IR Sensor Module for Remote Control Systems



20953

FEATURES

- Photo detector and preamplifier in one package
- AC coupled response from 20 kHz to 60 kHz, all data formats
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Supply voltage 2.5 V to 5.5 V, typically the device works in the range between 2.0 V and 5.5 V
- Carrier out signal for code learning functions
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

Product Page | 3D Models | Calculators | Marking

DESCRIPTION

The TSMP77000 is a two lens miniaturized sensor for receiving various kinds of modulated IR signals. Two PIN diodes and a 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 code learning applications.

This component has not been qualified according to automotive specifications.

MECHANICAL DATA

Pinning:

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

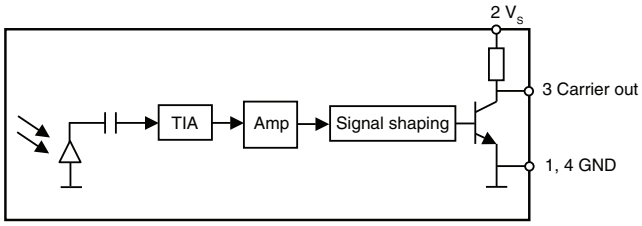
ORDERING CODE

Taping:

TSMP77000TT - top view taped, 2200 pcs/reel

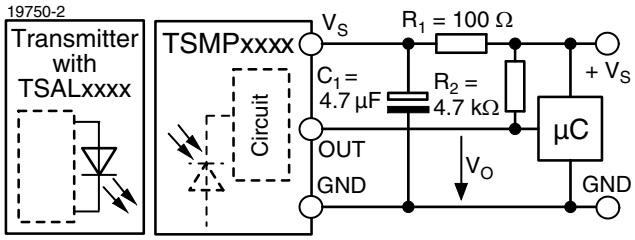
TSMP77000TR - side view taped, 2300 pcs/reel

BLOCK DIAGRAM



19746-3

APPLICATION CIRCUIT



R_1 + C_1 recommended to suppress power supply disturbances.
R_2 recommended to get faster slopes and a correct high level of the output pulses.

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PARTS TABLE		
Carrier frequency	20 kHz to 60 kHz	TSMP77000
Package		Heimdall
Pinning		1, 4 = GND, 2 = V_S, 3 = carrier OUT
Dimensions (mm)		6.8 W x 3.0 H x 3.2 D
Mounting		SMD
Application		Code learning
Special options		• 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 (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage (pin 2)		V_S	-0.3 to +6	V
Output voltage (pin 3)		V_O	-0.3 to (V_S + 0.3)	V
Output current (pin 3)		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

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 CARRIER OUT
(T_{amb} = 25 °C, unless otherwise specified, V_S = 3 V)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current (pin 2)	E_v = 0	I_{SD}	0.55	0.7	0.9	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 = 50 mA	d	-	1.8	-	m
Output voltage low (pin 3)	I_{OSL} = 0.5 mA, test signal see Fig. 1	V_{OSL}	-	-	250	mV
Minimum irradiance	V_S = 3 V, (20 kHz to 60 kHz)	$E_{e\ min.}$	-	12	25	mW/m²
Maximum irradiance	Test signal see Fig. 1, (20 kHz to 60 kHz)	$E_{e\ max.}$	50	80	-	W/m²
Directivity	Angle of half transmission distance	$\varphi_{1/2}$	-	± 50	-	°
Output accuracy	f_C = 20 kHz to 60 kHz, E_e = 25 mW/m² to 50 W/m², test signal see Fig. 1, BER ≤ 2%	N carrier pulses	Input burst length - 1 cycle	Input burst length	Input burst length + 1 cycle	counts

