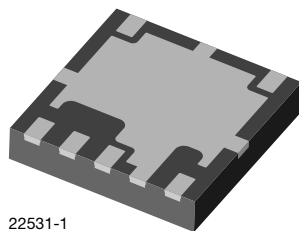
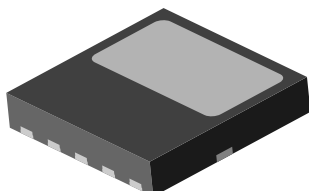


## IR Receiver Modules for Remote Control Systems



22531-1



### FEATURES

- Height of 0.8 mm
- $\pm 75^\circ$  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](http://www.vishay.com/doc?99912)



### 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.

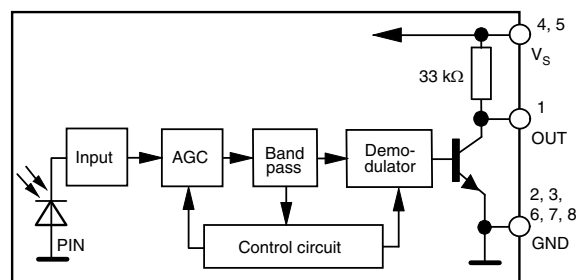
The demodulated output signal can be directly connected to a microprocessor. The TSOP573.. is compatible with all common IR remote control data formats. It is optimized to suppress almost all spurious pulses from energy saving fluorescent lamps. The TSOP575.. has an excellent noise suppression. It is 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

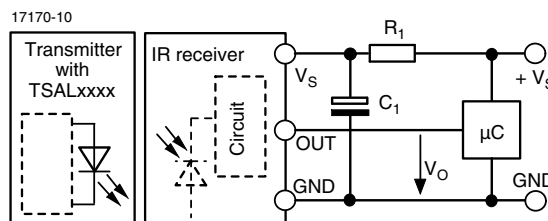
AGC		NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)	VERY NOISY ENVIRONMENTS AND SHORT BURSTS (AGC5)
Carrier frequency	36 kHz	TSOP57336 <sup>(1)(2)</sup>	TSOP57536 <sup>(1)(2)</sup>
	38 kHz	TSOP57338 <sup>(3)(4)(5)(6)</sup>	TSOP57538 <sup>(3)(4)(5)</sup>
	40 kHz	TSOP57340	TSOP57540
	56 kHz	TSOP57356	TSOP57556
Package	Pinning	1 = OUT; 2, 3, 6, 7, 8 = GND; 4, 5 = V <sub>S</sub>	
	Dimensions (mm)	0.8 H x 3.95 W x 3.95 L	
Mounting		SMD	
Application		Remote control	
Best remote control code		<sup>(1)</sup> MCIR <sup>(2)</sup> RCM <sup>(3)</sup> Mitsubishi <sup>(4)</sup> RECS-80 Code <sup>(5)</sup> x-map <sup>(6)</sup> XMP-1, XMP-2	

### BLOCK DIAGRAM



20445-6

### APPLICATION CIRCUIT



The external components  $R_1$  and  $C_1$  are optional to improve the robustness against electrical overstress (typical values are  $R_1 = 100 \Omega$ ,  $C_1 = 0.1 \mu F$ ).

**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 voltage		$V_S$	2.5		5.5	V
Supply current	$V_S = 5\text{ V}$ , $E_v = 0$	$I_{SD}$	0.55	0.7	0.9	mA
	$E_v = 40\text{ klx}$ , sunlight	$I_{SH}$		0.8		mA
Transmission distance	$E_v = 0$ , IR diode TSAL6200, $I_F = 250\text{ mA}$ , test signal see fig. 1	$d$		40		m
Output voltage low	$I_{OSL} = 0.5\text{ mA}$ , $E_e = 0.7\text{ mW/m}^2$ , test signal see fig. 1	$V_{OSL}$			100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e\text{ min.}$		0.2	0.4	$\text{mW/m}^2$
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e\text{ max.}$	50			$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\Phi_{1/2}$		$\pm 75$		deg

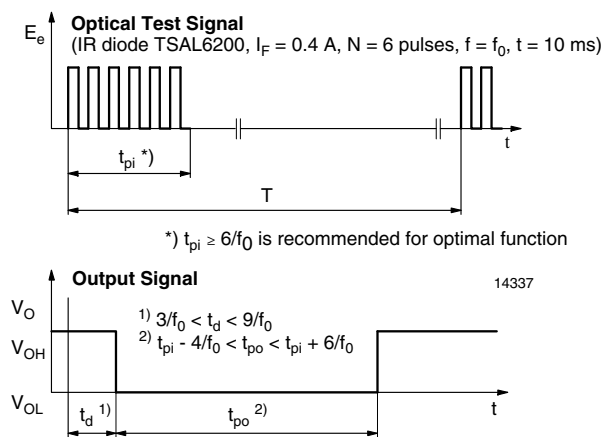
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)


