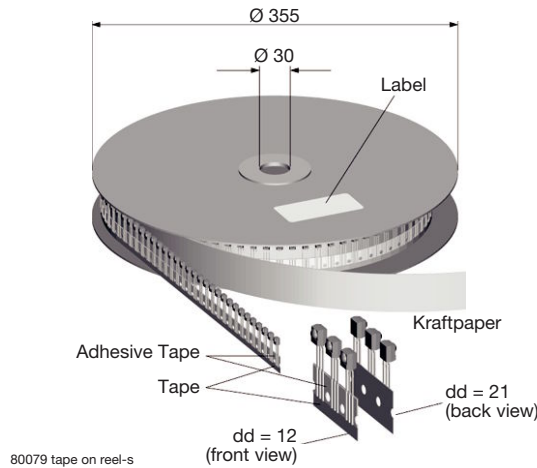


## TAPE AND REEL/AMMOPACK

Up to 3 consecutive components may be missing if the gap is followed by at least 6 components. A maximum of 0.5 % of the components per reel quantity may be missing. At least 5 empty positions are present at the start and the end of the tape to enable insertion.

Tensile strength of the tape: > 15 N

Pulling force in the plane of the tape, at right angles to the reel: > 5 N



VERSION	DIMENSION "H"
BS	20 ± 0.5
PS	23.3 ± 0.5
OS	26 ± 0.5

## ORDERING INFORMATION

**T S d P**

O = for IR receiver applications  
M = for repeater/learning applications

**d d d d d**

2 or 3 digit product series

2 digit frequency

**S S 1**

SS1 for T and R, bulk or ammpack

**d d d d**

dd = Tape and reel  
dd = 12 or 21

**Z**

Ampack

### Note

- d = "digit", please consult the list of available devices create a valid part number.

**EXAMPLE: TSOP1238SS1BS12**

**TSOP1238SS1BS12Z**

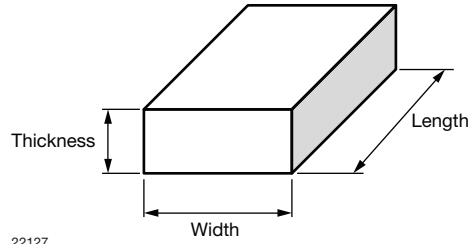
## PACKAGING QUANTITY

- 1000 pieces per reel
- 1000 pieces per ammpack



## OUTER PACKAGING

### CARTON BOX DIMENSIONS in millimeters



KINDS OF CARTON BOX	THICKNESS	WIDTH	LENGTH
<b>Packaging Plastic Tubes</b> (Normal/auxiliary devices)	82	152	564
<b>Tape and Reel Box</b> (Taping in reels)	400	310	410
<b>Ammo-Box</b> (Zigzag taping)	50	130	350



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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

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