

## IR Receiver Modules for Remote Control Systems



20953

### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

The TSMP95100XV series are miniaturized SMD IR receiver modules for infrared remote control systems. A PIN diode 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

- High sensitivity and wide receiving angle
- AC coupled response from 30 kHz to 60 kHz, all data formats
- Improved shielding against electrical field disturbance
- AGC to suppress ambient noise
- High sensitivity, long receiving range
- Supply voltage: 2.0 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)



### MECHANICAL DATA

#### Pinning:

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

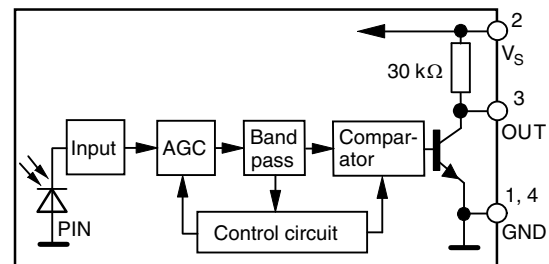
### ORDERING CODE

#### Taping:

TSMP95100XVTT - top view taped, 2200 pcs/reel

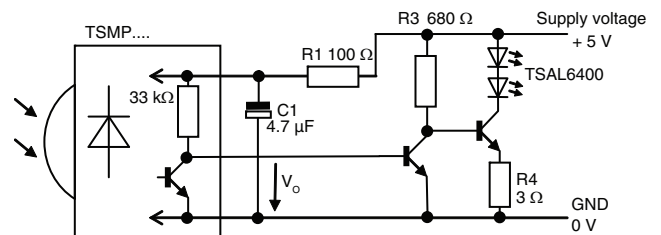
TSMP95100XVTR - side view taped, 2300 pcs/reel

### 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		
Carrier frequency	38 kHz	TSMP95100XV
Package	Heimdall	
Pinning	1, 4 = GND, 2 = V <sub>S</sub> , 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"> <li>Extended temperature range: <a href="http://www.vishay.com/doc?82738">www.vishay.com/doc?82738</a></li> <li>Narrow optical filter: <a href="http://www.vishay.com/doc?81590">www.vishay.com/doc?81590</a></li> <li>Wide optical filter: <a href="http://www.vishay.com/doc?82726">www.vishay.com/doc?82726</a></li> </ul>	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V <sub>S</sub>	-0.3 to +6	V
Supply current		I <sub>S</sub>	5	mA
Output voltage		V <sub>O</sub>	-0.3 to (V <sub>S</sub> + 0.3)	V
Output current		I <sub>O</sub>	5	mA
Junction temperature		T <sub>j</sub>	100	°C
Storage temperature range		T <sub>stg</sub>	-25 to +85	°C
Operating temperature range		T <sub>amb</sub>	-25 to +85	°C
Power consumption	T <sub>amb</sub> ≤ 85 °C	P <sub>tot</sub>	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 <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		V <sub>S</sub>	2.0	-	5.5	V
Supply current	V <sub>S</sub> = 3.3 V, E <sub>v</sub> = 0	I <sub>SD</sub>	0.25	0.35	0.45	mA
	E <sub>v</sub> = 40 klx, sunlight	I <sub>SH</sub>	-	0.45	-	mA
Transmission distance	E <sub>v</sub> = 0, test signal see Fig. 1, IR diode TSAL6200, I <sub>F</sub> = 50 mA	d	-	10	-	m
Output voltage low	I <sub>OSL</sub> = 0.5 mA, E <sub>e</sub> = 0.7 mW/m <sup>2</sup> , test signal see Fig. 1	V <sub>OSL</sub>	-	-	100	mV
Minimum irradiance	Less than 7 missing or 3 additional sub carrier pulses related to one burst, f = 38 kHz	E <sub>e</sub> min.	-	0.5	2.5	mW/m <sup>2</sup>
Maximum irradiance	Less than 7 missing or 3 additional sub carrier pulses related to one burst, f = 38 kHz	E <sub>e</sub> max.	30	-	-	W/m <sup>2</sup>
Directivity	Angle of half transmission distance	φ <sub>1/2</sub>	-	± 50	-	°

