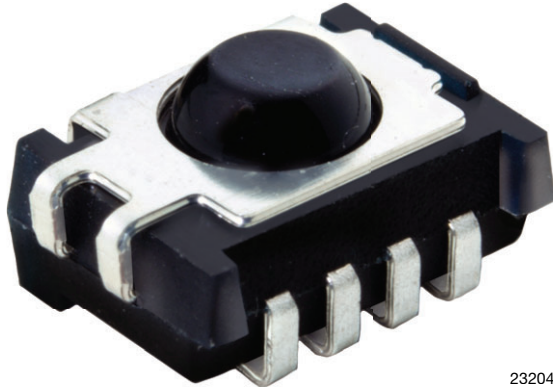




IR Receiver Modules for Remote Control Systems



23204

DESCRIPTION

This IR receiver series is optimized for short burst remote control systems in different environments. The customer can choose between different IC settings (AGC variants), to find the optimum solution for his application. The higher the AGC, the better noise is suppressed, but the lower the code compatibility.

The devices contain a PIN diode and a preamplifier assembled on a lead frame. The epoxy package contains an IR filter. The demodulated output signal can be directly connected to a microprocessor for decoding. These components have not been qualified to automotive specifications.

FEATURES

- Individual IC settings to reach maximum performance
- Immunity against noise (lamps, LCD TV, Wi-Fi)
- Low supply current
- Photo detector and preamplifier in one package
- Supply voltage: 2.0 V to 5.5 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



Product Page



Marking

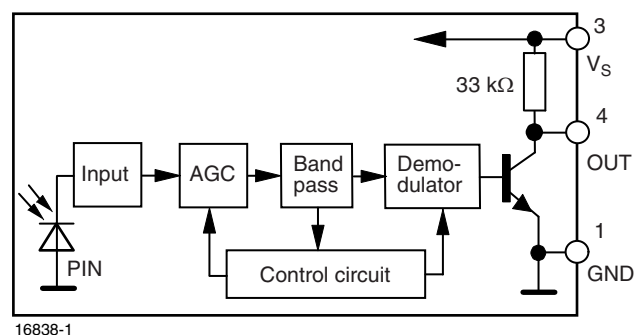
APPLICATIONS

- Infrared remote control systems

DESIGN SUPPORT TOOLS

- [3D models](#)
- [Window size calculator](#)

BLOCK DIAGRAM





www.vishay.com

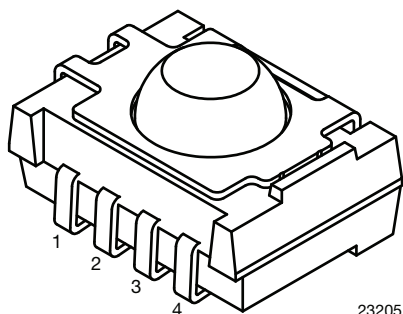
TSOP61..., TSOP63..., TSOP65...

Vishay Semiconductors

MECHANICAL DATA

Pinning

1 = GND, 2 = N.C., 3 = V_S , 4 = OUT



ORDERING CODE

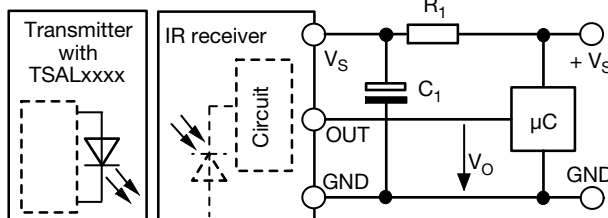
Taping:

TSOP6...TT - top view taped, 1190 pcs/reel

TSOP6...TR - side view taped, 1120 pcs/reel

APPLICATION CIRCUIT

17170-14



R_1 and C_1 recommended in case there are strong ripple or spikes on the supply line.

