Chipsmall

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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!
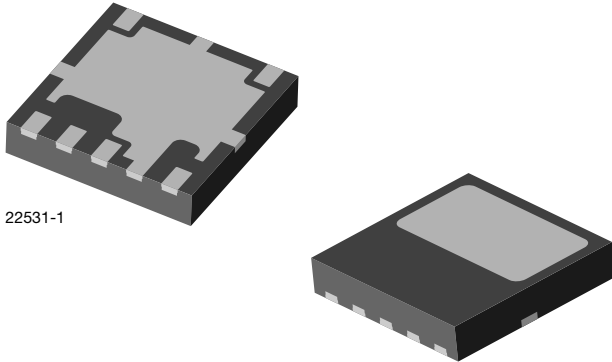
Contact us

IR Receiver Modules for Remote Control Systems

FEATURES

- Height of 0.8 mm
- ± 75° half angle sensitivity
- Low supply current
- Photo detector and preamplifier in one package
- Suitable for all common data formats including those for short bursts
- Supply voltage: 2.5 V to 5.5 V, typically even 2.0 V to 5.5 V is possible
- Improved immunity against ambient light
- Insensitive to supply voltage ripple and noise
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS
COMPLIANT
*GREEN*
(5-2008)

22531-1

DESCRIPTION

The TSOP573.., TSOP575.. series are miniaturized receiver modules for infrared remote control systems. A PIN diode and a preamplifier are assembled on a lead frame, the epoxy lens cap is designed as an IR filter.

The demodulated output signal can be directly decoded by a microprocessor. The TSOP573.. is compatible with all common IR remote control data formats. It is optimized to suppress allmost all spurious pulses from energy saving fluorescent lamps. The TSOP575.. has an excellent noise suppression. It is immune to dimmed LCD backlighting and any fluorescent lamps. IR receivers with AGC3 and AGC5 setting may also suppress some data signals in case of continuous transmission.

This component has not been qualified according to automotive specifications.
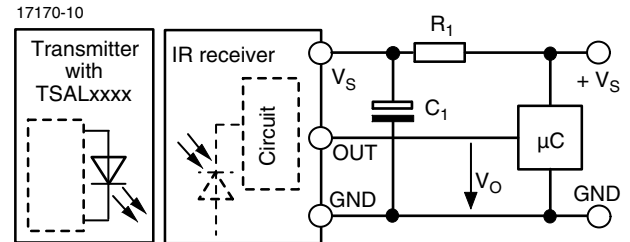
PARTS TABLE

CARRIER FREQUENCY	STANDARD APPLICATIONS (AGC3)	VERY NOISY ENVIRONMENTS (AGC5)
36 kHz	TSOP57336	TSOP57536
38 kHz	TSOP57338	TSOP57538
40 kHz	TSOP57340	TSOP57540
56 kHz	TSOP57356	TSOP57556

BLOCK DIAGRAM
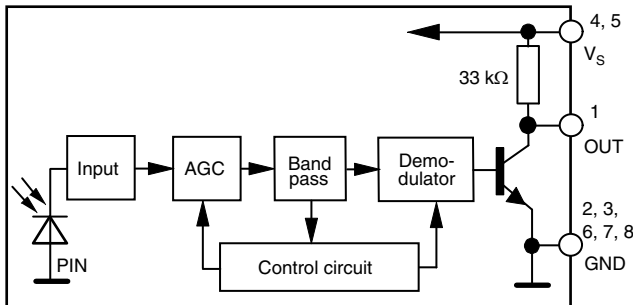
20445-6

APPLICATION CIRCUIT

17170-10

The external components R_1 and C_1 are optional to improve the robustness against electrical overstress (typical values are R_1 = 100 Ω, C_1 = 0.1 µF).

