



## IR Receiver Modules for Remote Control Systems



22594

### DESCRIPTION

The TSSP570.. is a compact infrared detector module for presence sensing applications. It receives 38 kHz modulated signals and has a peak sensitivity of 940 nm.

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](http://www.vishay.com/doc?49009)
- Light barrier: up to 12 m distance, TSAL6200 with  $I_F = 50$  mA, find more info at: [www.vishay.com/doc?49650](http://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?82741](http://www.vishay.com/doc?82741)
- Supply voltage: 2.0 V to 5.5 V
- 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)

### LINKS TO ADDITIONAL RESOURCES



Product Page



Marking

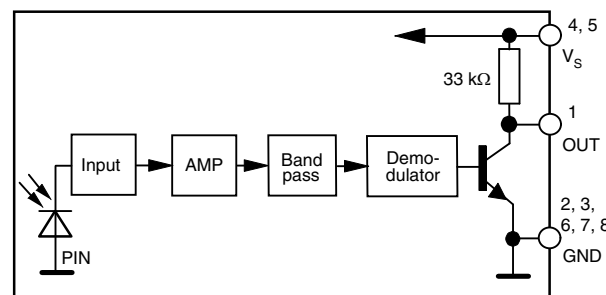
### APPLICATIONS

- 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](#)

### BLOCK DIAGRAM



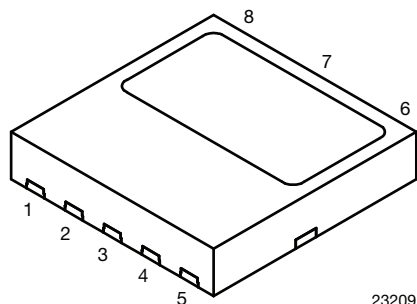
20445-7



## MECHANICAL DATA

### Pinning:

1 = OUT, 2, 3, 6, 7, 8 = GND, 4, 5 =  $V_S$



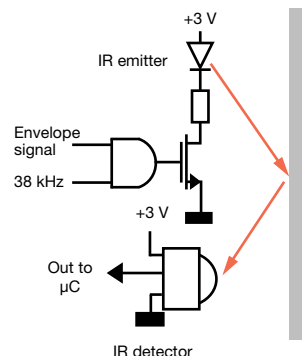
23209

## ORDERING CODE

### Taping:

TSSP570..HTT1 - top view taped, 1500 pcs/reel

## PRESENCE SENSING



PARTS TABLE		
Carrier frequency	38 kHz	TSSP57038H
	56 kHz	TSSP57056H
Package	Belobog shield	
Pinning	1, 4 = GND, 2 = $V_S$ , 3 = OUT	
Dimensions (mm)	3.95 W x 3.95 H x 0.8 D	
Mounting	SMD	
Application	Presence sensors, fast proximity sensors	
Special options	<ul style="list-style-type: none"> <li>Extended temperature range: <a href="http://www.vishay.com/doc?82738">www.vishay.com/doc?82738</a></li> </ul>	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		$V_S$	-0.3 to +6	V
Supply current		$I_S$	5	mA
Output voltage		$V_O$	-0.3 to ( $V_S + 0.3$ )	V
Output current		$I_O$	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	$T_{amb} \leq 85^\circ\text{C}$	$P_{tot}$	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	$E_{e\text{ min.}}$	-	0.7	1.2	$\text{mW/m}^2$
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	-	-	$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\Phi_{1/2}$	-	$\pm 75$	-	$^{\circ}$