Fig. 1 - Output Active Low

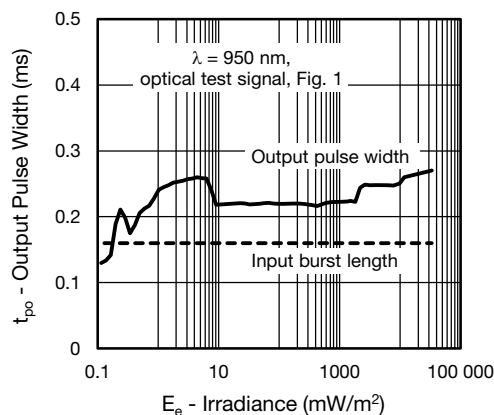


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

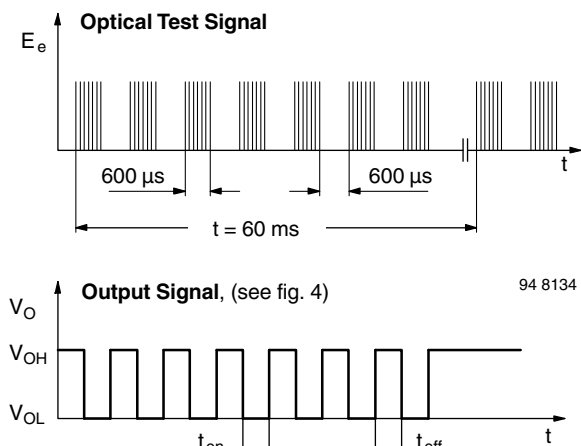


Fig. 3 - Output Function

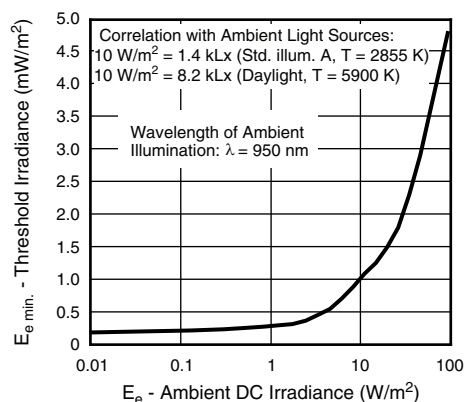


Fig. 6 - Sensitivity in Bright Ambient

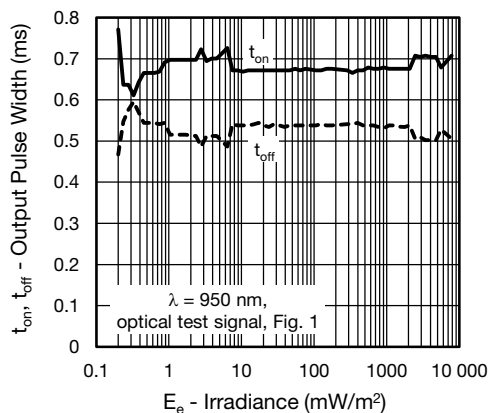


Fig. 4 - Output Pulse Diagram

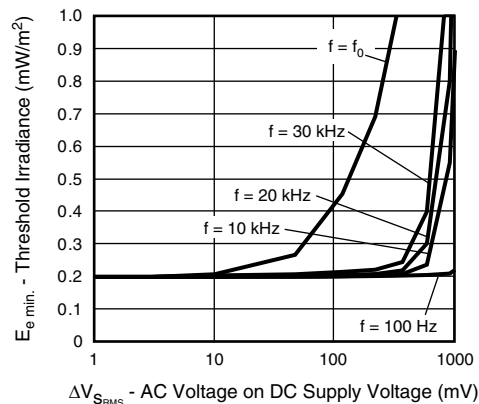


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

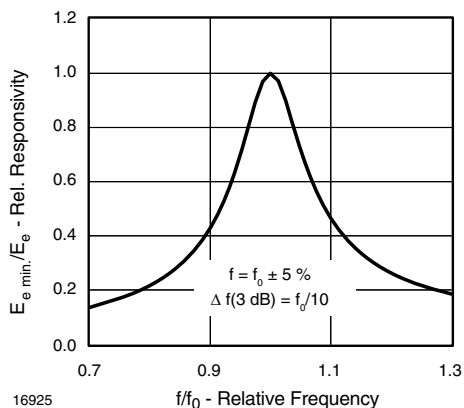


Fig. 5 - Frequency Dependence of Responsivity

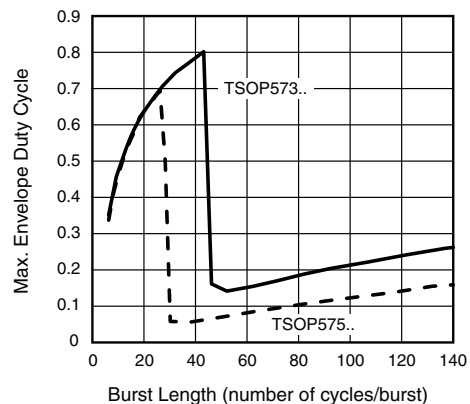


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

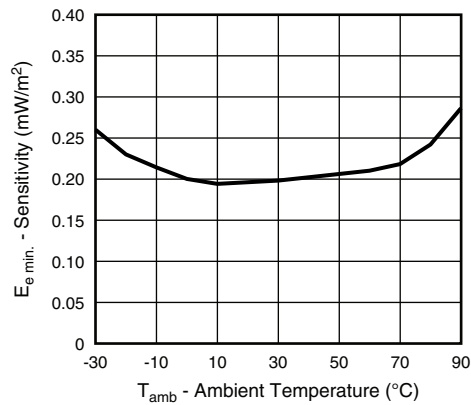


Fig. 9 - Sensitivity vs. Ambient Temperature

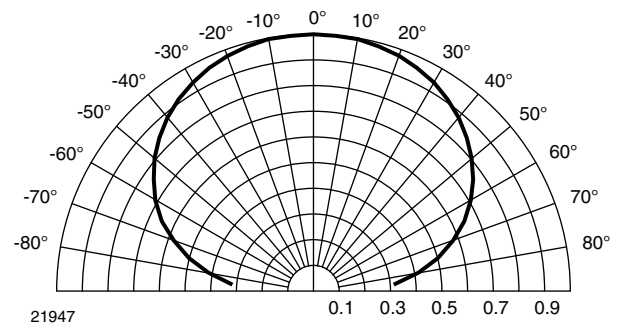