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

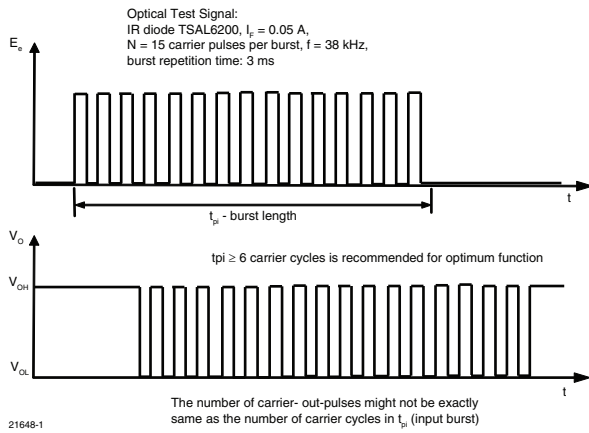


Fig. 1 - Output Active Low

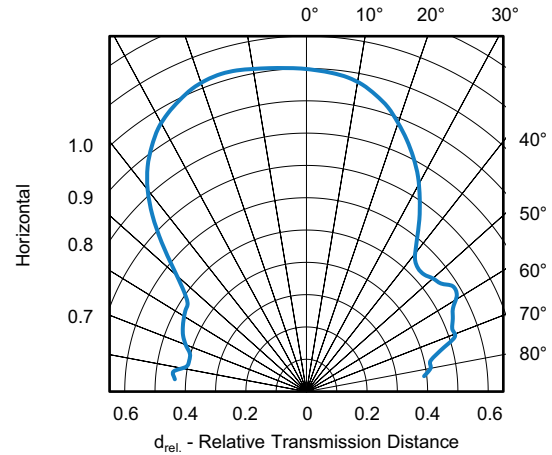


Fig. 4 - Horizontal Directivity

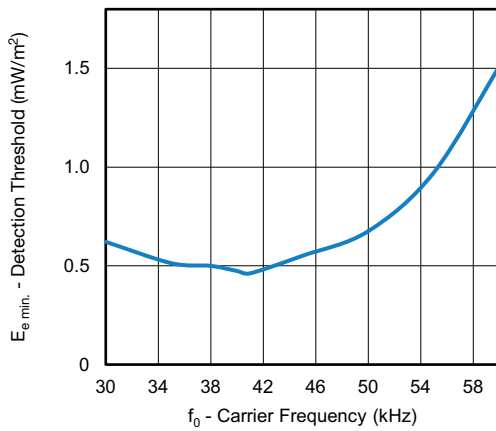


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