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

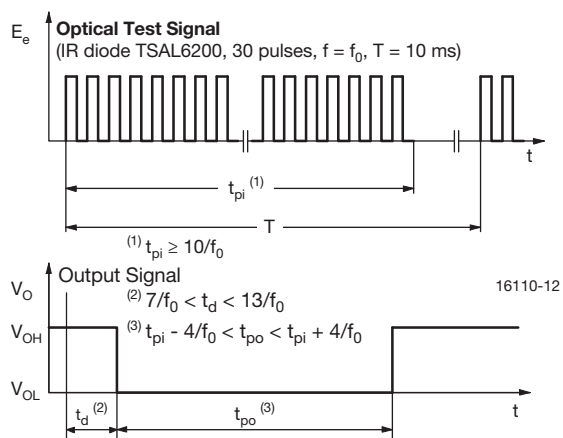


Fig. 1 - Output Active Low

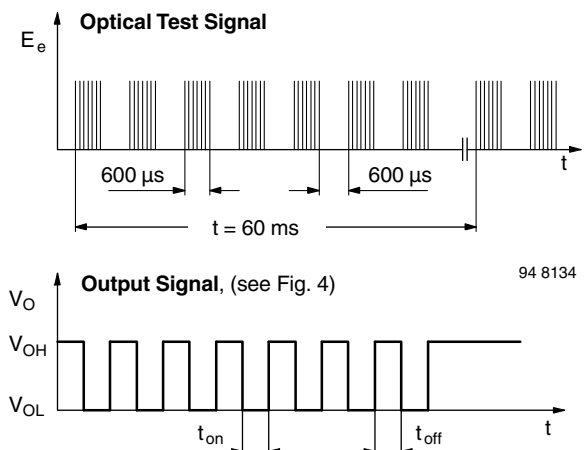


Fig. 3 - Output Function

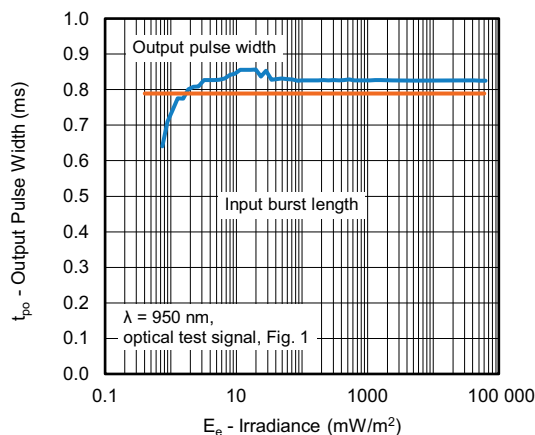


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

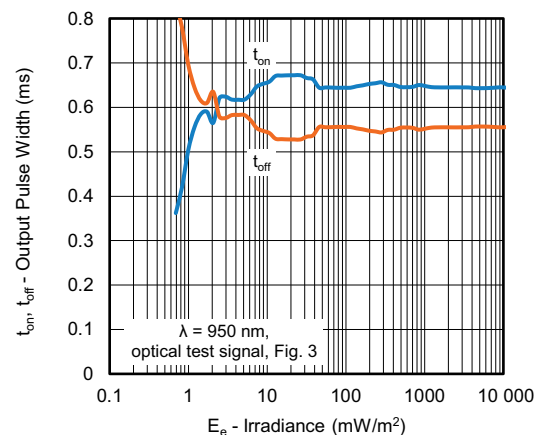


Fig. 4 - Output Pulse Diagram

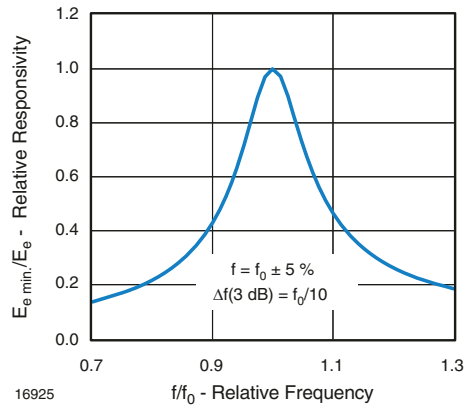


Fig. 5 - Frequency Dependence of Responsivity

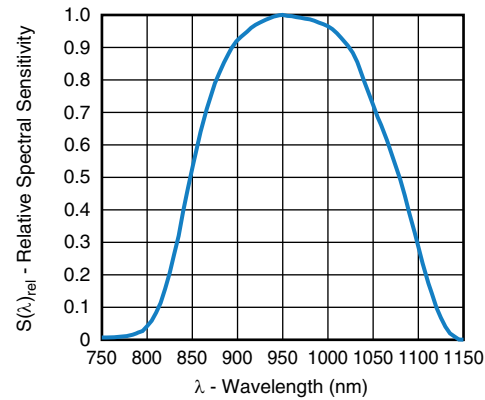


Fig. 8 - Relative Spectral Sensitivity vs. Wavelength

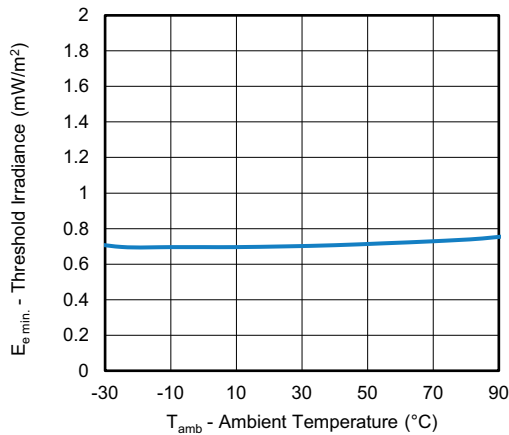


Fig. 6 - Sensitivity vs. Ambient Temperature

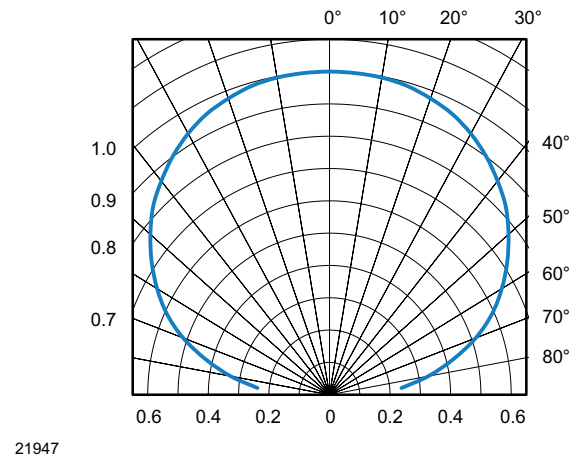


Fig. 9 - Horizontal Directivity

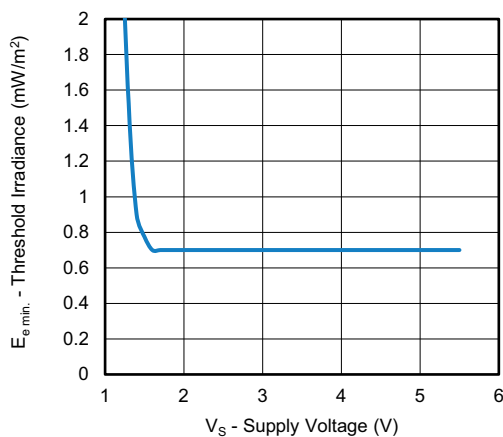
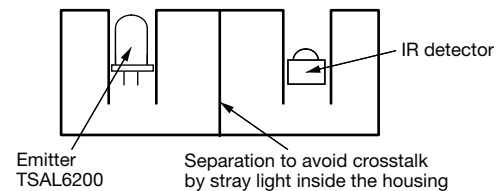


Fig. 7 - Sensitivity vs. Supply Voltage

The typical application of this device is a reflective or beam break sensor with active low “detect” or “no detect” information contained in its output. The TSSP570.. is also suitable for fast (~ 15 ms) proximity sensor applications for ranges between 10 cm and 2 m, if a burst pattern with variable intensity is used.

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.

Technical drawing of a rectangular mold, showing top and side views with dimensions and tolerances in mm.

**Top View Dimensions:**

- Overall width:  $4 \times 0.75 = 3$
- Overall height:  $1.8$
- Inner width:  $0.75 \pm 0.05$
- Inner height:  $0.475$
- Wall thickness:  $0.3$
- Bottom flange width:  $0.35 \pm 0.05$  (8 x)
- Bottom flange height:  $0.4$
- Bottom flange thickness:  $0.3$
- Bottom flange width (inner):  $1.5$
- Bottom flange width (outer):  $3$
- Bottom flange height (inner):  $0.55$
- Bottom flange height (outer):  $0.55$
- Bottom flange height (total):  $1.1$
- Bottom flange height (total, including tolerance):  $1 \pm 0.2$
- Bottom flange height (total, including tolerance, with note):  $1.15$
- Bottom flange height (total, including tolerance, with note):  $0.15$
- Bottom flange height (total, including tolerance, with note):  $0.3$
- Bottom flange height (total, including tolerance, with note):  $0.55$
- Bottom flange height (total, including tolerance, with note):  $0.7$
- Bottom flange height (total, including tolerance, with note):  $0.95$