Fig. 11 - Horizontal Directivity

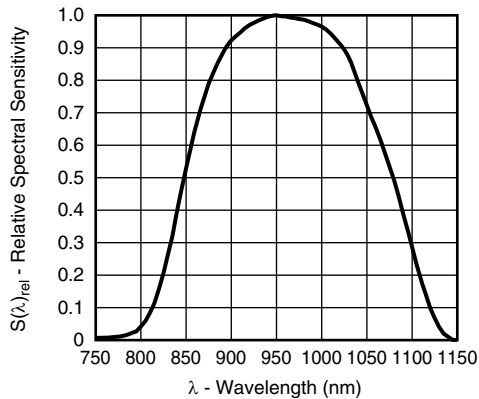


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

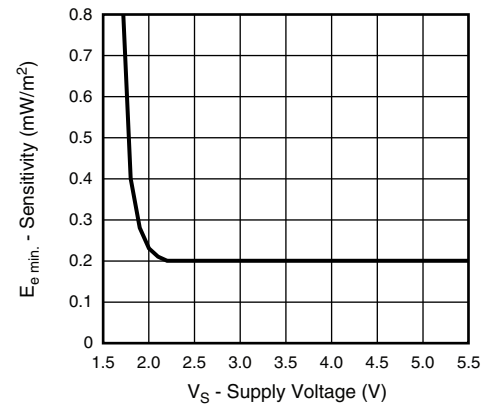


Fig. 12 - Sensitivity vs. Supply Voltage

## SUITABLE DATA FORMAT

The TSOP573.., TSOP575.. series is designed to suppress spurious output pulses due to noise or disturbance signals. The devices can distinguish data signals from noise due to differences in frequency, burst length, and envelope duty cycle. The data signal should be close to the device's 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, the sensitivity of the receiver is automatically reduced by the AGC to insure that no spurious pulses are present at the receiver's output. Some examples which are suppressed are:

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

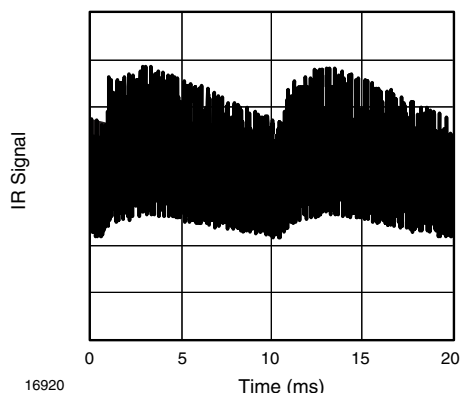


Fig. 13 - IR Signal from Fluorescent Lamp with Low Modulation

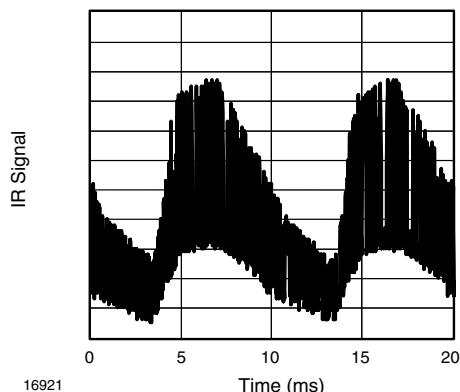


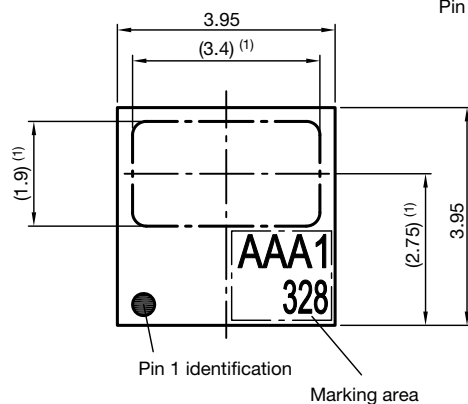
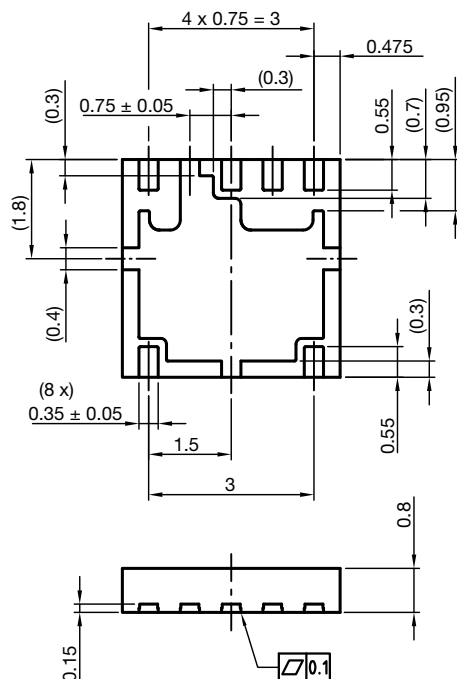
Fig. 14 - IR Signal from Fluorescent Lamp with High Modulation

	<b>TSOP573..</b>	<b>TSOP575..</b>
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 patterns are suppressed	Even extreme disturbance patterns are suppressed

### Notes

- For data formats with bursts longer than 12 cycles/burst please see the datasheet for TSOP574..
- Example of compatible products for IR-codes:  
TSOP57436: RC-5, RC-6, Panasonic;  
TSOP57438: NEC, Sharp, r-step;  
TSOP57456: r-step, Thomson RCA

