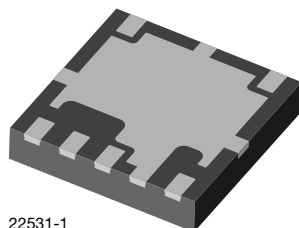
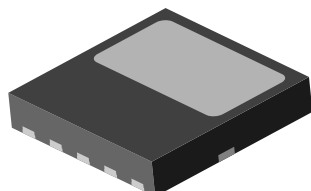


## IR Receiver Modules for Remote Control Systems



22531-1



### FEATURES

- Up to 2 m for presence sensing
- Uses modulated bursts at 38 kHz
- 940 nm peak wavelength
- PIN diode and sensor IC in one package
- Low supply current
- Shielding against EMI
- Visible light is suppressed by IR filter
- Insensitive to supply voltage ripple and noise
- Supply voltage: 2.5 V to 5.5 V
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### ORDERING CODE

#### Taping:

TSSP57038TT1 - top view taped

TSSP57038TT2 - top view taped

### 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 activation

### DESCRIPTION

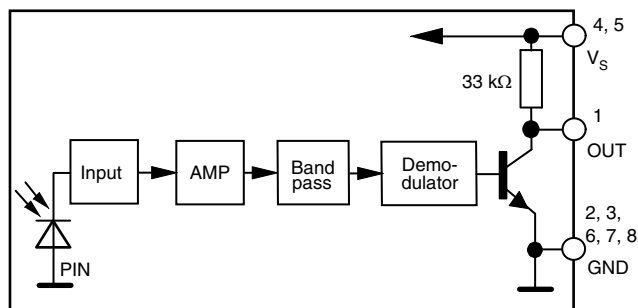
The TSSP57038 is a compact infrared detector module for presence sensing applications. It receives 38 kHz modulated signals and has a peak sensitivity of 940 nm.

This component has not been qualified according to automotive specifications.

### PARTS TABLE

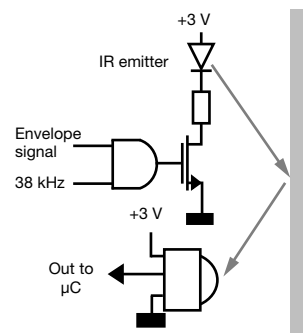
Carrier frequency	38 kHz	TSSP57038
Package		Belobog
Pinning		1 = OUT, 2, 3, 6, 7, 8 = GND, 4, 5 = V <sub>S</sub>
Dimensions (mm)		3.95 W x 3.95 H x 0.8 D
Mounting		SMD
Application		Presence sensors

### BLOCK DIAGRAM



20445-7

### PRESENCE SENSING



**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	$T_{amb} \leq 85\text{ °C}$	$P_{tot}$	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** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current (pin 3)	$E_v = 0, V_S = 5\text{ V}$	$I_{SD}$	0.55	0.7	0.9	mA
	$E_v = 40\text{ klx}$ , sunlight	$I_{SH}$	-	0.8	-	mA
Supply voltage		$V_S$	2.5	-	5.5	V
Transmission distance	$E_v = 0$ , test signal see fig. 1, IR diode TSAL6200, $I_F = 400\text{ mA}$	$d$	-	25	-	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: $t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$ , test signal see fig. 1	$E_e\text{ min.}$	-	0.7	1.2	mW/m <sup>2</sup>
Maximum irradiance	$t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$ , test signal see fig. 1	$E_e\text{ max.}$	50	-	-	W/m <sup>2</sup>
Directivity	Angle of half transmission distance	$\phi_{1/2}$	-	$\pm 75$	-	deg

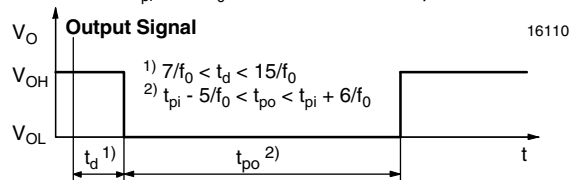
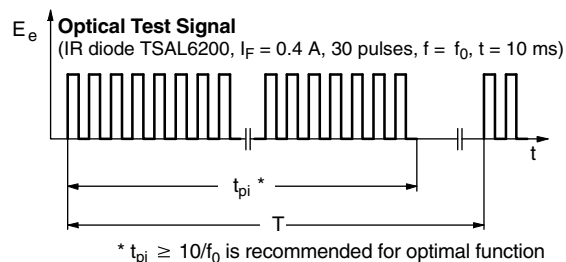
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Output Active Low