**Side View Dimensions:**

- Overall height:  $1 \pm 0.2$
- Bottom flange height:  $0.15$
- Bottom flange width:  $0.3$
- Bottom flange height (inner):  $0.55$
- Bottom flange height (outer):  $0.55$
- Bottom flange height (total):  $1.1$
- Bottom flange height (total, including tolerance):  $1 \pm 0.2$
- Bottom flange height (total, including tolerance, with note):  $1.15$
- Bottom flange height (total, including tolerance, with note):  $0.15$
- Bottom flange height (total, including tolerance, with note):  $0.3$
- Bottom flange height (total, including tolerance, with note):  $0.55$
- Bottom flange height (total, including tolerance, with note):  $0.7$
- Bottom flange height (total, including tolerance, with note):  $0.95$

**Notes:**

- Outer edge to solder molded  $\pm 0.1$  mm
- technique according to specifications

**Surface Finish:**

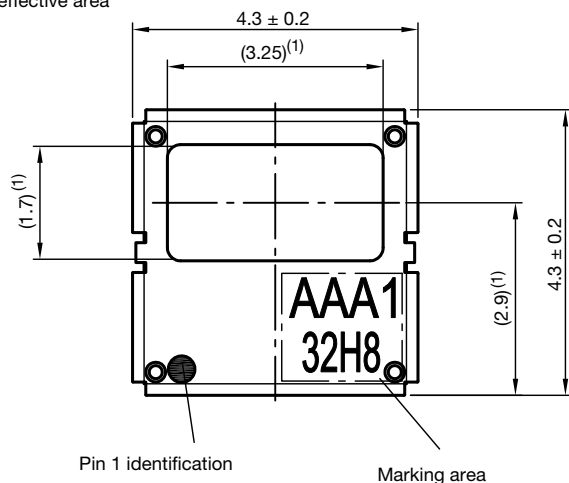
- Surface finish symbol:  $\nabla 0.1$

**Dimensions:**

- All dimensions in mm

technical drawings  
according to DIN  
specifications

(1) optically effective area



offset  
e of shield  
pads of  
device

Pinning from Topview

8  
GND

7<sup>(2)</sup>  
(GND)

6  
GND

Out  
(GND)

1 2 3 4 5

(2) (2) (2)

Vs

Proposed pad layout from  
component side  
(dim. for reference only)

(4.3)

(1.2)

(4.3)

4 x 0.75 = 3

(0.45)

(0.8) (3 x)

(2.75)

(3 x) (0.35)



## ASSEMBLY INSTRUCTIONS

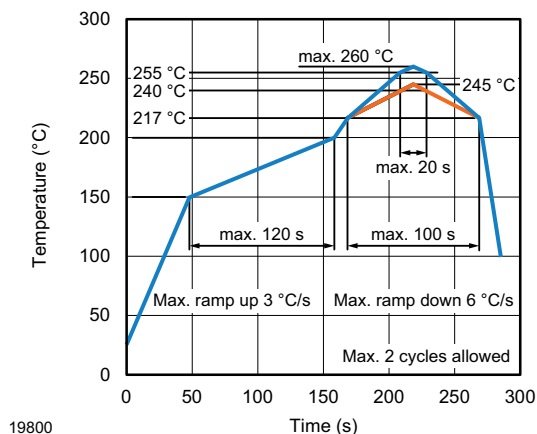
### Reflow Soldering

- Reflow soldering must be done within 168 h while stored under a max. temperature of 30 °C, 60 % RH after opening the dry pack envelope
- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Exercise extreme care to keep the maximum temperature below 260 °C. The temperature shown in the profile means the temperature at the device surface. Since there is a temperature difference between the component and the circuit board, it should be verified that the temperature of the device is accurately being measured
- Handling after reflow should be done only after the work surface has been cooled off