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	$T_{amb} \leq 85$ °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	$E_v = 0$, IR diode TSAL6200, $I_F = 250$ mA, test signal see fig. 1	d		40		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	Pulse width tolerance: $t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$, test signal see fig. 1	$E_{e\ min.}$		0.2	0.4	mW/m^2
Maximum irradiance	$t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$, test signal see fig. 1	$E_{e\ max.}$	50			W/m^2
Directivity	Angle of half transmission distance	$\varphi_{1/2}$		± 75		deg

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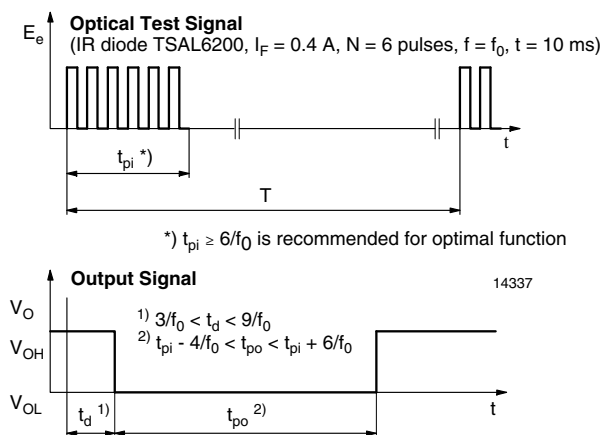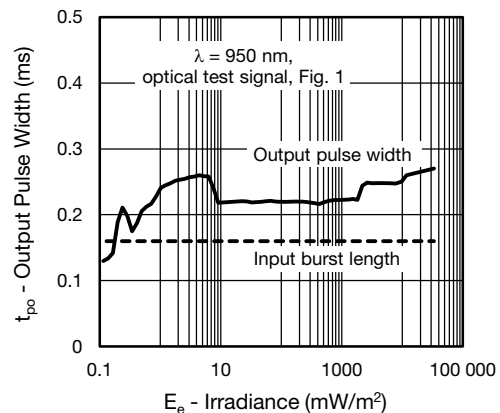

Fig. 1 - Output Active Low
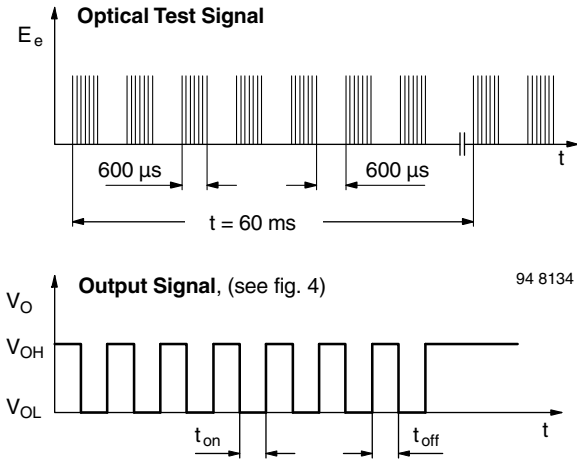

Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

Optical Test Signal

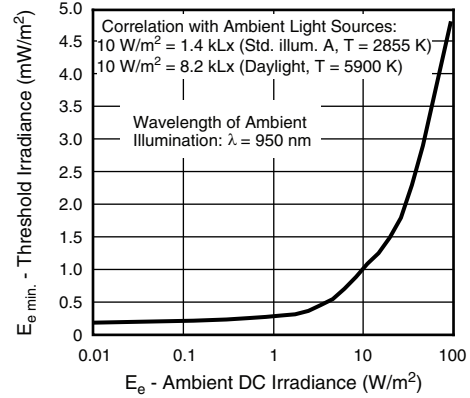

Fig. 3 - Output Function

94 8134

Fig. 4 - Output Pulse Diagram

Fig. 5 - Frequency Dependance of Responsivity

16925

Fig. 6 - Sensitivity in Bright Ambient

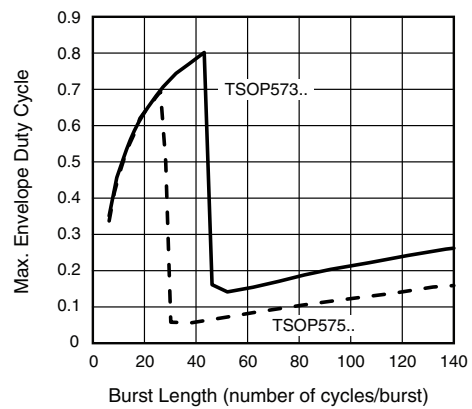Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