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

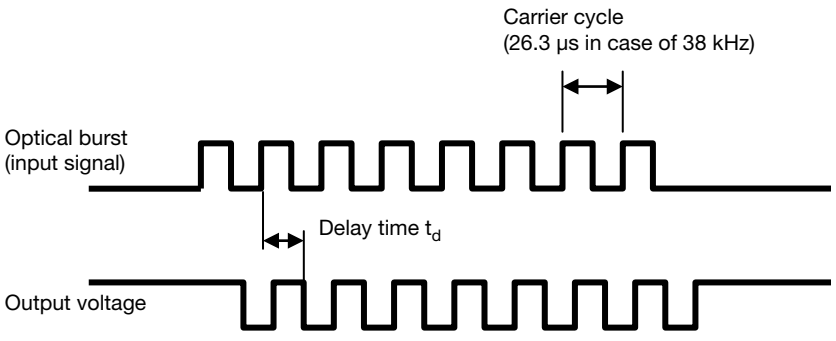


Fig. 1 - Testsignal

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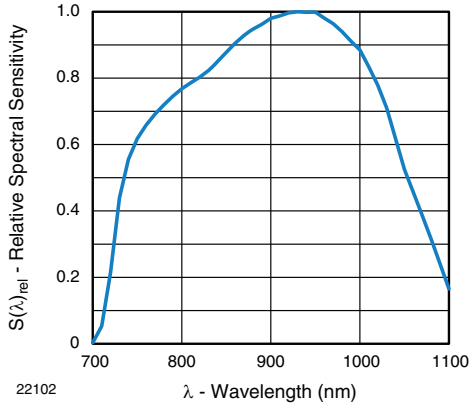