### Manual Soldering

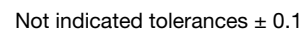
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off

## VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE



Tape and reel dimensions:

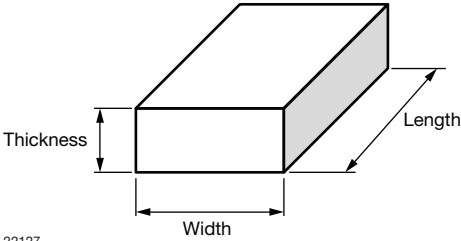
Reel size "Y"  
TT1  $\varnothing 180 \pm 2 = 1500$  pcs.





## OUTER PACKAGING

The sealed reel is packed into a pizza box.

CARTON BOX DIMENSIONS in millimeters			
			
	THICKNESS	WIDTH	LENGTH
Pizza box (Panhead, Heimdall, and Belobog) (taping in reels)	50	340	340

## LABEL

### Standard bar code labels for finished goods

The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain Vishay Semiconductor GmbH specific data.

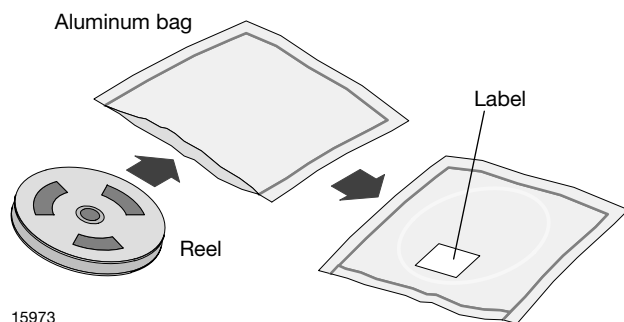
VISHAY SEMICONDUCTOR GmbH STANDARD BAR CODE PRODUCT LABEL (finished goods)		
PLAIN WRITING	ABBREVIATION	LENGTH
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by	ACC	-
Packed by	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	xxxxxxx+	Company logo
LONG BAR CODE TOP	TYPE	LENGTH
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
SHORT BAR CODE BOTTOM	TYPE	LENGTH
Selection-code	X	3
Data-code	N	3
Batch-number	X	10
Filter	-	1
Total length	-	17





## DRY PACKING

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



15973

## FINAL PACKING

The sealed reel is packed into a cardboard box.

## RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 168 h under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:  
192 h at 40 °C + 5 °C / - 0 °C and < 5 % RH (dry air / nitrogen) or

96 h at 60 °C + 5 °C and < 5 % RH for all device containers or

24 h at 125 °C + 5 °C not suitable for reel or tubes.

An EIA JEDEC® standard J-STD-020 level 3 label is included on all dry bags.

Caution		LEVEL 3
This bag contains MOISTURE-SENSITIVE DEVICES		
1. Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)		
2. Peak package body temperature: 260 °C <small>If blank, see adjacent bar code label</small>		
3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be		
a) Mounted within: 168 hours of factory conditions <small>If blank, see adjacent bar code label</small>		
b) Stored per J-STD-033		
4. Devices require bake, before mounting, if:		
a) Humidity Indicator Card reads > 10% for level 2a - 5a devices or >60% for level 2 devices when read at 23±5°C		
b) 3a or 3b are not met		
5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure		
Bag Seal Date: _____ <small>If blank, see adjacent bar code label</small>		
<small>Note: Level and body temperature defined by IPC/JEDEC J-STD-020</small>		

22650

EIA JEDEC standard J-STD-020 level 3 label is included on all dry bags

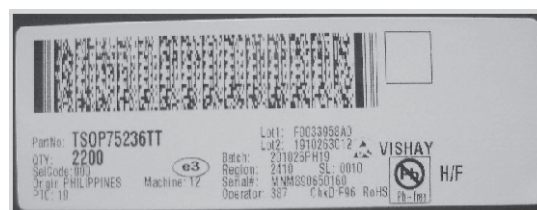
## ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electrostatic sensitive devices warning labels are on the packaging.

## VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.

## BAR CODE PRODUCT LABEL (example)



22178



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