PARTS TABLE

AGC		LEGACY, FOR SHORT BURST REMOTE CONTROLS (AGC1)	NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)	VERY NOISY ENVIRONMENTS AND SHORT BURSTS (AGC5)
Carrier frequency	30 kHz	TSOP6130	TSOP6330	TSOP6530
	33 kHz	TSOP6133	TSOP6333	TSOP6533
	36 kHz	TSOP6136	TSOP6336 ⁽¹⁾⁽²⁾	TSOP6536
	38 kHz	TSOP6138	TSOP6338 ⁽³⁾⁽⁵⁾	TSOP6538
	40 kHz	TSOP6140	TSOP6340	TSOP6540
	56 kHz	TSOP6156	TSOP6356 ⁽⁴⁾	TSOP6556
Package		Panhead		
Pinning		1 = GND, 2 = N.C., 3 = V_S , 4 = OUT		
Dimensions (mm)		7.5 W x 5.3 H x 4.0 D		
Mounting		SMD		
Application		Remote control		
Best choice for		⁽¹⁾ MCIR ⁽²⁾ RCMM ⁽³⁾ RECS-80 Code ⁽⁴⁾ r-map ⁽⁵⁾ XMP		
Special options		<ul style="list-style-type: none"> Narrow optical filter: www.vishay.com/doc?81590 Wide optical filter: www.vishay.com/doc?82726 		

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	$T_{amb} \leq 85^\circ\text{C}$	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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		V_S	2.0	-	5.5	V
Supply current	$V_S = 3.3\text{ V}$, $E_v = 0$	I_{SD}	0.25	0.35	0.45	mA
	$E_v = 40\text{ klx}$, sunlight	I_{SH}	-	0.45	-	mA
Transmission distance	$E_v = 0$, IR diode TSAL6200, $I_F = 50\text{ mA}$, test signal see Fig. 1	d	-	18	-	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	Test signal: RC5 code	$E_{e\text{ min.}}$	-	0.2	0.4	mW/m^2
	Test signal: XMP code	$E_{e\text{ min.}}$	-	0.35	0.5	mW/m^2
Maximum irradiance	$t_{pi} - 3/f_0 < t_{po} < t_{pi} + 3.5/f_0$, test signal see Fig. 1	$E_{e\text{ max.}}$	30	-	-	W/m^2
Directivity	Angle of half transmission distance	$\phi_{1/2}$	-	± 50	-	deg

