



1IR Receiver Modules for Remote Control Systems



20953

LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

The TSMP77138 series are miniaturized SMD IR receiver modules for infrared remote control systems. Two PIN diodes and a preamplifier are assembled on a leadframe, the epoxy package contains an IR filter. The modulated output signal, carrier out, can be used for repeater applications and code learning applications.

These components have not been qualified according to automotive specifications.

FEATURES

- Two lenses for high sensitivity and wide receiving angle
- AC coupled response from 30 kHz to 55 kHz, all data formats
- If the IR signal strength is less than 0.5 W/m² (distance more than 0.5 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



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

MECHANICAL DATA

Pinning:

1, 4 = GND, 2 = V_S, 3 = OUT

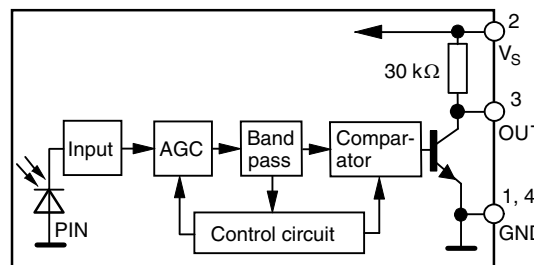
ORDERING CODE

Taping:

TSMP77138TT - top view taped, 2200 pcs/reel

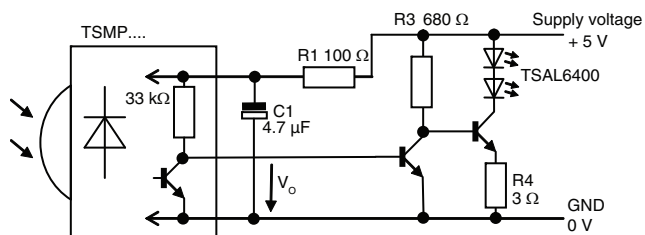
TSMP77138TR - side view taped, 2300 pcs/reel

BLOCK DIAGRAM



23161

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.

22638-1



PARTS TABLE	
AGC	
LEGACY, FOR LONG BURST REMOTE CONTROLS (AGC2)	
Carrier frequency	38 kHz
TSMP77138	
Package	Heimdall
Pinning	1, 4 = GND, 2 = V _S , 3 = OUT
Dimensions (mm)	6.8 W x 3.0 H x 3.2 D
Mounting	SMD
Application	Repeater
Special options	<ul style="list-style-type: none"> Extended temperature range: www.vishay.com/doc?82738 Narrow optical filter: www.vishay.com/doc?81590 Wide optical filter: www.vishay.com/doc?82726

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} ≤ 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 voltage		V _S	2.5	-	5.5	V
Supply current	V _S = 5 V, E _v = 0	I _{SD}	0.55	0.7	0.9	mA
	E _v = 40 klx, sunlight	I _{SH}	-	0.8	-	mA
Transmission distance	E _v = 0, test signal see Fig. 1, IR diode TSAL6200, I _F = 50 mA	d	-	7	-	m
Output voltage low	I _{OSL} = 0.5 mA, E _e = 0.7 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 min.	-	1	2	mW/m ²
Maximum irradiance	Less than 5 missing or 5 additional sub carrier pulses related to one burst	E _e max.	30	-	-	W/m ²
Directivity	Angle of half transmission distance	φ _{1/2}	-	± 50	-	°