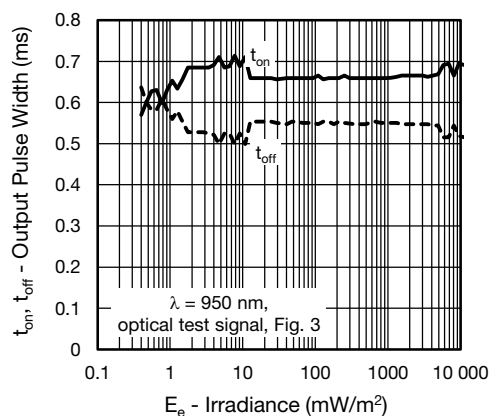


Fig. 4 - Output Pulse Diagram

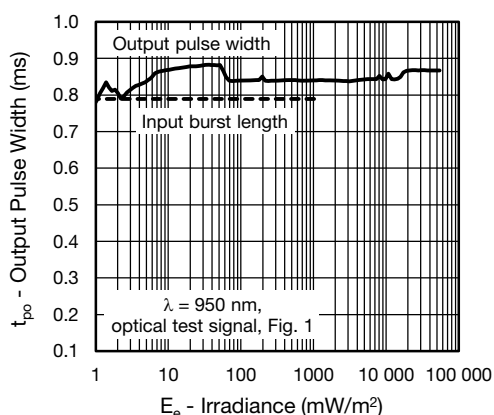


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

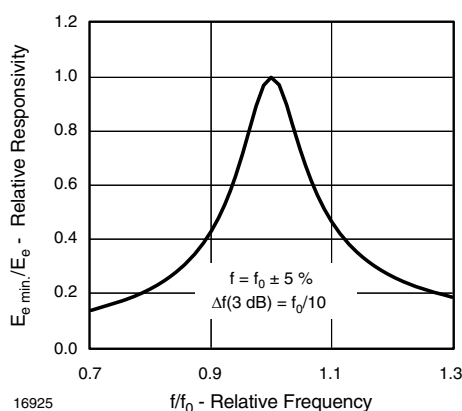


Fig. 5 - Frequency Dependence of Responsivity

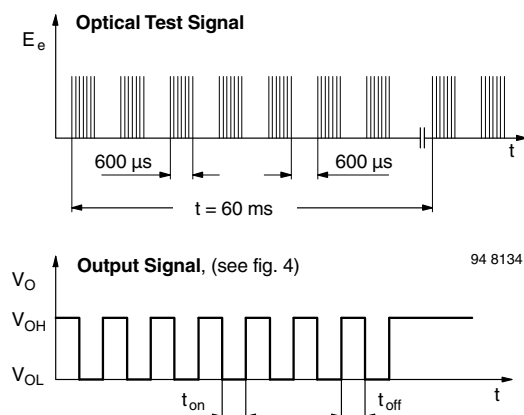


Fig. 3 - Output Function

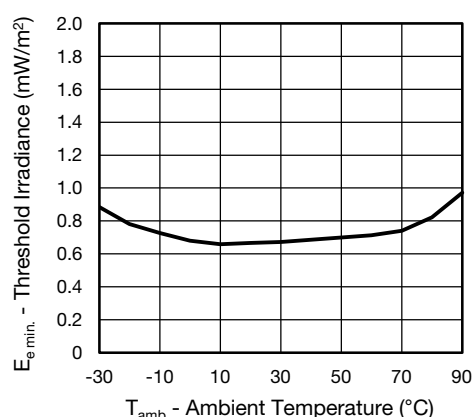


Fig. 6 - Sensitivity vs. Ambient Temperature

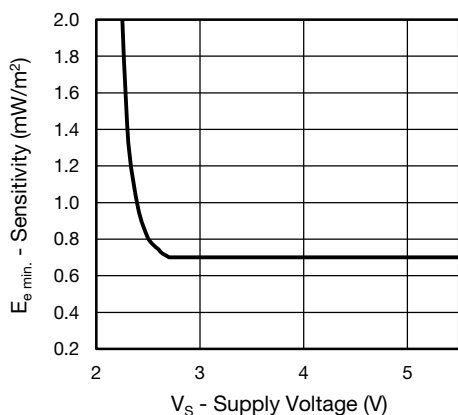


Fig. 7 - Sensitivity vs. Supply Voltage

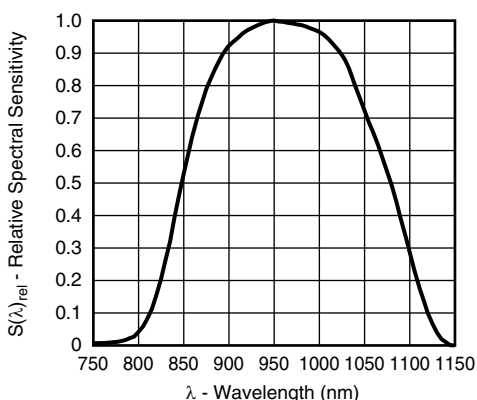


Fig. 8 - Relative Spectral Sensitivity vs. Wavelength

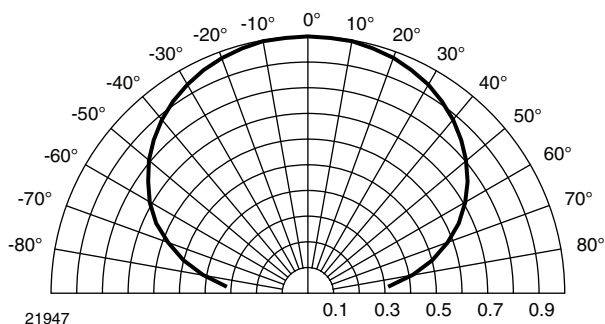
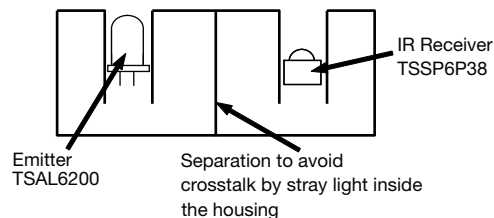


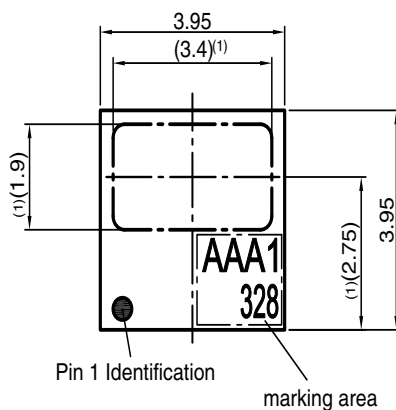
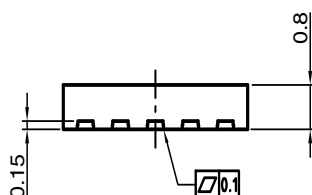
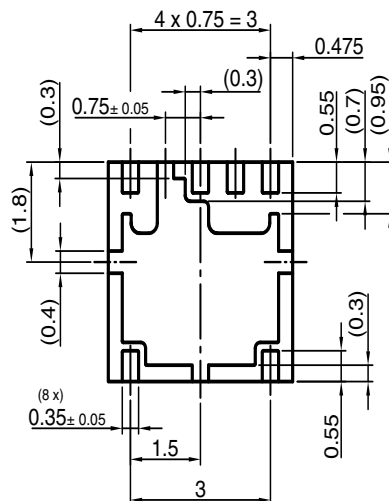
Fig. 9 - Horizontal Directivity

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. Applications requiring up to 2 m beam break or 1 m reflective range benefit from the lower gain of these sensors because they are less sensitive to stray signal from the emitter, simplifying the mechanical design.

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.

**PACKAGE DIMENSIONS** in millimeters


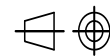
Drawing-No.: 6.550-5315.01-4  
Issue: 2; 12.02.14

**Notes**

<sup>(1)</sup> Optically effective area

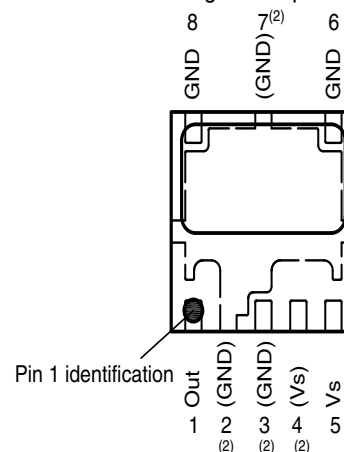
<sup>(2)</sup> Pins connected internally. It is not necessary to connect externally.