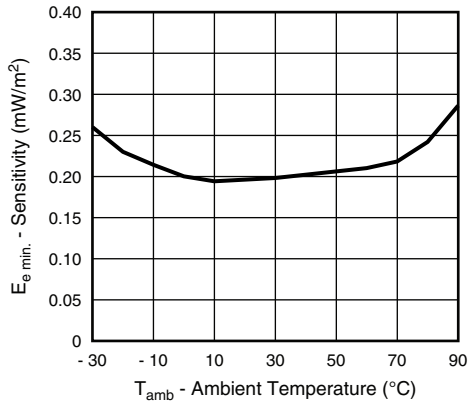Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length
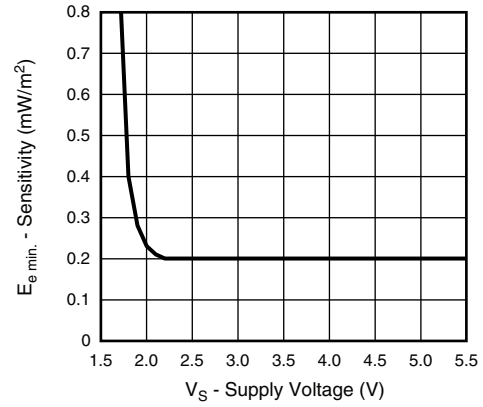
Fig. 9 - Sensitivity vs. Ambient Temperature

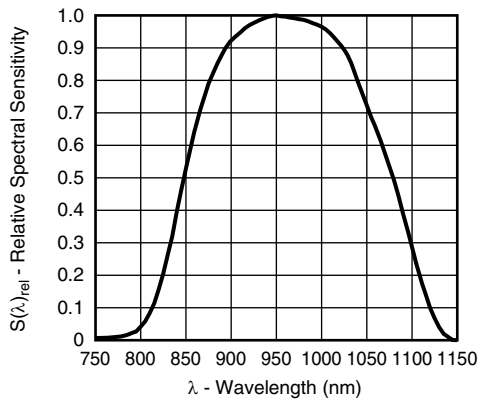Fig. 12 - Sensitivity vs. Supply Voltage

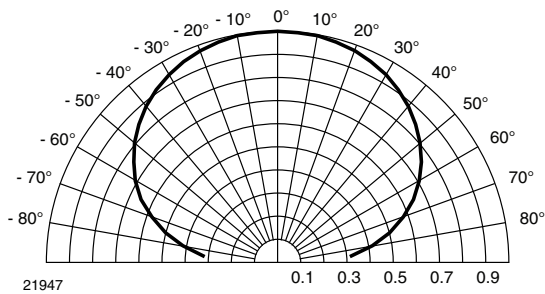Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

Fig. 11 - Horizontal Directivity

SUITABLE DATA FORMAT

The TSOP573.., TSOP575.. series is designed to suppress spurious output pulses due to noise or disturbance signals. Data and disturbance signals can be distinguished by the devices according to carrier frequency, burst length and envelope duty cycle. The data signal should be close to the band-pass center frequency (e.g. 38 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the TSOP573.., TSOP575.. in the presence of a disturbance signal, the sensitivity of the receiver is reduced to insure that no spurious pulses are present at the output. Some examples of disturbance signals which are suppressed are:

- DC light (e.g. from tungsten bulb or sunlight)
- Continuous signals at any frequency
- Strongly or weakly modulated noise from fluorescent lamps with electronic ballasts (see figure 12 or figure 13)
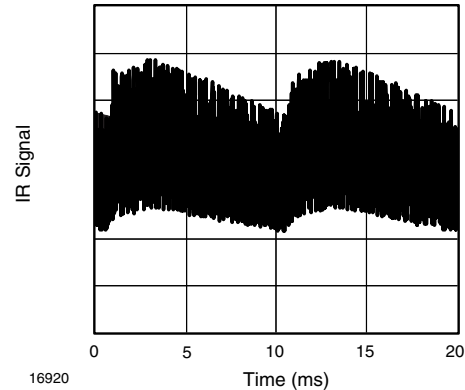