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

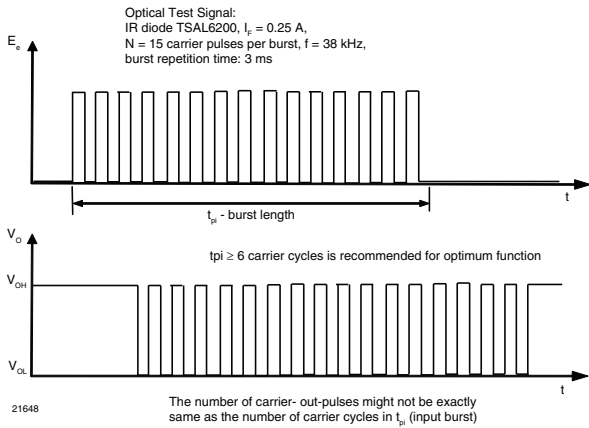


Fig. 1 - Output Active Low

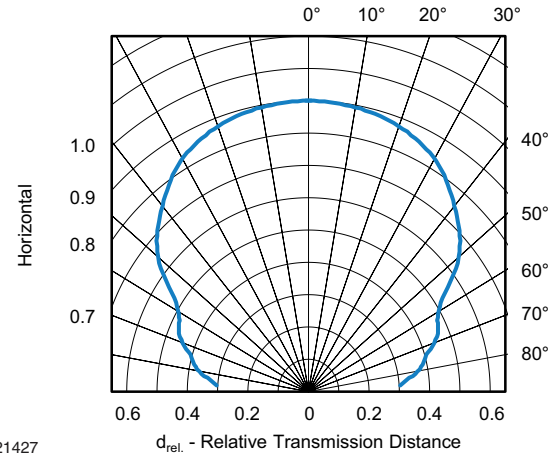


Fig. 4 - Horizontal Directivity

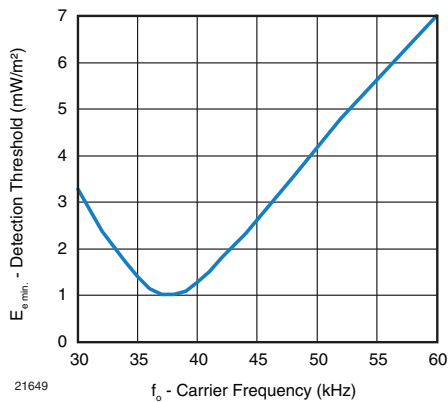


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

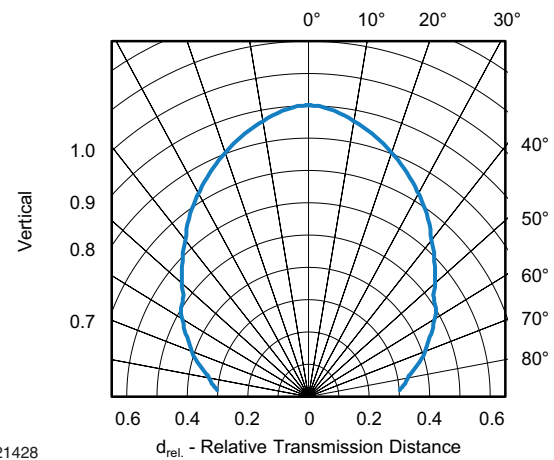


Fig. 5 - Vertical Directivity

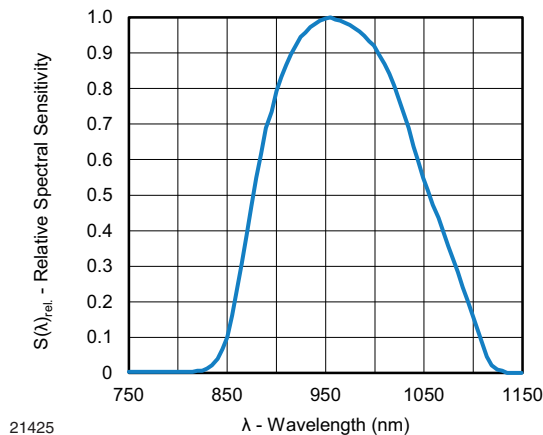
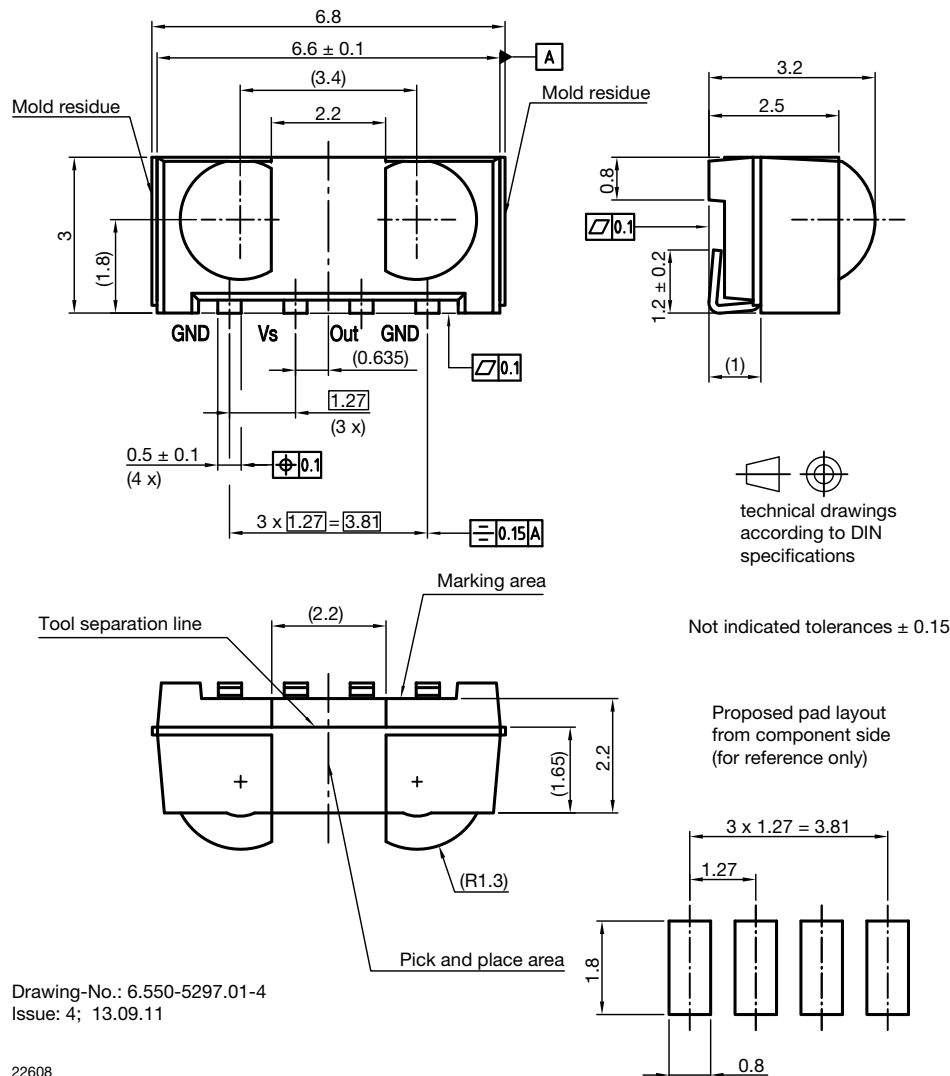


Fig. 3 - Relative Spectral Sensitivity vs. Wavelength

**PACKAGE DIMENSIONS** in millimeters**ASSEMBLY INSTRUCTIONS****Reflow Soldering**

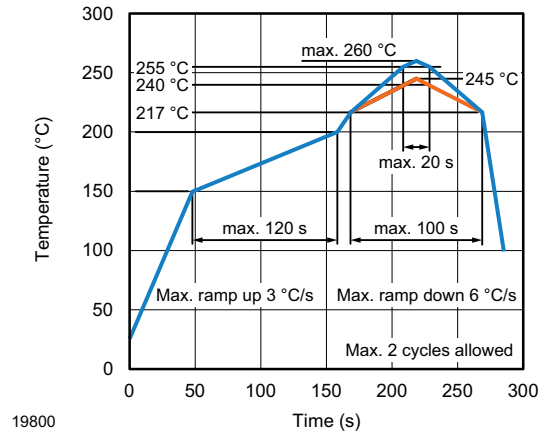
- Reflow soldering must be done within 72 h while stored under a max. temperature of 30 °C, 60 % RH after opening the dry pack envelope
- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Exercise extreme care to keep the 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