Not indicated tolerances  $\pm 0.1$

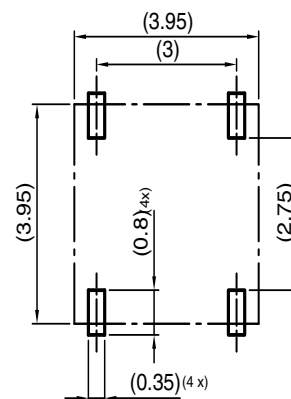


technical drawings  
according to DIN  
specifications

Pinning from topview



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





## ASSEMBLY INSTRUCTIONS

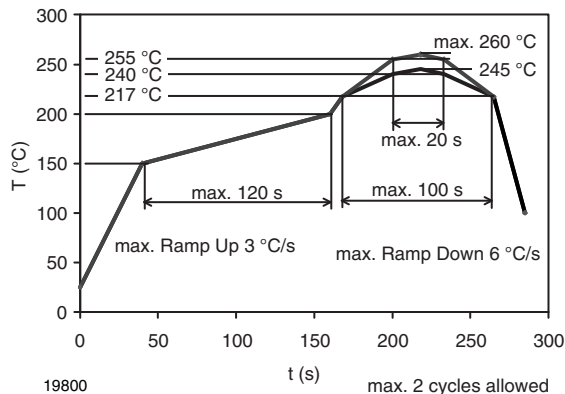
### Reflow Soldering

- 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

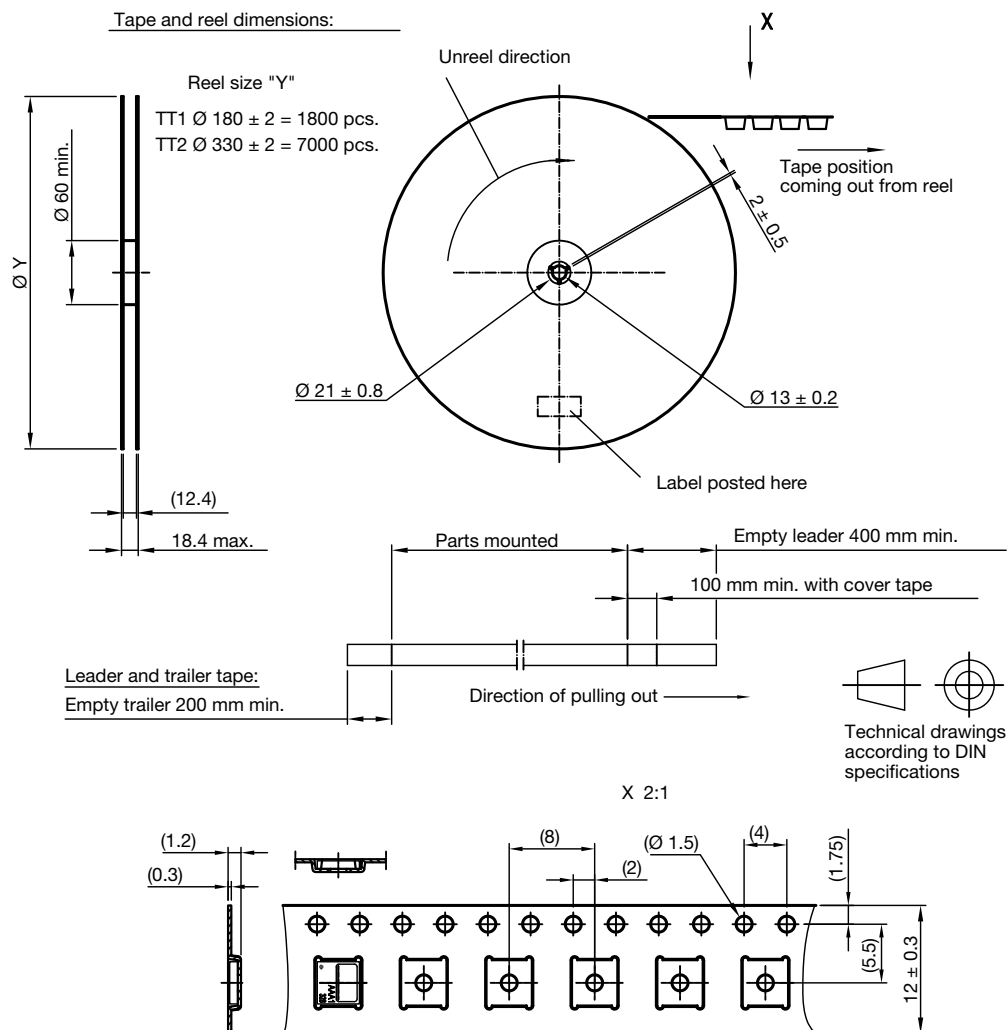
## VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE



ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME <sup>(1)</sup>	REMARKS
TSSP57038..TT1	Tape and reel	MOQ: 1800 pcs	3.95 mm x 3.95 mm x 0.75 mm
TSSP57038..TT2		MOQ: 7000 pcs	

### Note

<sup>(1)</sup> MOQ: minimum order quantity

**TAPING VERSION TSSP57038 DIMENSIONS** in millimeters


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

Not indicated tolerances  $\pm 0.1$

## LABEL

### Standard bar code labels for finished goods

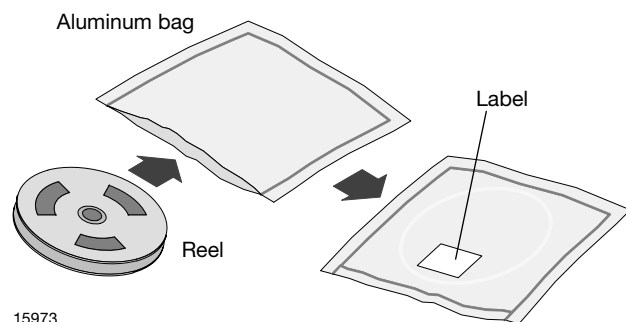
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled

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.

<b>VISHAY SEMICONDUCTOR GmbH STANDARD BAR CODE PRODUCT LABEL (finished goods)</b>		
<b>PLAIN WRITING</b>	<b>ABBREVIATION</b>	<b>LENGTH</b>
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
<b>Long bar code top</b>	<b>Type</b>	<b>Length</b>
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
<b>Short bar code bottom</b>	<b>Type</b>	<b>Length</b>
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. 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 J-STD-020 level 3 label is included on all dry bags.



	<b>Caution</b> This bag contains <b>MOISTURE-SENSITIVE DEVICES</b>	<b>LEVEL</b> <b>3</b> <small>If blank, see adjacent bar code label</small>
	<small>If blank, see adjacent bar code label</small>	
1. Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)		
2. Peak package body temperature: <u>260</u> °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: <u>168</u> hours of factory conditions <small>If blank, see adjacent bar code label</small>		
≤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: _____ <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

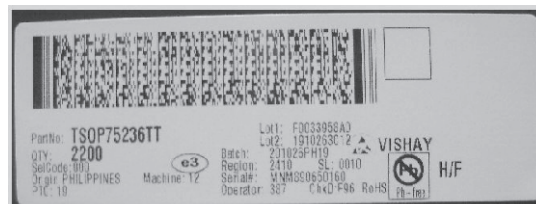
## ESD PRECAUTION

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



## Tape and Reel Standards for SMD IR Receiver Modules

Vishay Semiconductor SMD IR receivers are packaged on tape and reel. The following specification is based on IEC publication 286, which takes the industrial requirements for automatic insertion into account.

Absolute maximum ratings, mechanical dimensions, optical and electrical characteristics for taped devices are identical to the basic catalog types and can be found in the specifications for untaped devices.