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

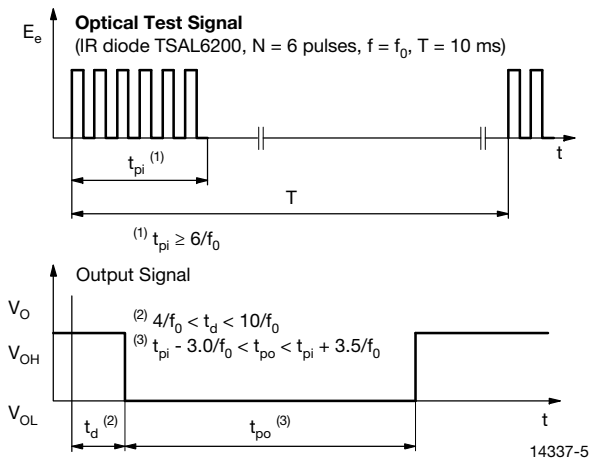


Fig. 1 - Output Active Low

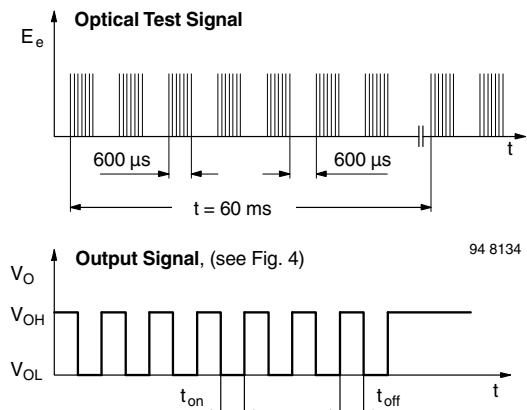


Fig. 3 - Output Function

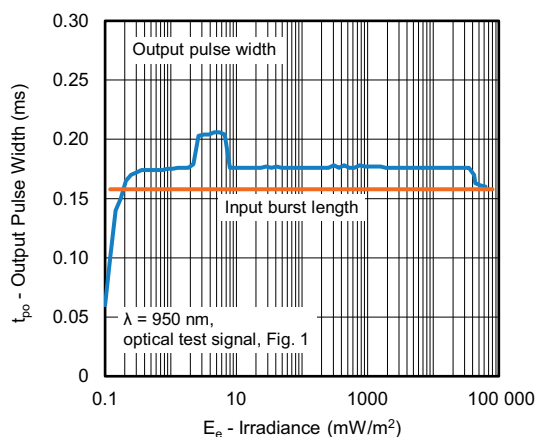


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

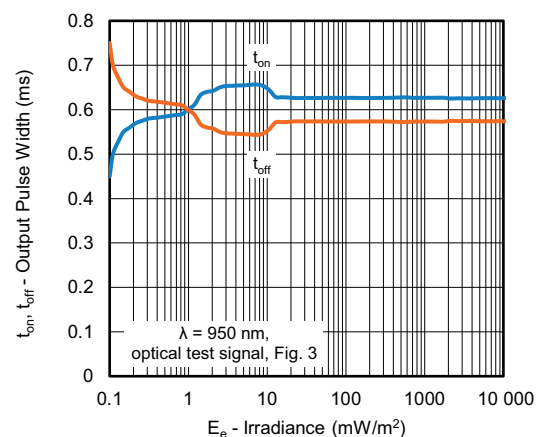


Fig. 4 - Output Pulse Diagram

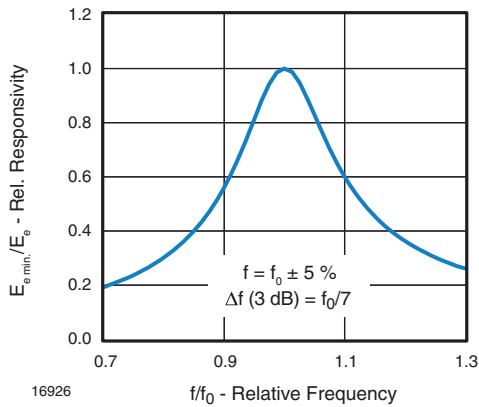


Fig. 5 - Frequency Dependence of Responsivity

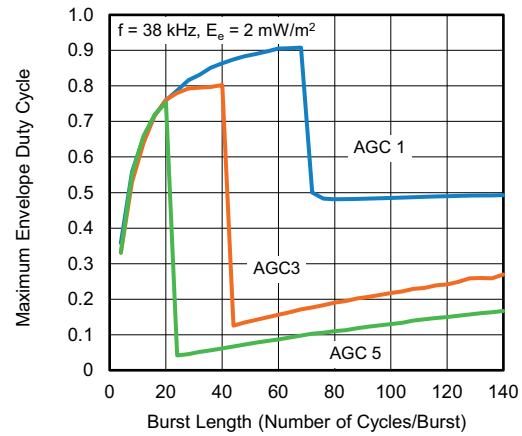


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

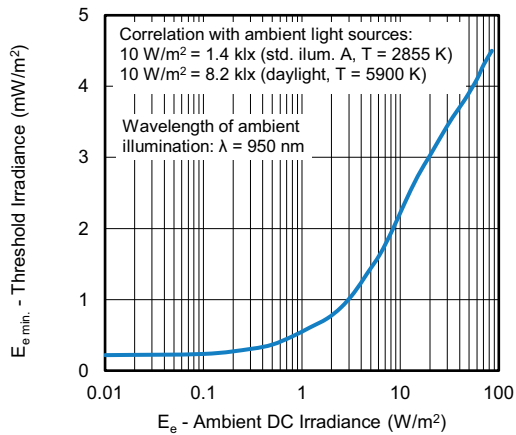


Fig. 6 - Sensitivity in Bright Ambient