Fig. 13 - IR Signal from Fluorescent Lamp
with Low Modulation
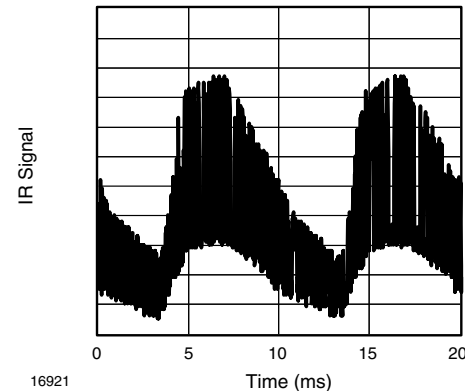
Fig. 14 - IR Signal from Fluorescent Lamp
with High Modulation

	TSOP573..	TSOP575..
Minimum burst length	6 cycles/burst	6 cycles/burst
After each burst of length a minimum gap time is required of	10 to 42 cycles ≥ 10 cycles	10 to 28 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	42 cycles > 7 x burst length	28 cycles > 12 x burst length
Maximum number of continuous short bursts/second	2000	2000
Recommended for NEC code	Yes	Yes
Recommended for RC5/RC6 code	Yes	Yes
Recommended for r-step code	Yes	Yes
Recommended for Thomson 56 kHz code	Yes	Yes
Recommended for XMP code	Yes	No
Recommended for RCMM code	Yes	Yes
Suppression of interference from fluorescent lamps	Most common disturbance signals are suppressed	Even extreme disturbance signals are suppressed

Note
- For data formats with bursts longer than 12 cycles/burst please see the datasheet for TSOP574..

PACKAGE DIMENSIONS in millimeters
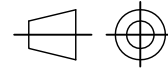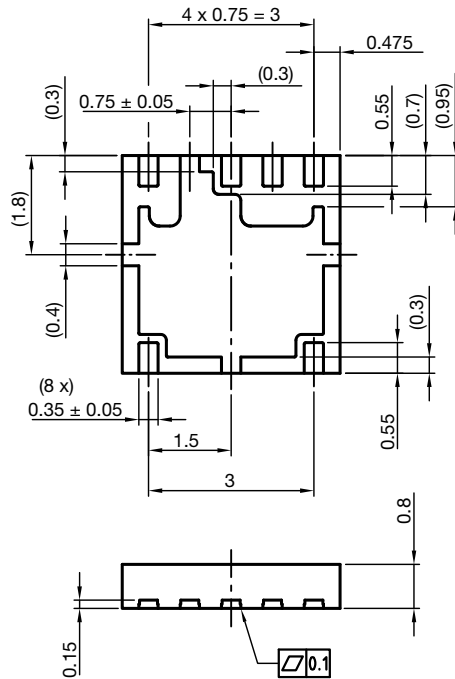
Technical drawings according to DIN specifications

Not indicated tolerances ± 0.1

Pinning from Topview

8	7	6
GND	(GND)	GND

Out	(GND)	(GND)	(V$_S$)	V$_S$
1	2	3	4	5
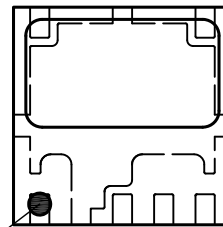
Pin 1 identification