### PACKAGING

The tapes of components are available on reels. Each reel is marked with labels which contain the following information:

- Vishay
- Type
- Group
- Tape code, normally part of type name
- Production code
- Quantity

### MISSING COMPONENTS

Up to 3 consecutive components may be missing if the gap is followed by at least 6 components. A maximum of 0.5 % of the components per reel quantity may be missing. At least 5 empty positions are present at the start and the end of the tape to enable tape insertion.

**Tensile strength** of the tape: > 15 N

### NUMBER OF COMPONENTS

- A. Panhead SMD: quantity per reel:
  - TT, SMD top view package, 1190 pcs
  - TR, SMD side view package, 1120 pcs
- B. Heimdall: quantity per reel:
  - TT, Heimdall top view package, 2200 pcs
  - TR, Heimdall side view package, 2300 pcs
- C. Heimdall without lens: quantity per reel:
  - WTT, top view package, 2200 pcs
  - WTR, side view package, 2300 pcs
- D. Belobog: quantity per reel:
  - TT1, 1800 pcs
  - TT2, 7000 pcs
  - TR, not available in side view
- E. Belobog with shield: quantity per reel:
  - TT1, 1500 pcs
  - TT2, 5000 pcs
- F. Minimold DF1P: quantity per reel:
  - DF1P, 1100 pcs

### ORDER DESIGNATION

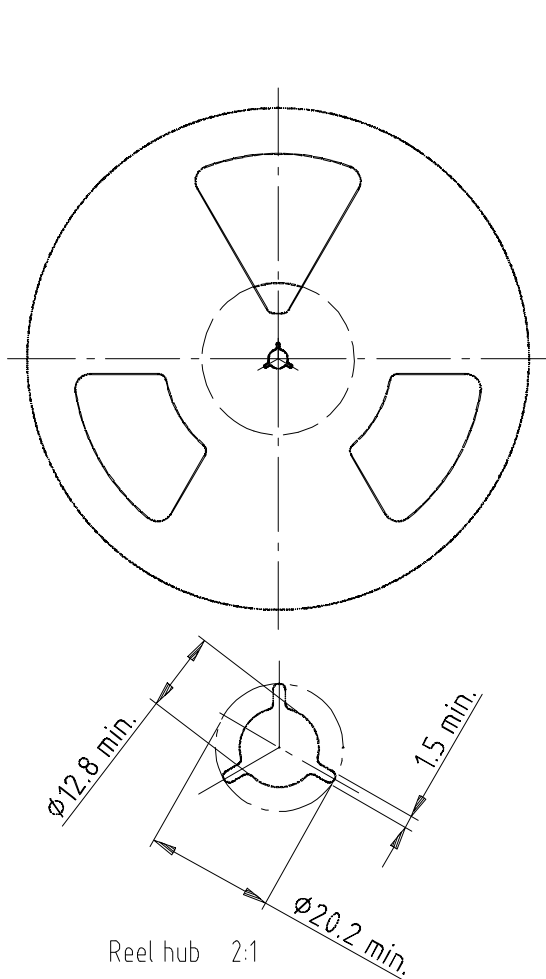
The type designation of the device is extended by TT or TT1 for top view or TR for side view.

#### Example:

- TSOP6238TR (reel packing)
- TSOP75238TR (reel packing)
- TSOP75338WTT (reel packing)
- TSOP57438TT1 (reel packing)
- TSOP57238HTT1 (reel packing)



## REEL DIMENSIONS FOR PANHEAD SMD AND HEIMDALL in millimeters



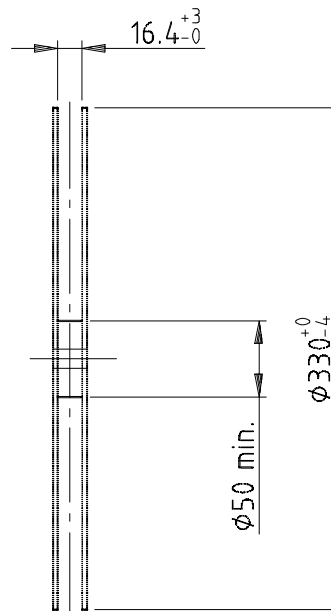
Drawing-No.: 9.800-5052.V2-4

Issue: 1; 07.05.02

16734

### Note

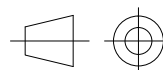
- The body structure of the reel can vary