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength

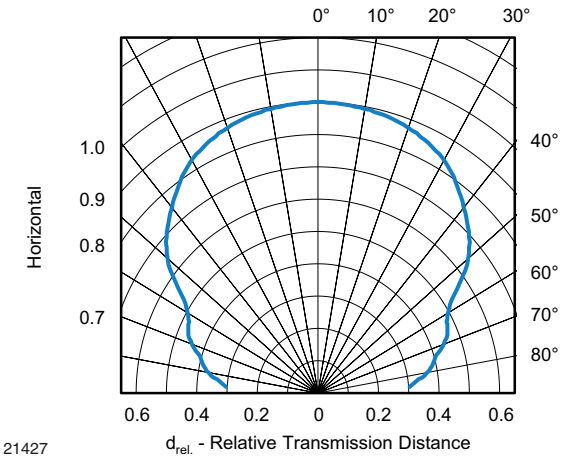


Fig. 3 - Horizontal Directivity

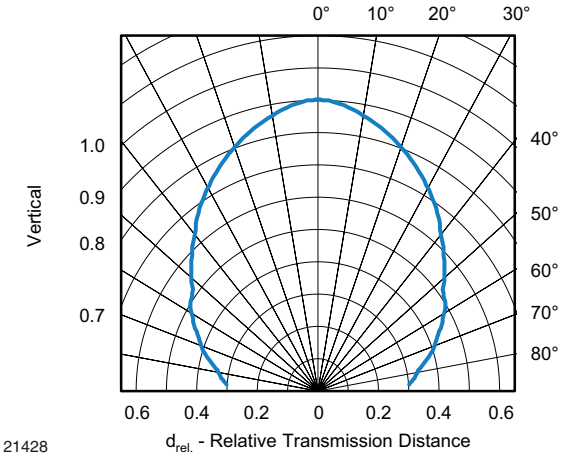
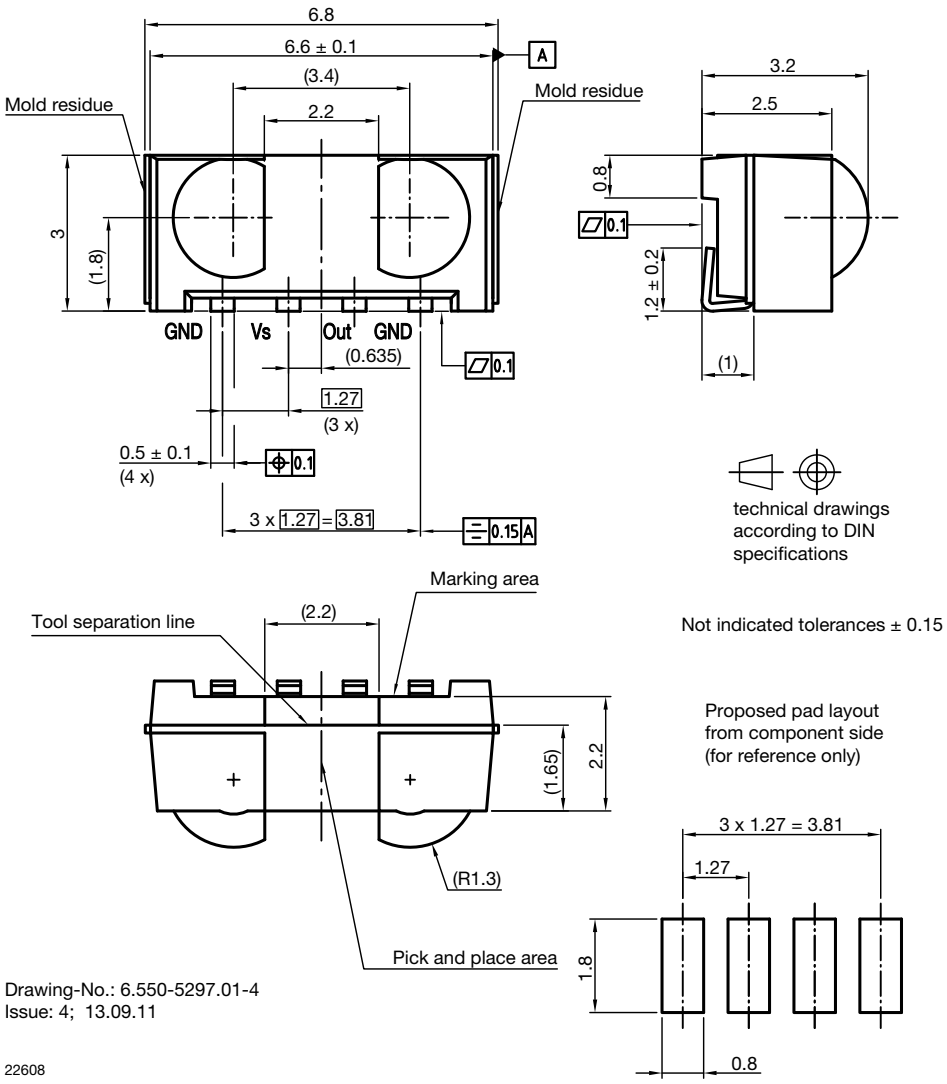


Fig. 4 - Vertical Directivity

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PACKAGE DIMENSIONS in millimeters



ASSEMBLY INSTRUCTIONS

Reflow Soldering

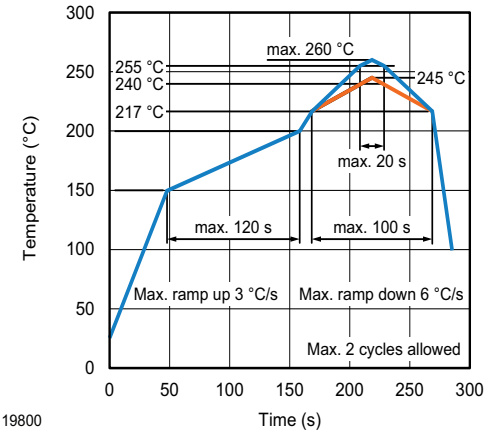
- Reflow soldering must be done within 72 h while stored under a max. temperature of 30 °C, 60 % RH after opening the dry pack envelope
- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Exercise extreme care to keep the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