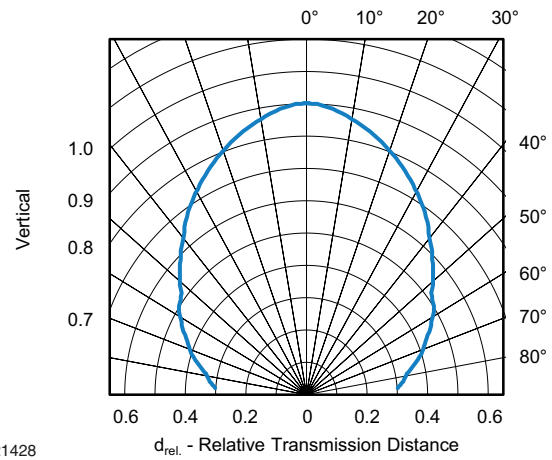


Fig. 5 - Vertical Directivity

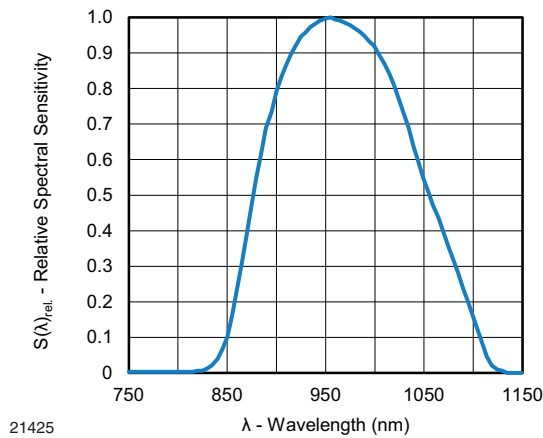
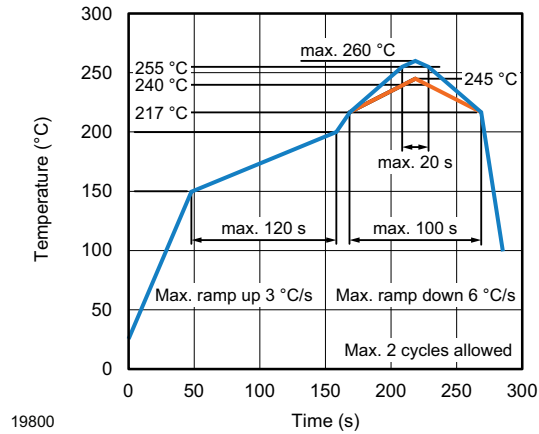


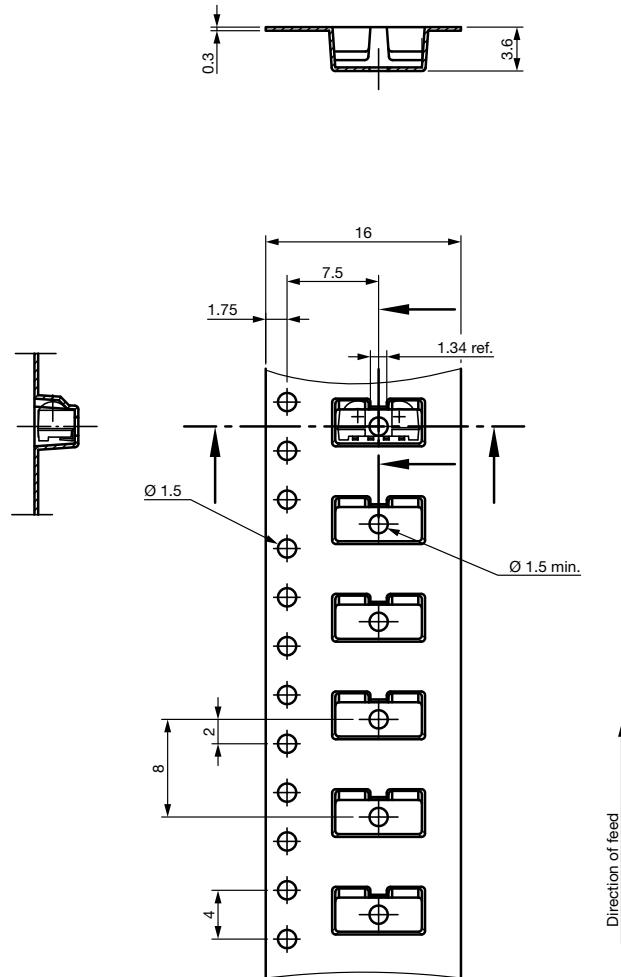
Fig. 3 - Relative Spectral Sensitivity vs. Wavelength