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

Dimension acc. to IEC EN 60 286-3

Tape width 16

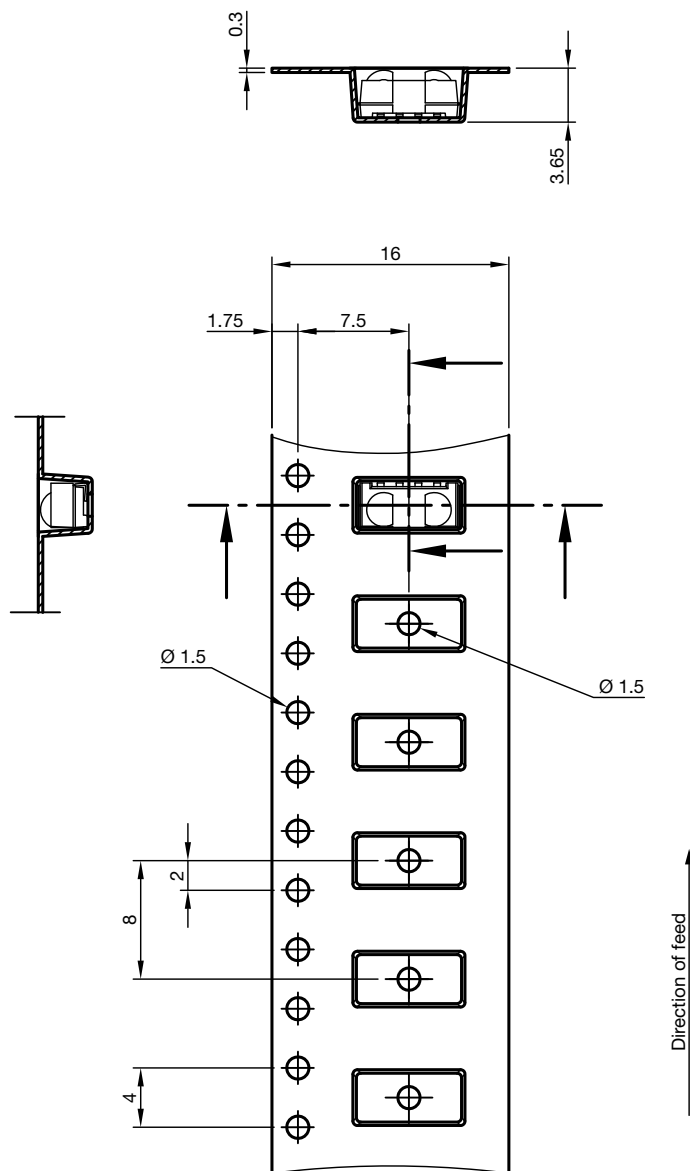


technical drawings  
according to DIN  
specifications

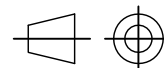


## TAPING VERSION TSOP..TT (TOP VIEW) DIMENSIONS in millimeters

B. Heimdall SMD (TSOP75...TT, TSOP77...TT, TSSP77...TT)



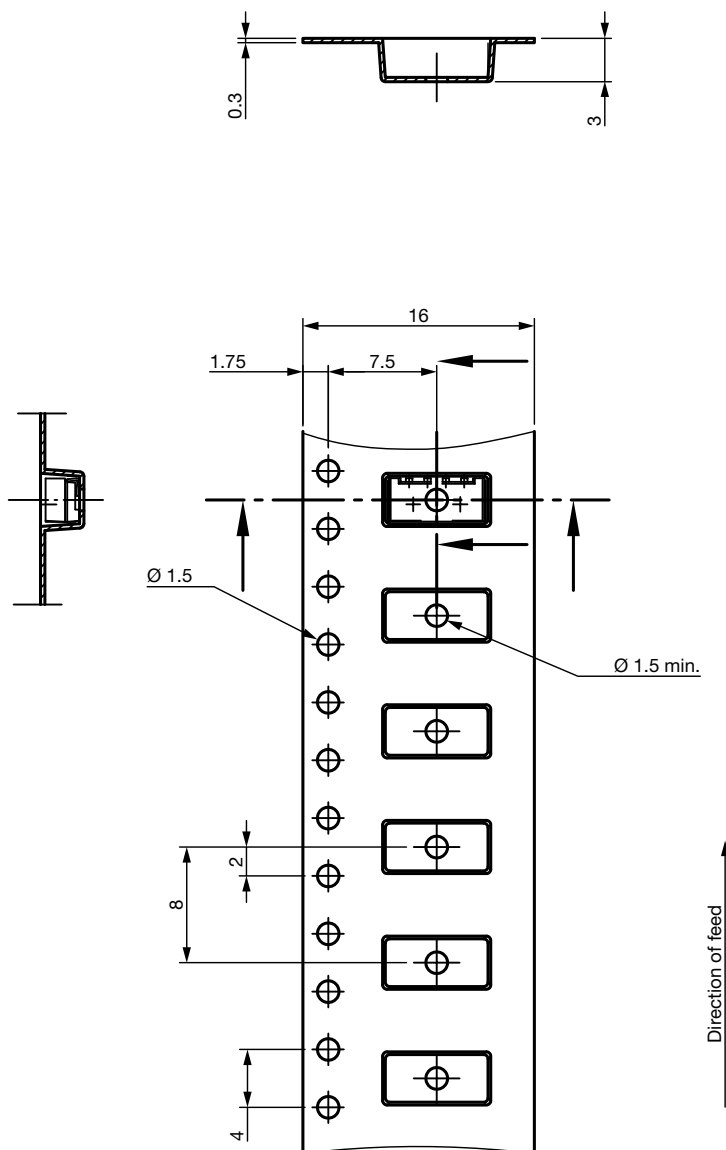
Drawing-No.: 9.700-5338.01-4  
Issue: 4; 12.06.13



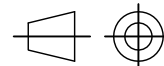
technical drawings  
according to DIN  
specifications

## TAPING VERSION TSOP..TT (TOP VIEW) DIMENSIONS in millimeters

C. Heimdall SMD without lens (TSOP75...WTT, TSOP77...WTT, TSSP77...WTT)



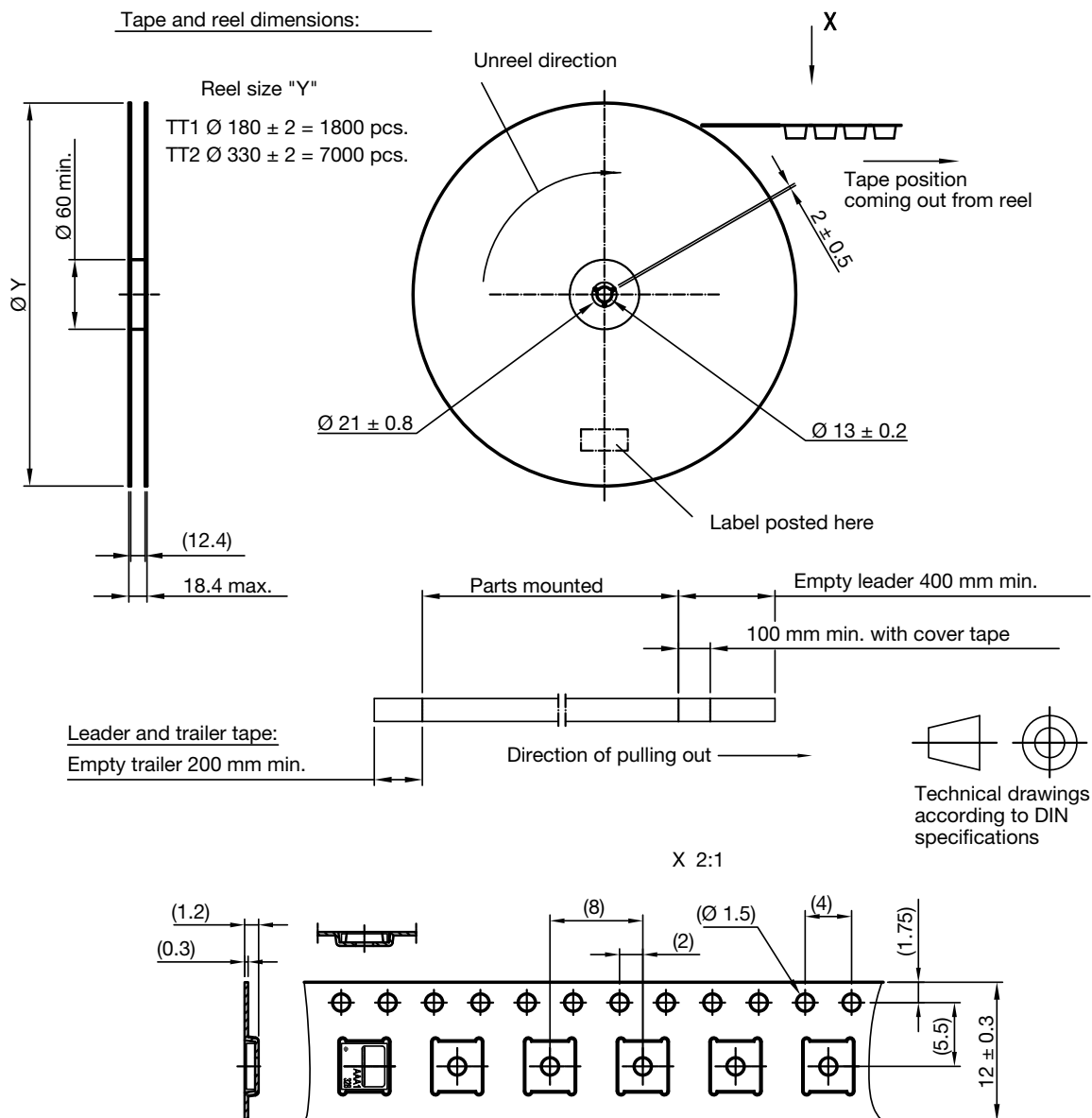
Drawing-No.: 9.700-5341.01-4  
Issue: 3; 06.10.15