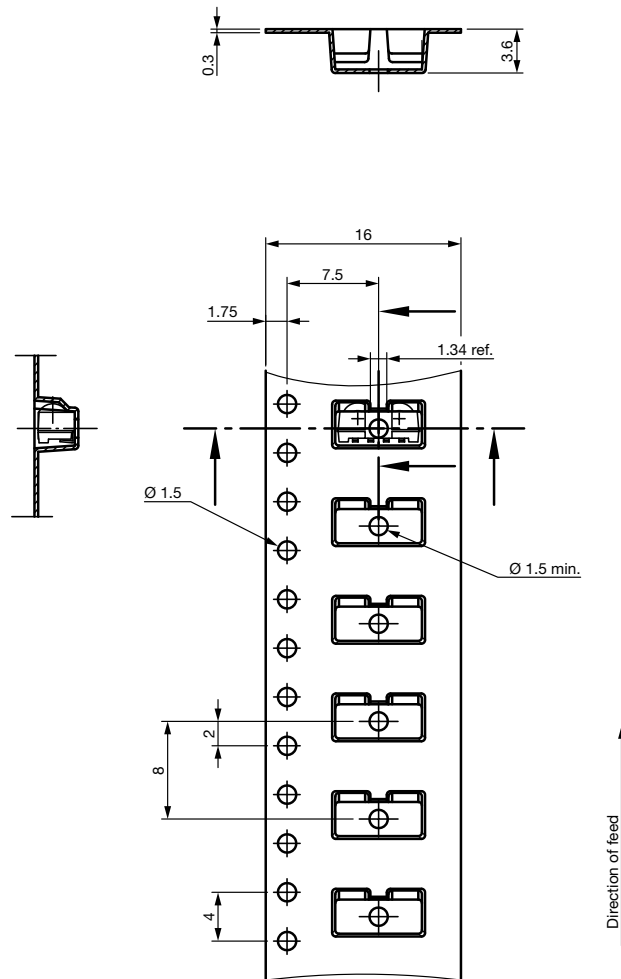
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off



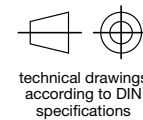
VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE



TAPING VERSION TSMP..TR DIMENSIONS in millimeters

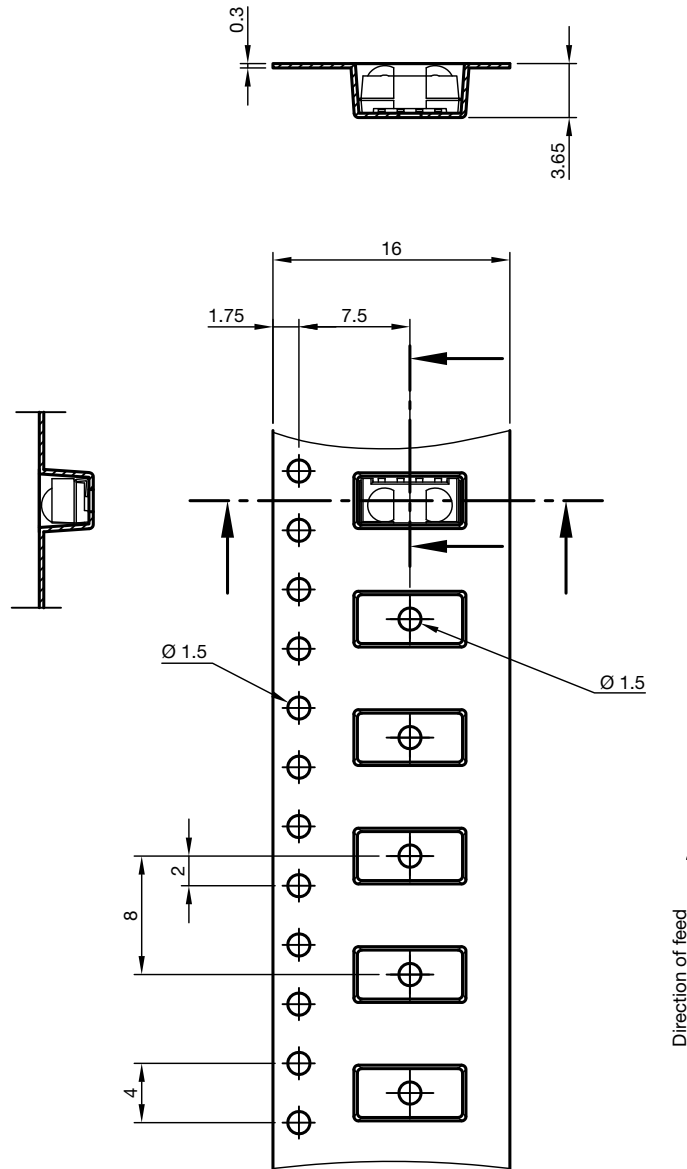


Drawing-No.: 9.700-5337.01-4
Issue: 2; 06.10.15

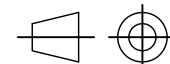




TAPING VERSION TSMP..TT DIMENSIONS in millimeters



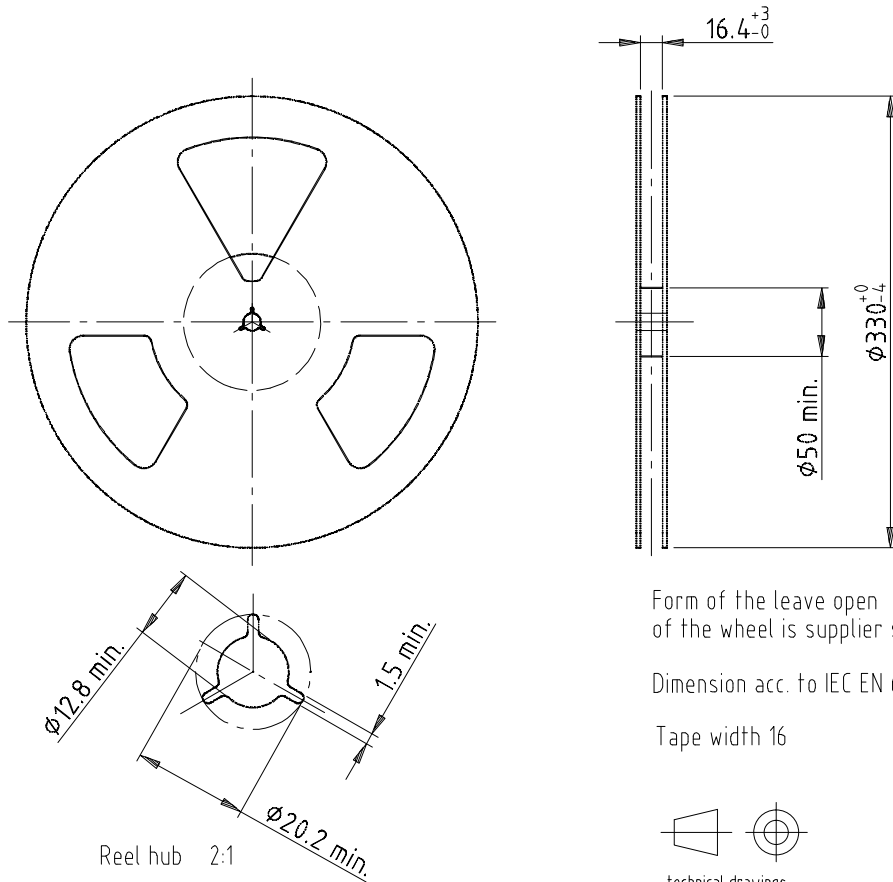
Drawing-No.: 9.700-5338.01-4
Issue: 4; 12.06.13



technical drawings
according to DIN
specifications



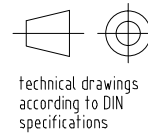
REEL DIMENSIONS in millimeters



Form of the leave open of the wheel is supplier specific.