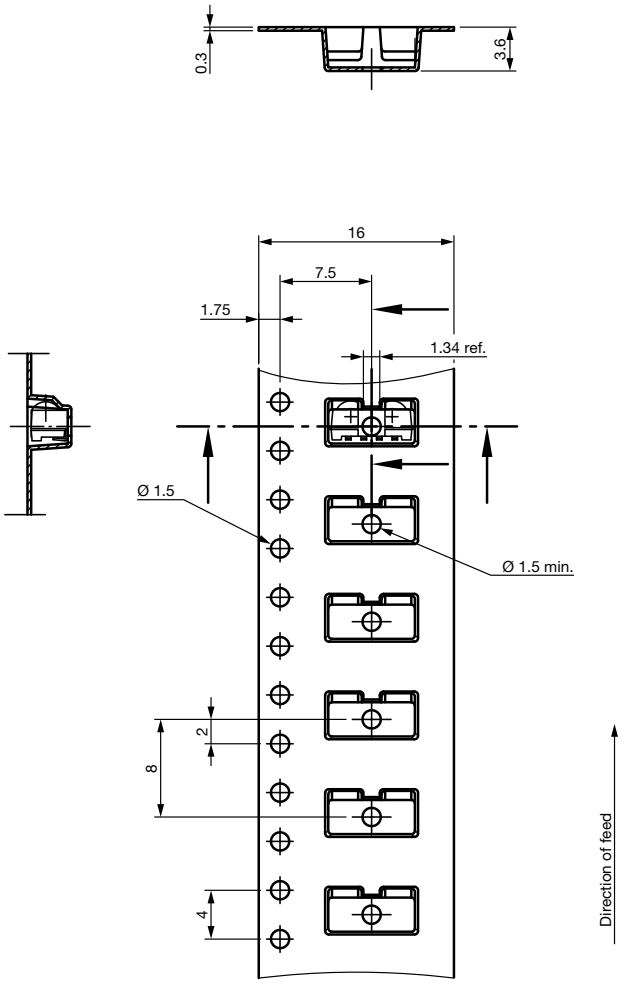
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off

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VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE



TAPING VERSION TSMP..TR DIMENSIONS in millimeters

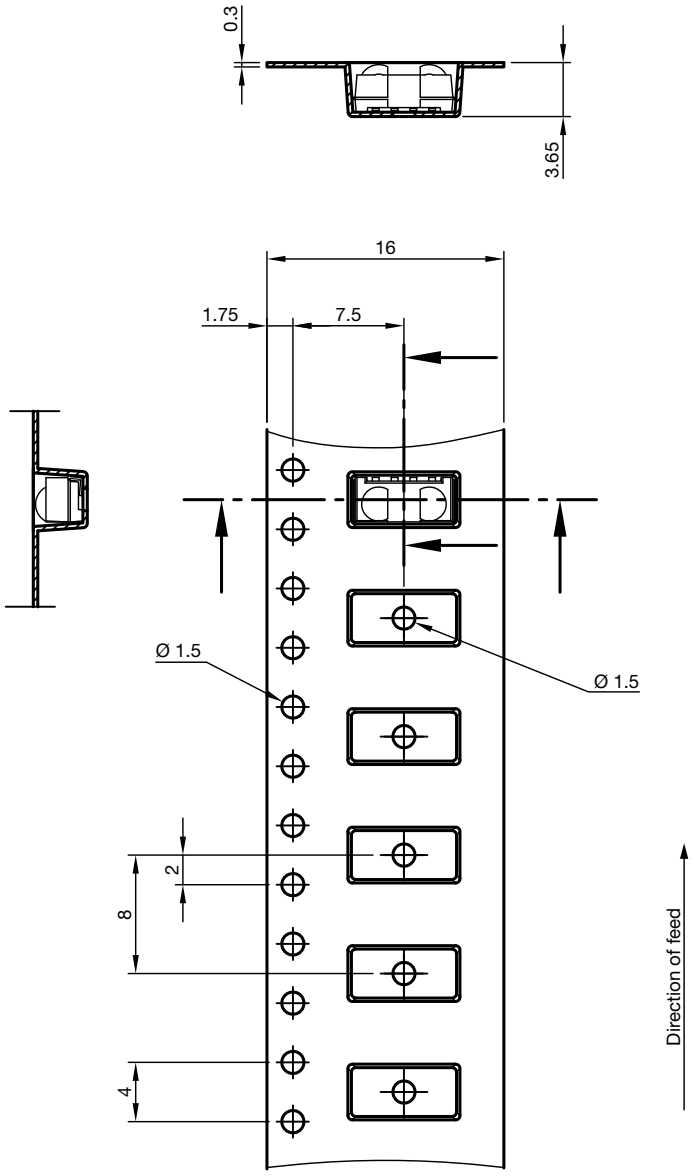


Drawing-No.: 9.700-5337.01-4
Issue: 2; 06.10.15

technical drawings
according to DIN
specifications

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TAPING VERSION TSMP..TT DIMENSIONS in millimeters