technical drawings  
according to DIN  
specifications

## TAPING VERSION TSOP..TT1, TSOP..TT2 (TOP VIEW) DIMENSIONS in millimeters

D. Belobog (TSOP37...TT1, TSOP37...TT2, TSOP57...TT1, TSOP57...TT2)



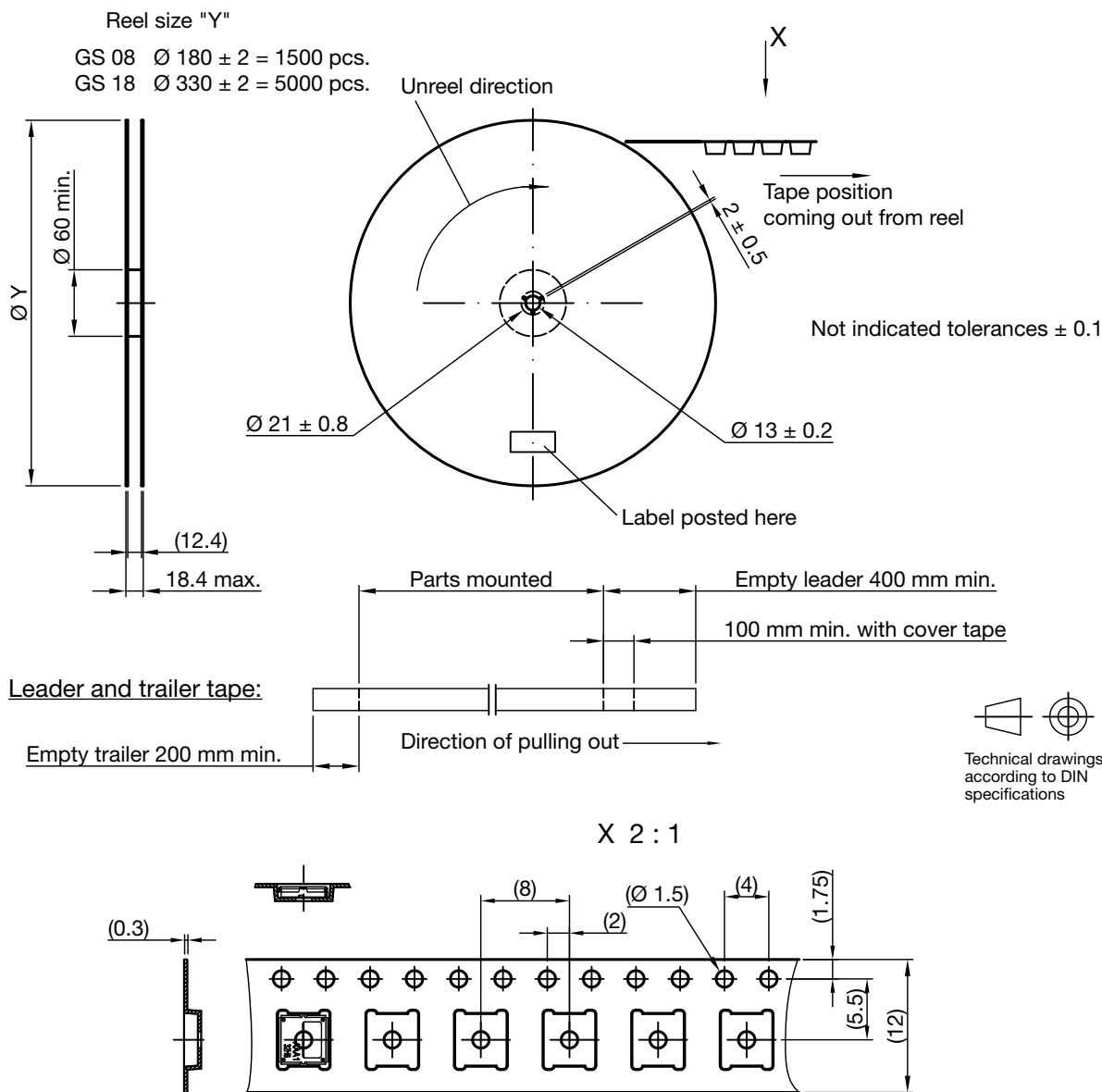
Drawing-No.: 9.700-5347.01-4  
Issue: 1; 14.11.11