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

Pin 1 identification

Marking area
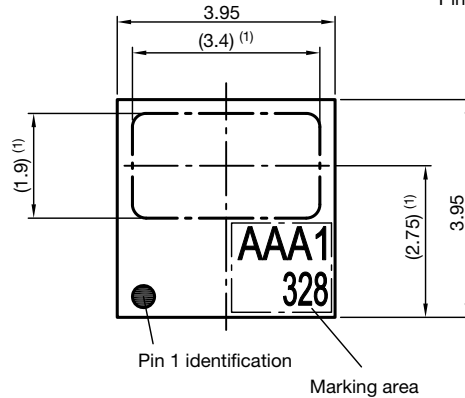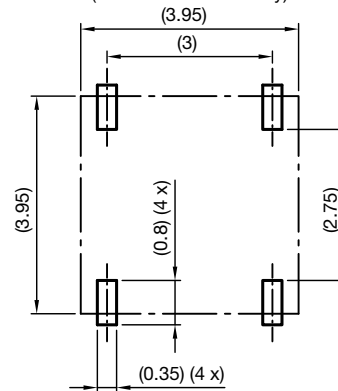
Drawing-No.: 6.550-5315.01-4
Issue: 1; 14.11.11

Note
[1] Optically effective area

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. Excercise 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

19800

max. 2 cycles allowed
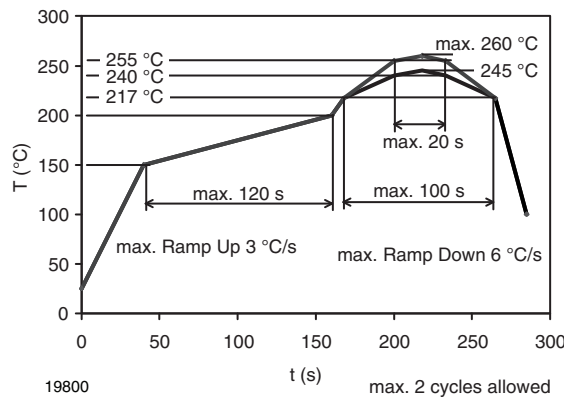
ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME [1]	REMARKS
TSOP57..TT1	Tape and reel	MOQ: 1800 pcs	3.95 mm x 3.95 mm x 0.75 mm
TSOP57..TT2		MOQ: 7000 pcs	

Note

[1] MOQ: minimum order quantity

TAPING VERSION TSOP57... DIMENSIONS in millimeters

Tape and reel dimensions:

Reel size "Y"

TT1 Ø 180 ± 2 = 1800 pcs.
TT2 Ø 330 ± 2 = 7000 pcs.

Unreel direction

X

Tape position
coming out from reel

2 ± 0.5

Ø 60 min.

Ø Y

Ø 21 ± 0.8

Ø 13 ± 0.2

Label posted here

(12.4)

18.4 max.

Parts mounted

Empty leader 400 mm min.

100 mm min. with cover tape

Leader and trailer tape:
Empty trailer 200 mm min.

Direction of pulling out

Technical drawings
according to DIN
specifications

X 2:1

(1.2)

(0.3)

(8)

(2)

(Ø 1.5)

(4)

(1.75)

(5.5)

12 ± 0.3

Drawing-No.: 9.700-5347.01-4
Issue: 1; 14.11.11

Not indicated tolerances ± 0.1

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
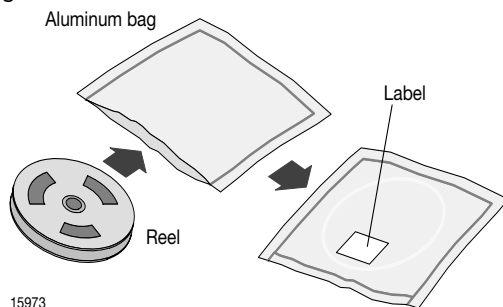
FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

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 JSTD-020 level 3 label is included on all dry bags.

Caution
This bag contains
MOISTURE-SENSITIVE DEVICES

LEVEL
3
If blank, see adjacent bar code label

1. Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)

2. Peak package body temperature: _____260_____ °C
If blank, see adjacent bar code label

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
   If blank, see adjacent bar code label
   ≤30°C/60% RH, or
   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:_____
If blank, see adjacent bar code label
Note: Level and body temperature defined by IPC/JEDEC J-STD-020

22650

EIA JEDEC standard JSTD-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. Electro-static 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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