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



**TAPING VERSION TSMP..TR DIMENSIONS in millimeters**

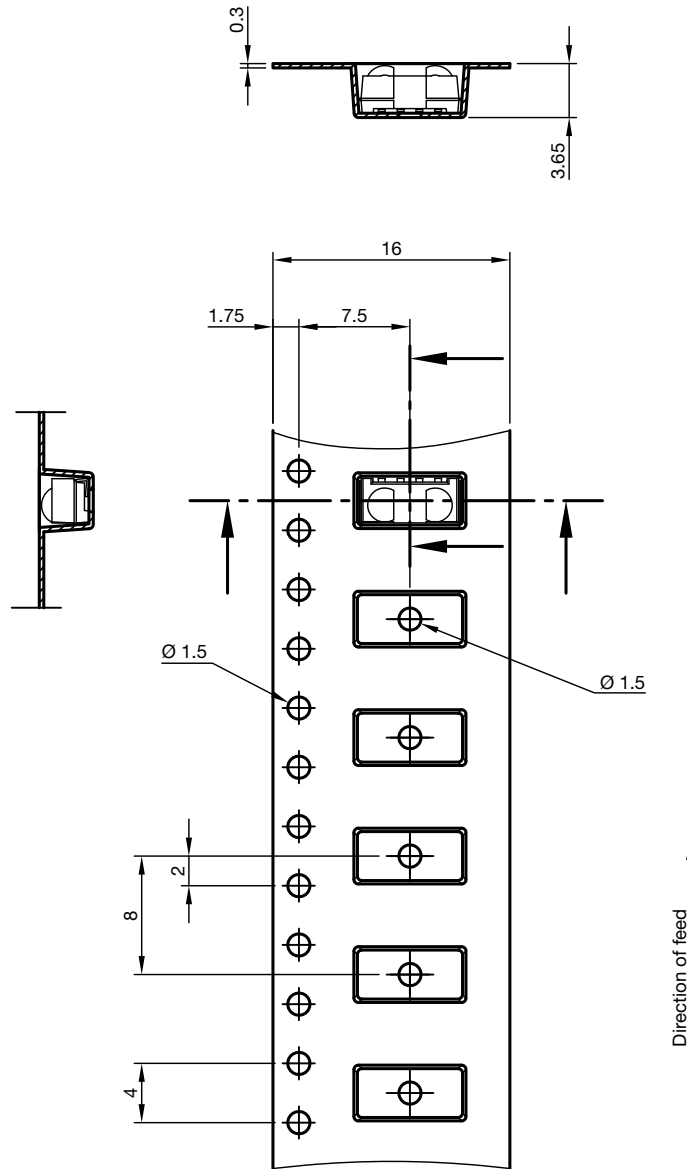


Drawing-No.: 9.700-5337.01-4  
Issue: 2; 06.10.15

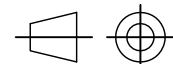
technical drawings according to DIN specifications