Dimension acc. to IEC EN 60 286-3

Tape width 16

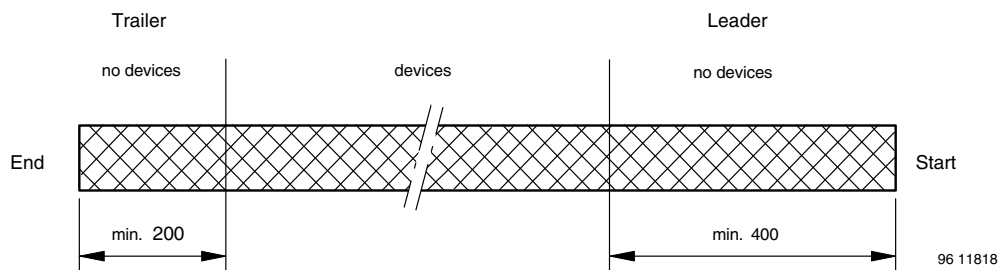


Drawing-No.: 9.800-5052.V2-4

Issue: 1; 07.05.02

16734

LEADER AND TRAILER DIMENSIONS in millimeters



COVER TAPE PEEL STRENGTH

According to DIN EN 60286-3

0.1 N to 1.3 N

300 ± 10 mm/min.

165° to 180° peel angle

**OUTER PACKAGING**

The sealed reel is packed into a pizza box.

CARTON BOX DIMENSIONS in millimeters			
	THICKNESS	WIDTH	LENGTH
Pizza box (SMD and heimdall) (taping in reels)	50	340	340

LABEL**Standard bar code labels for finished goods**

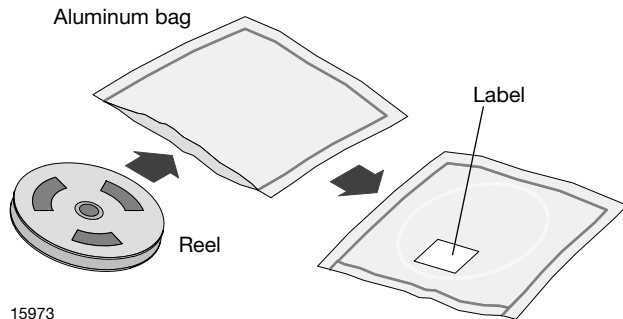
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain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



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 72 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.

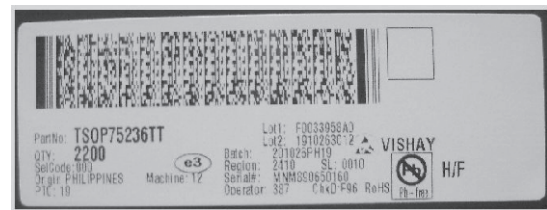
An EIA JEDEC® standard J-STD-020 level 4 label is included on all dry bags.

ESD PRECAUTION

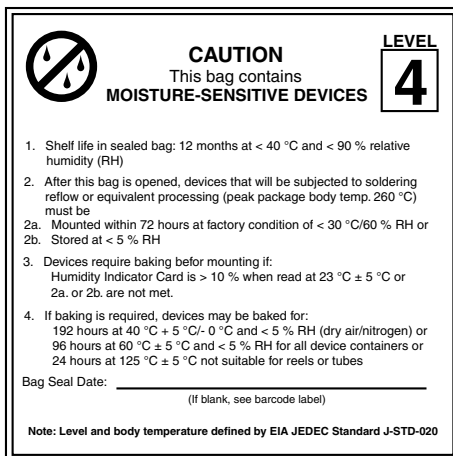
Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electrostatic sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS (example)

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.



22178



22522

EIA JEDEC standard J-STD-020 level 4 label is included on all dry bags



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