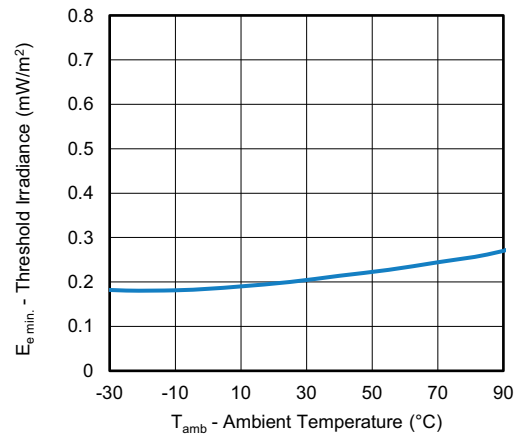


Fig. 9 - Sensitivity vs. Ambient Temperature

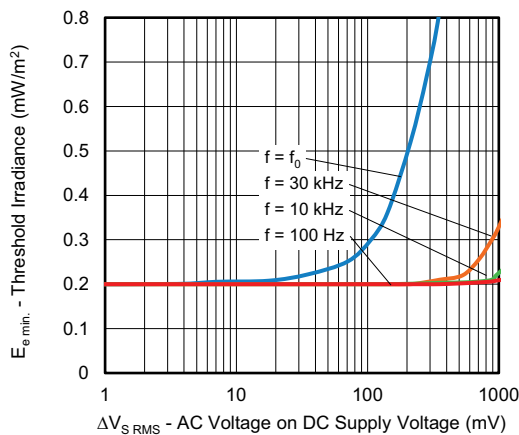


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

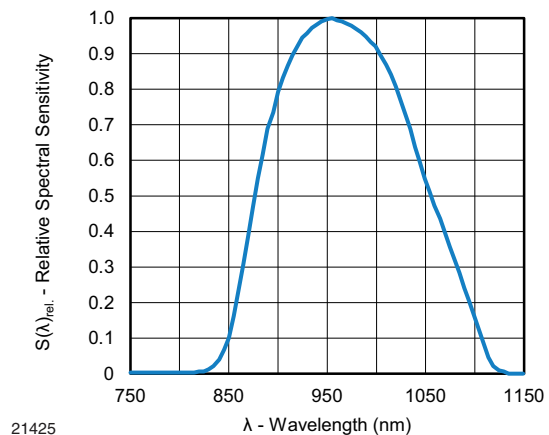


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

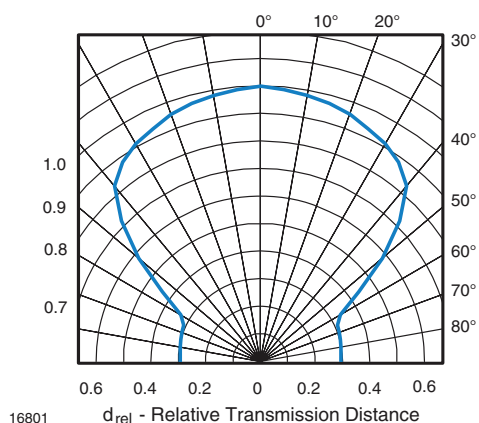


Fig. 11 - Horizontal Directivity

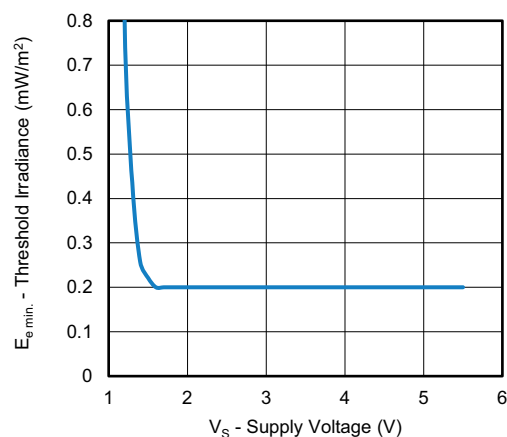


Fig. 12 - Sensitivity vs. Supply Voltage



SUITABLE DATA FORMAT

This 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 product 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 Fig. 13 or Fig. 14)
- 2.4 GHz and 5 GHz Wi-Fi