## TAPING VERSION TSMP..TT DIMENSIONS in millimeters

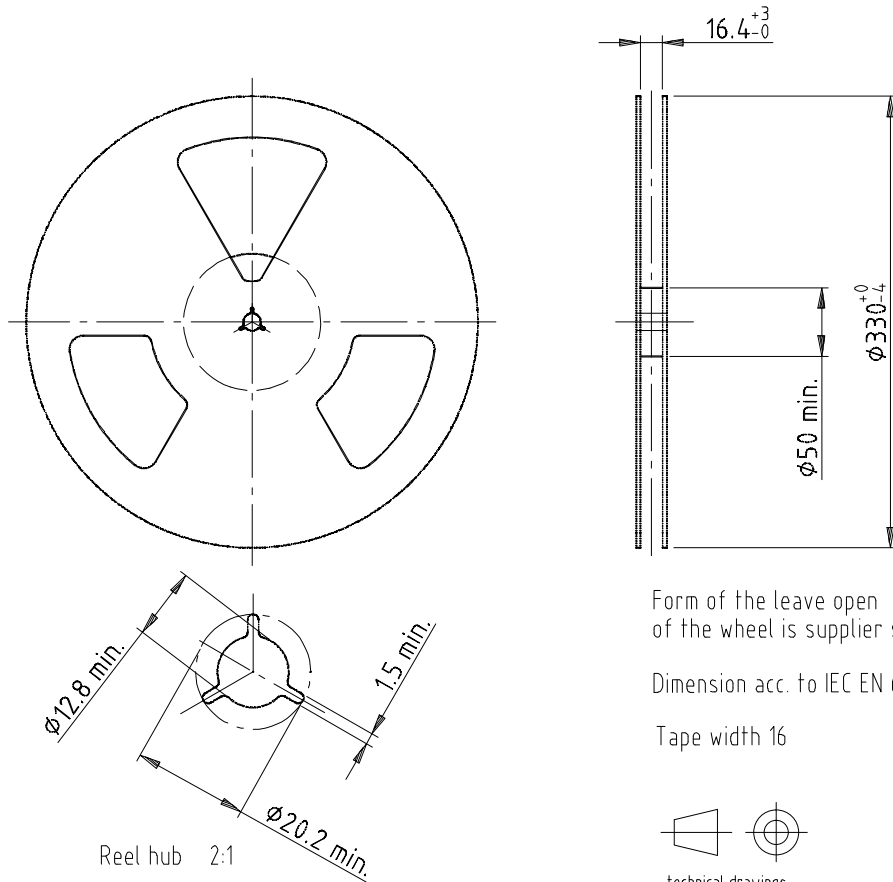


Drawing-No.: 9.700-5338.01-4  
Issue: 4; 12.06.13



technical drawings  
according to DIN  
specifications

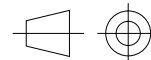
**REEL DIMENSIONS** in millimeters



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

Dimension acc. to IEC EN 60 286-3

Tape width 16



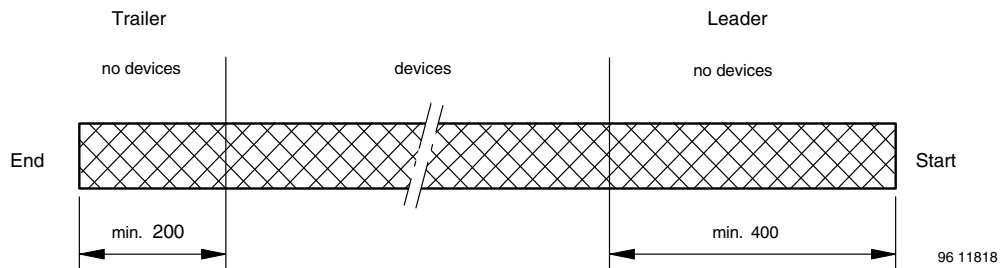
technical drawings according to DIN specifications

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

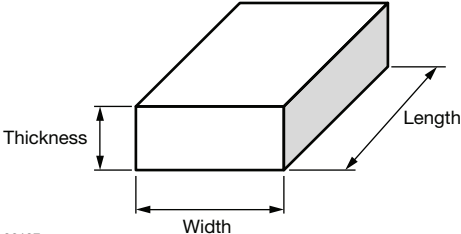
0.1 N to 1.3 N

300 ± 10 mm/min.

165° to 180° peel angle

**OUTER PACKAGING**

The sealed reel is packed into a pizza box.

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

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

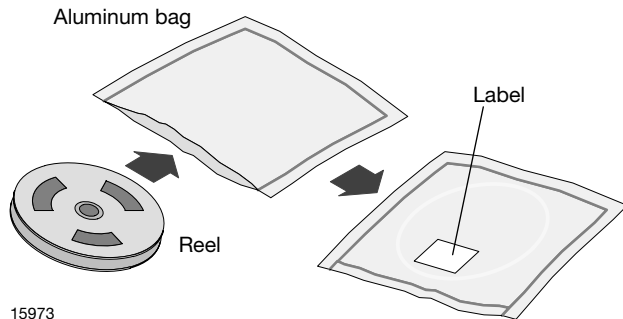
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain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

<b>VISHAY SEMICONDUCTOR GmbH STANDARD BAR CODE PRODUCT LABEL</b> (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.

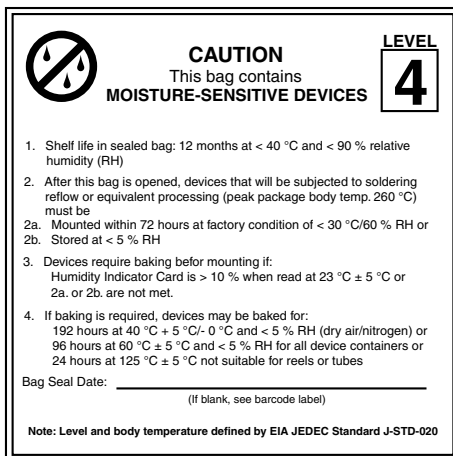
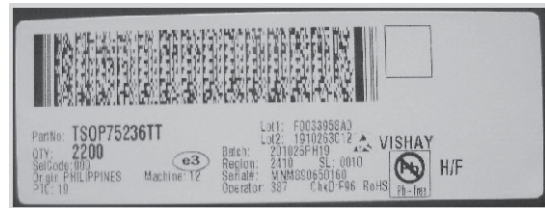
An EIA JEDEC® standard J-STD-020 level 4 label is included on all dry bags.

**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.



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



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