Not indicated tolerances  $\pm 0.1$

## TAPING VERSION TSOP..TT1, TSOP..TT2 (TOP VIEW) DIMENSIONS in millimeters

E. Belobog with shield (TSOP37...HTT1, TSOP37...HTT2, TSOP57...HTT1, TSOP57...HTT2)

### Tape and Reel dimensions:



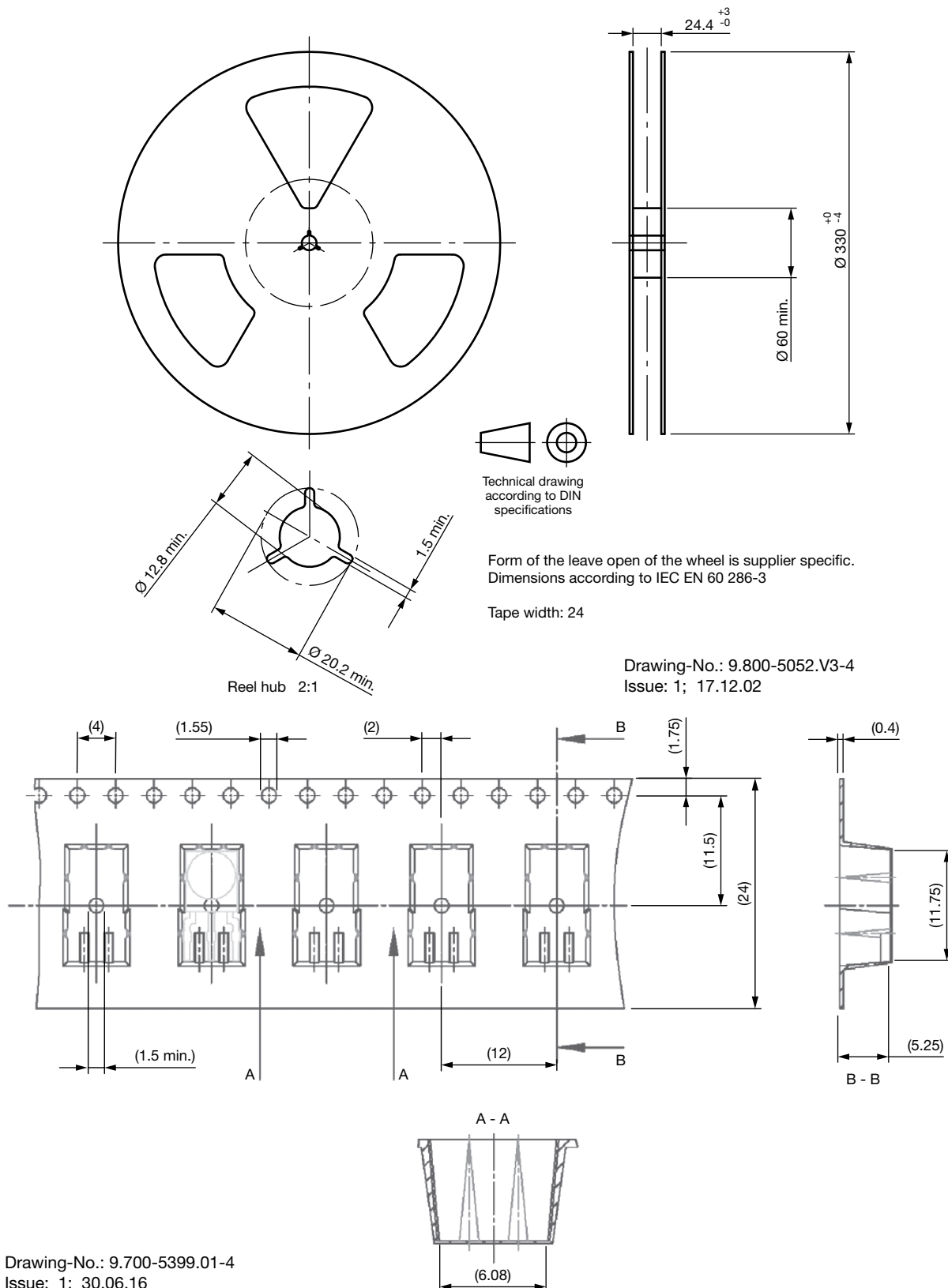
Reel dimensions and tape

Drawing-No.: 9.700-5380.01-4  
Issue: 1; 28.10.13



## TAPING VERSION TSOP..DF1P (SIDE VIEW) DIMENSIONS in millimeters

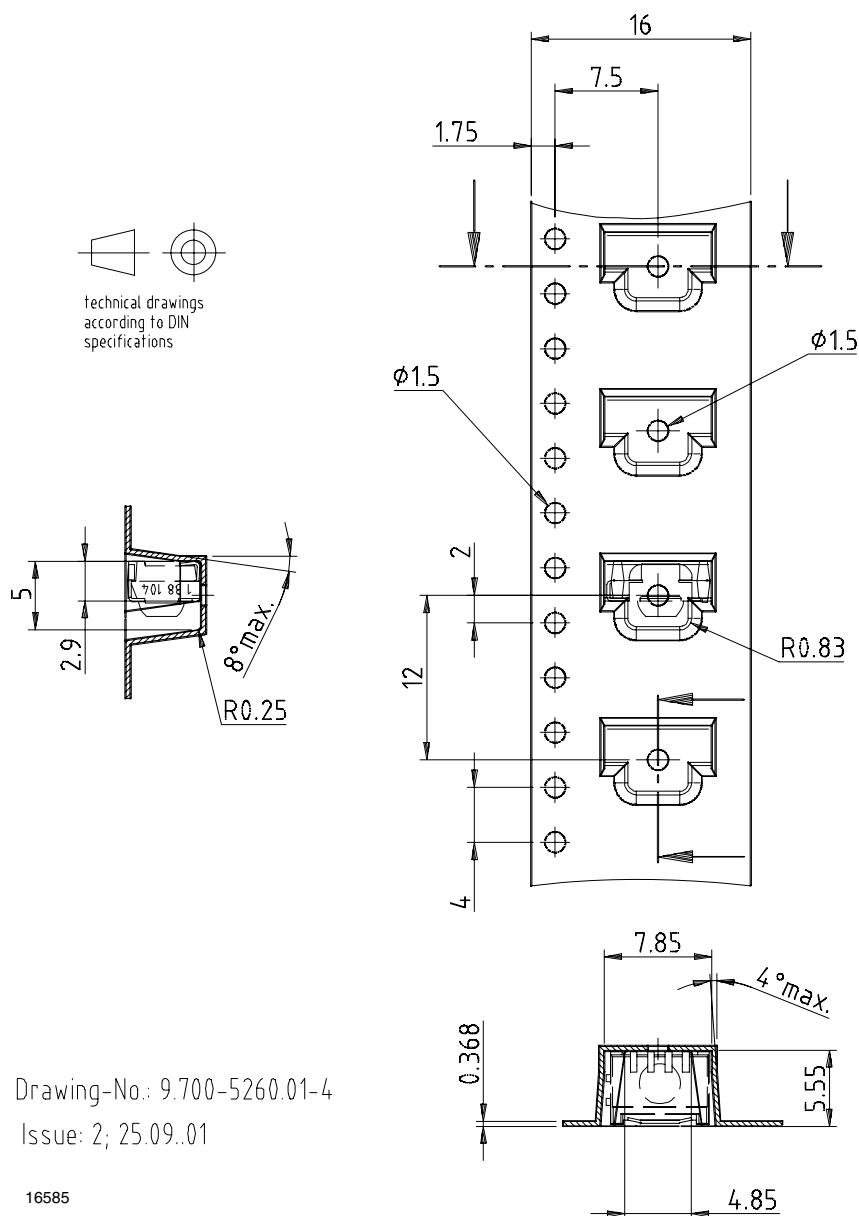
F. Minimold DF1P (TSOP33...DF1P, TSOP53...DF1P)