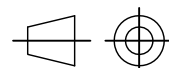
### PACKAGE DIMENSIONS in millimeters



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

### Note

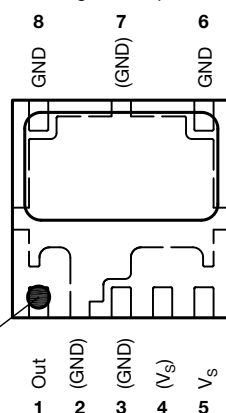
(1) Optically effective area



Technical drawings  
according to DIN  
specifications

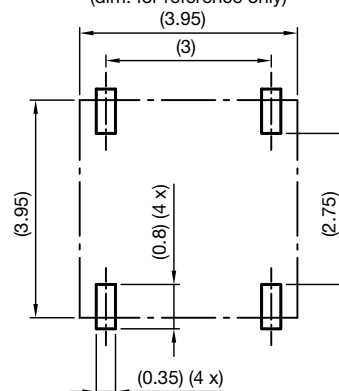
Not indicated tolerances  $\pm 0.1$

## Pinning from Topview



### Pin 1 identification

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

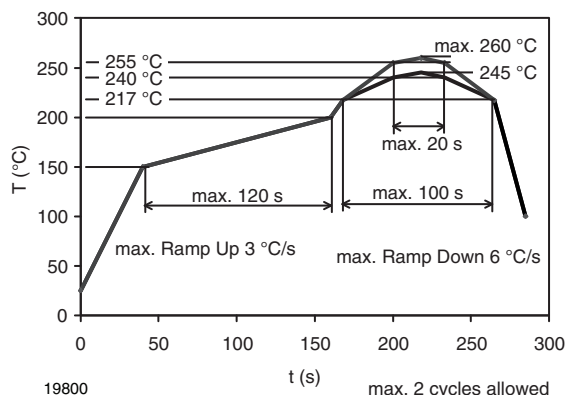


**ASSEMBLY INSTRUCTIONS****Reflow Soldering**

- 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**

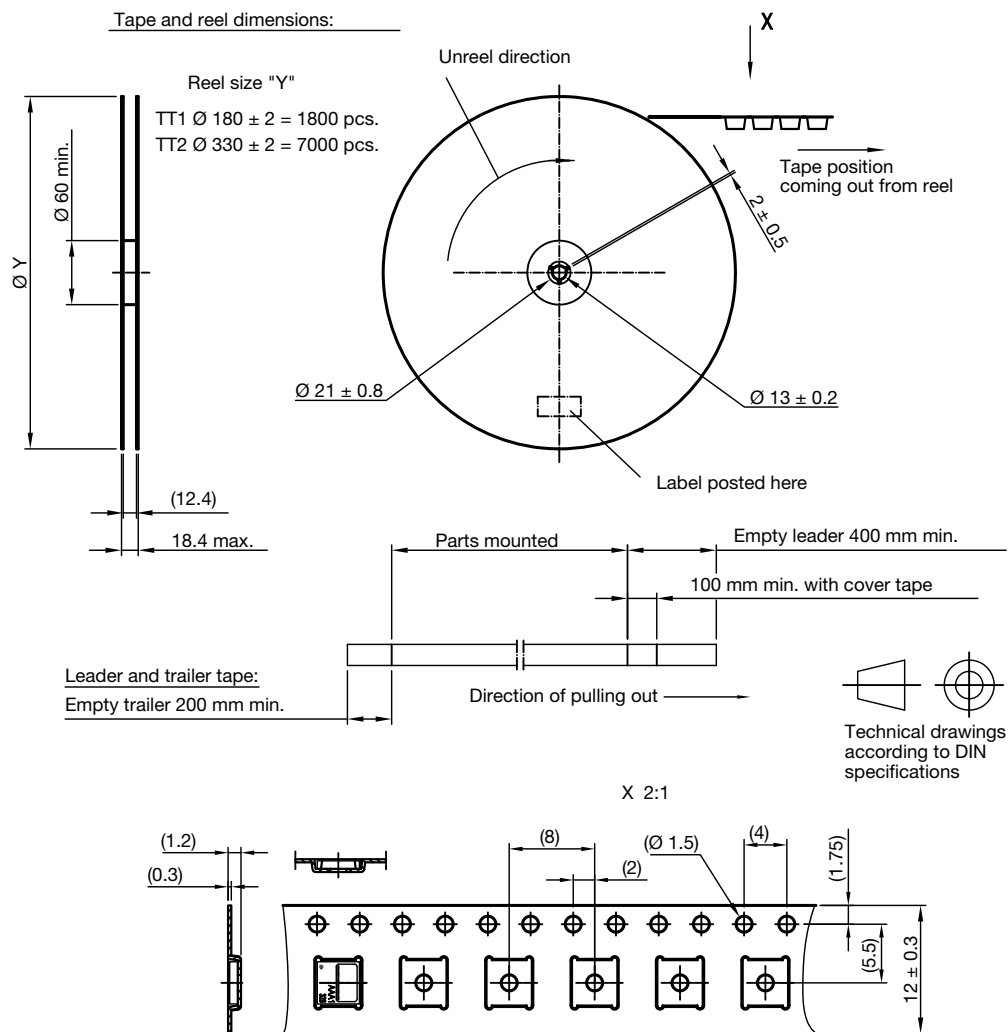
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off

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

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME <sup>(1)</sup>	REMARKS
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**

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

**TAPING VERSION TSOP57... 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

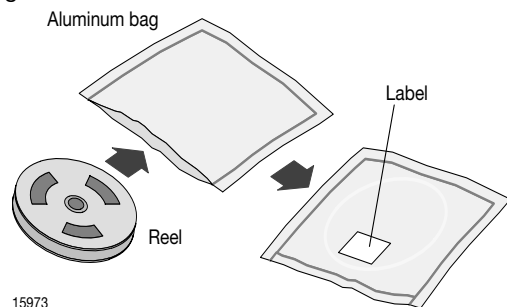
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled

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>	<b>LEVEL 3</b>
	This bag contains MOISTURE-SENSITIVE DEVICES	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: <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

## 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

## 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.



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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**