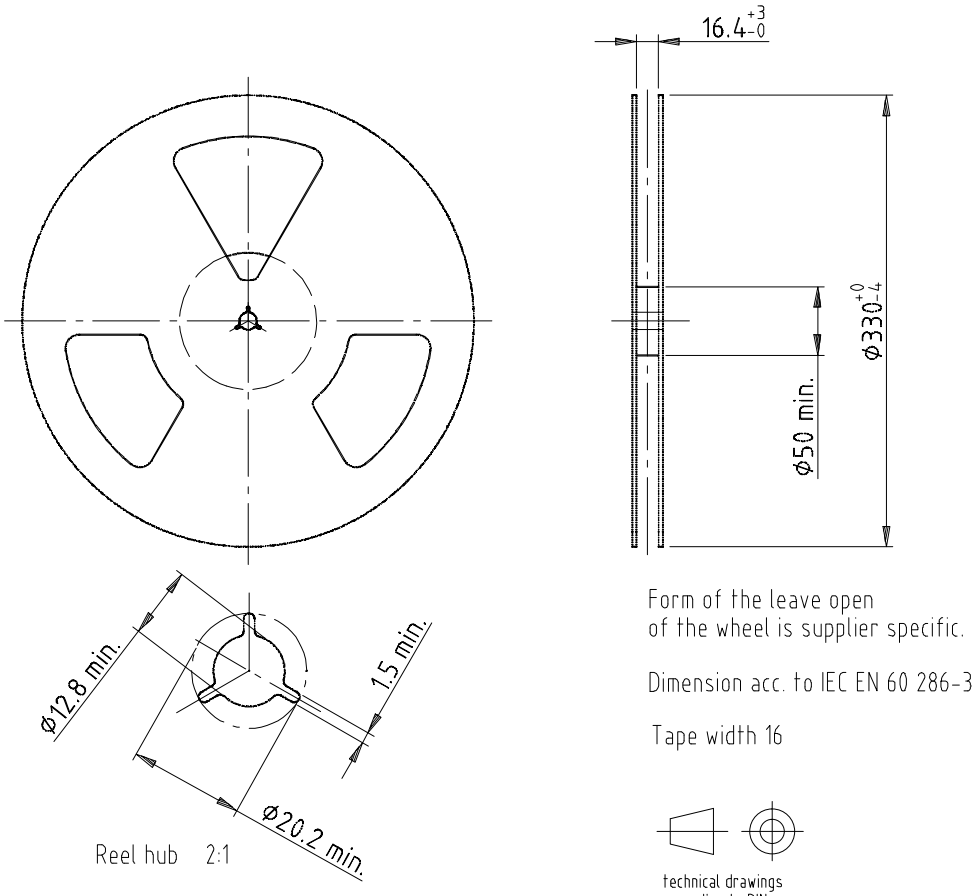


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Issue: 4; 12.06.13

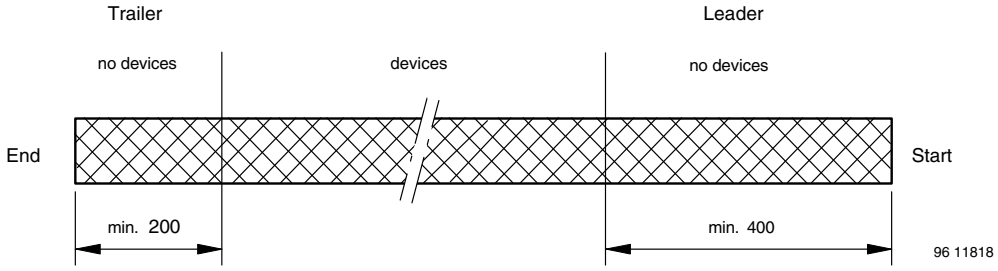
technical drawings
according to DIN
specifications

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REEL DIMENSIONS in millimeters



LEADER AND TRAILER DIMENSIONS in millimeters



COVER TAPE PEEL STRENGTH

According to DIN EN 60286-3

0.1 N to 1.3 N

300 mm/min. ± 10 mm/min.

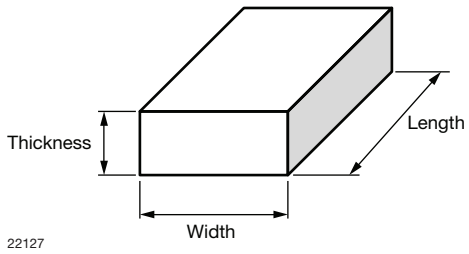
165° to 180° peel angle

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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.

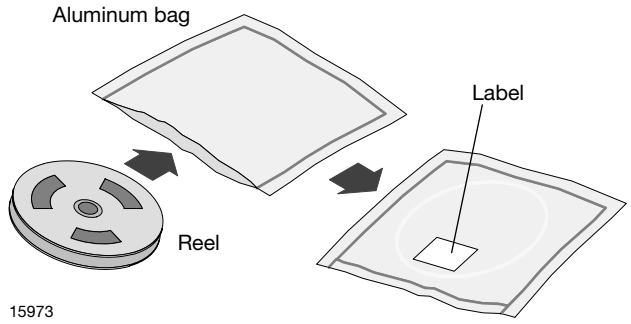
VISHAY SEMICONDUCTOR GmbH STANDARD BAR CODE PRODUCT LABEL (finished goods)

PLAIN WRITTING	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

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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:

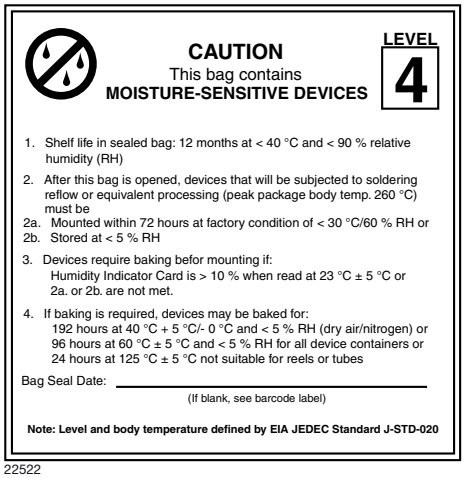
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 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.



22522

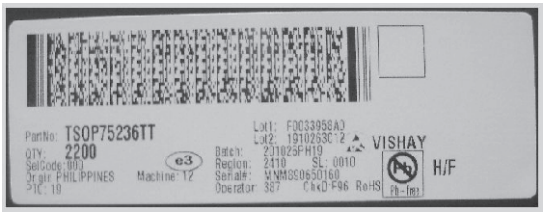
EIA JEDEC standard J-STD-020 level 4 label is included on all dry bags

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

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

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