Drawing-No.: 9.700-5399.01-4  
Issue: 1; 30.06.16

## TAPING VERSION TSOP..TR (SIDE VIEW) DIMENSIONS in millimeters

A. Panhead SMD (TSOP36...TR, TSSP6...TR, TSOP6...TR)



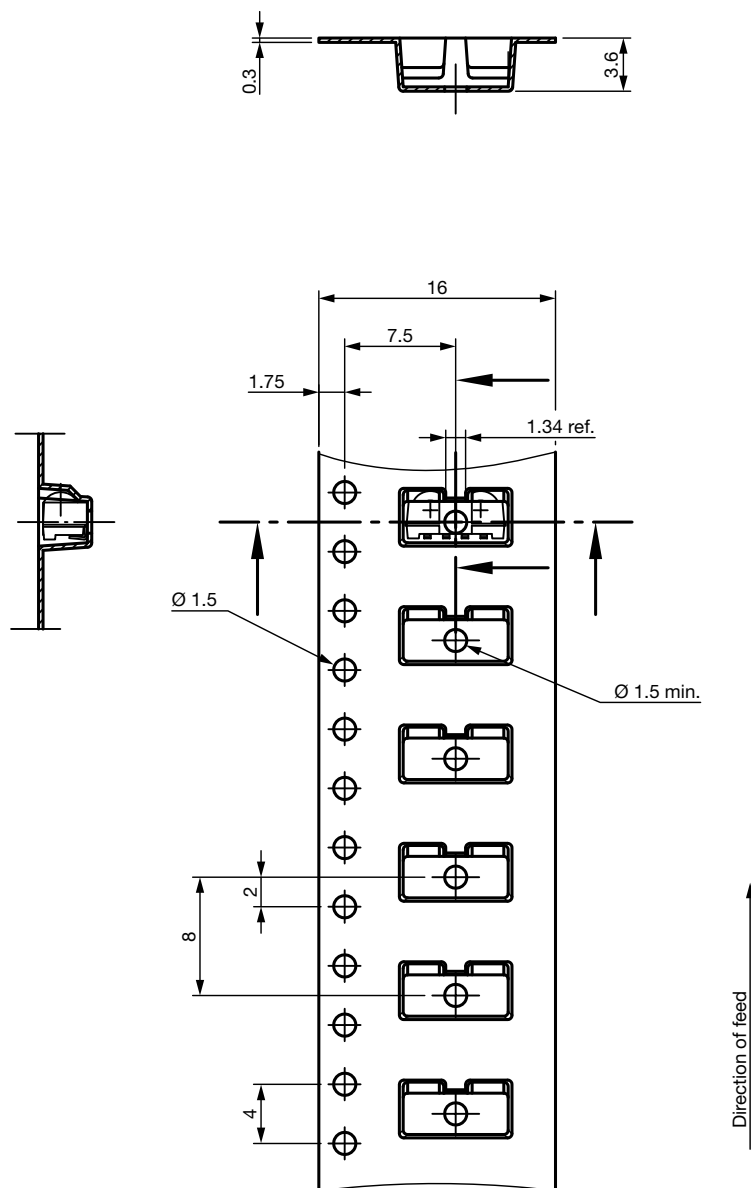
Drawing-No.: 9.700-5260.01-4

Issue: 2; 25.09..01

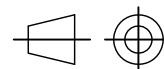
16585

### TAPING VERSION TSOP..TR (SIDE VIEW) DIMENSIONS in millimeters

B. Heimdall SMD (TSOP75..., TSOP77..., TSSP7....)



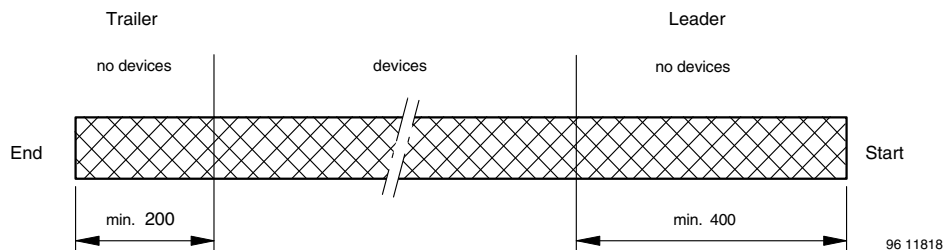
Drawing-No.: 9.700-5337.01-4  
Issue: 2; 06.10.15



technical drawings  
according to DIN  
specifications



## LEADER AND TRAILER DIMENSIONS in millimeters



## COVER TAPE REEL STRENGTH

According to DIN EN 60286-3

0.1 N to 1.3 N

300 mm/min.  $\pm$  10 mm/min.

165° to 180° peel angle

## LABEL

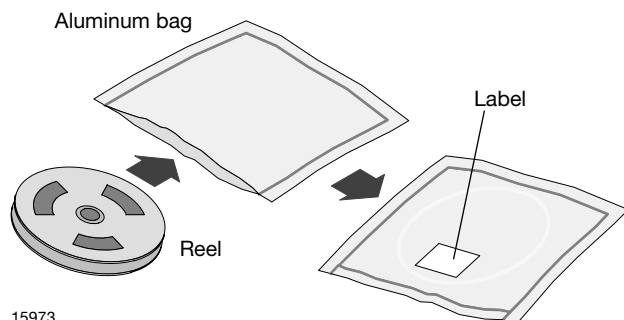
### Standard bar code labels for finished goods

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 TOP	TYPE	LENGTH
Selection-code	X	3
Data-code	N	3
Batch-number	X	10
Filter	-	1
Total length	-	17

**DRY PACKAGING**

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



15973

**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 JSTD-020 level 4 label is included on all dry bags.

	<b>CAUTION</b> This bag contains <b>MOISTURE-SENSITIVE DEVICES</b>	<b>LEVEL</b> <b>4</b>
	<ol style="list-style-type: none"> <li>Shelf life in sealed bag: 12 months at &lt; 40 °C and &lt; 90 % relative humidity (RH)</li> <li>After this bag is opened, devices that will be subjected to soldering reflow or equivalent processing (peak package body temp. 260 °C) must be:               <ol style="list-style-type: none"> <li>Mounted within 72 hours at factory condition of &lt; 30 °C/60 % RH or</li> <li>Stored at &lt; 5 % RH</li> </ol> </li> <li>Devices require baking before mounting if: Humidity Indicator Card is &gt; 10 % when read at 23 °C ± 5 °C or 2a. or 2b. are not met.</li> <li>If baking is required, devices may be baked for:               <ul style="list-style-type: none"> <li>192 hours at 40 °C + 5 °C/- 0 °C and &lt; 5 % RH (dry air/nitrogen) or</li> <li>96 hours at 60 °C ± 5 °C and &lt; 5 % RH for all device containers or</li> <li>24 hours at 125 °C ± 5 °C not suitable for reels or tubes</li> </ul> </li> </ol>	
Bag Seal Date: _____ (If blank, see barcode label)		
Note: Level and body temperature defined by EIA JEDEC Standard J-STD-020		

22522

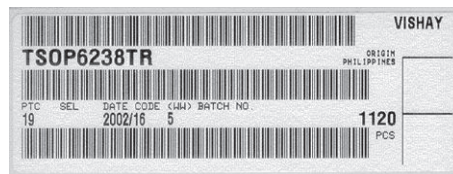
EIA JEDEC standard JSTD-020 level 4 label is included on all dry bags

**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**

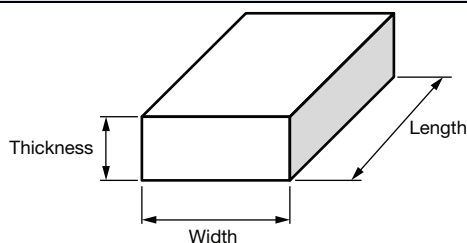
The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.



16962

**OUTER PACKAGING**

The sealed reel is packed into a pizza box.

**CARTON BOX DIMENSIONS** in millimeters

22127

	THICKNESS	WIDTH	LENGTH
<b>Pizza Box</b> (SMD and Heimdall) (Taping in reels)	50	340	340



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