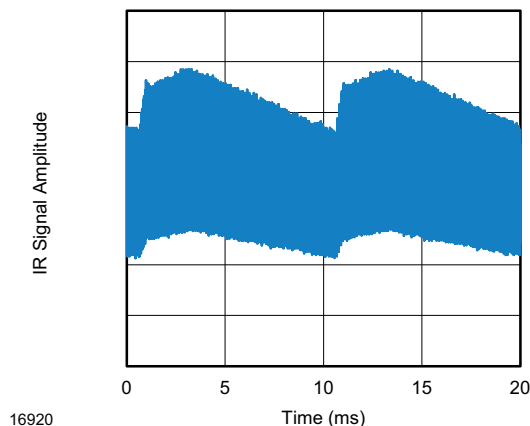


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

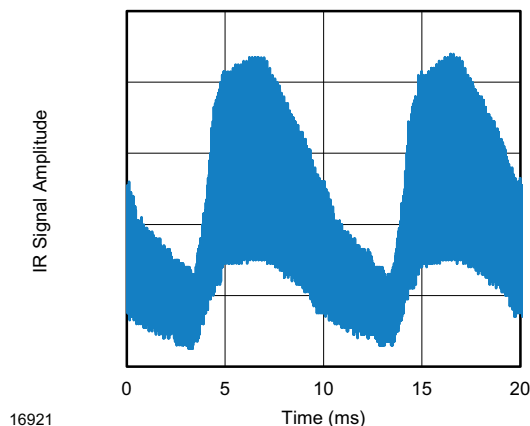


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP61..	TSOP63..	TSOP65..
Minimum burst length	6 cycles/burst	6 cycles/burst	6 cycles/burst
After each burst of length A gap time is required of	6 to 68 cycles ≥ 6 cycles	6 to 40 cycles ≥ 7 cycles	6 to 20 cycles ≥ 7 cycles
For bursts greater than a minimum gap time in the data stream is needed of	68 cycles > 1 x burst length	40 cycles > 6 x burst length	20 cycles > 10 x burst length
Maximum number of continuous short bursts/second	2500	2500	2500
RCMM code	Yes	Preferred	Yes
XMP code	Yes	Preferred	Yes
r-map code	Yes	Preferred	Yes
Suppression of interference from fluorescent lamps	Mild disturbance patterns are suppressed (example: signal pattern of Fig. 13)	Complex disturbance patterns are suppressed (example: signal pattern of Fig. 14)	Critical disturbance patterns are suppressed, e.g. highly dimmed LCDs

Note

- For data formats with long bursts (more than 10 carrier cycles) please see the datasheet for TSOP62.., TSOP64..

Technical drawing of a 4-pin D-subminiature connector housing, showing front, side, and footprint views with dimensions and tolerances.

Front View Dimensions:

- Overall width: 7.5
- Width to center of pin 1: 7.2
- Overall height: 2.8
- Pin pitch: 1.27
- Pin 1 to center of pin 4: 5.51
- Pin 1 to center of pin 2: 3 x 1.27 = 3.81
- Pin 2 to center of pin 4: 0.5 ± 0.15
- Pin diameter: $\varnothing 0.3$ 4x
- Pin 1 to center of pin 4: 3.81
- Pin 2 to center of pin 4: 0.4 A

Side View Dimensions:

- Overall height: 6.3
- Pin 1 to center of pin 4: 2.9
- Pin 1 to center of pin 2: 1.4
- Pin 2 to center of pin 4: 0.1
- Pin 1 to center of pin 4: 0.1
- Pin 2 to center of pin 4: 0.1
- Pin 1 to center of pin 4: 0.1

Footprint Dimensions:

- Overall width: 7.5
- Width to center of pin 1: 7.2
- Overall height: 2.8
- Pin pitch: 1.27
- Pin 1 to center of pin 4: 5.51
- Pin 1 to center of pin 2: 3 x 1.27 = 3.81
- Pin 2 to center of pin 4: 0.5 ± 0.15
- Pin diameter: $\varnothing 0.3$ 4x
- Pin 1 to center of pin 4: 3.81
- Pin 2 to center of pin 4: 0.4 A

Technical Drawing Details:

- Technical drawings according to DIN specifications
- Not indicated tolerances ± 0.3
- Pick and place area. TT taping
- Pick and place area. TR taping
- Footprint
- 3 x 1.27 = 3.81
- 1.27
- 0.9
- 2.2
- R 1.7

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Figure 1 is a graph showing the temperature profile of a sample during a DSC measurement. The y-axis represents Temperature (°C) from 0 to 300, and the x-axis represents Time (s) from 0 to 300. The profile shows a ramp up at 3 °C/s to 255 °C at 50 s, a dwell at 255 °C for 120 s, a ramp down at 6 °C/s to 217 °C at 170 s, a dwell at 217 °C for 100 s, a second ramp down at 6 °C/s to 245 °C at 210 s, a dwell at 245 °C for 20 s, and a final ramp down at 6 °C/s to 100 °C at 280 s. The maximum temperature is 260 °C.

technical drawings
according to DIN
specifications

138104

8° max.

16

7.5

1.75

Ø1.5

Ø1.5

R0.4

12

2

4±0.1

4.55

0.33

7.85

4° max.

1

5.45

2.45

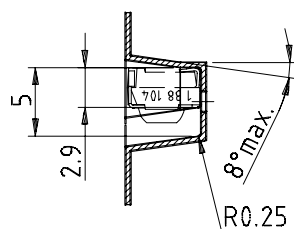
4.25

4.55

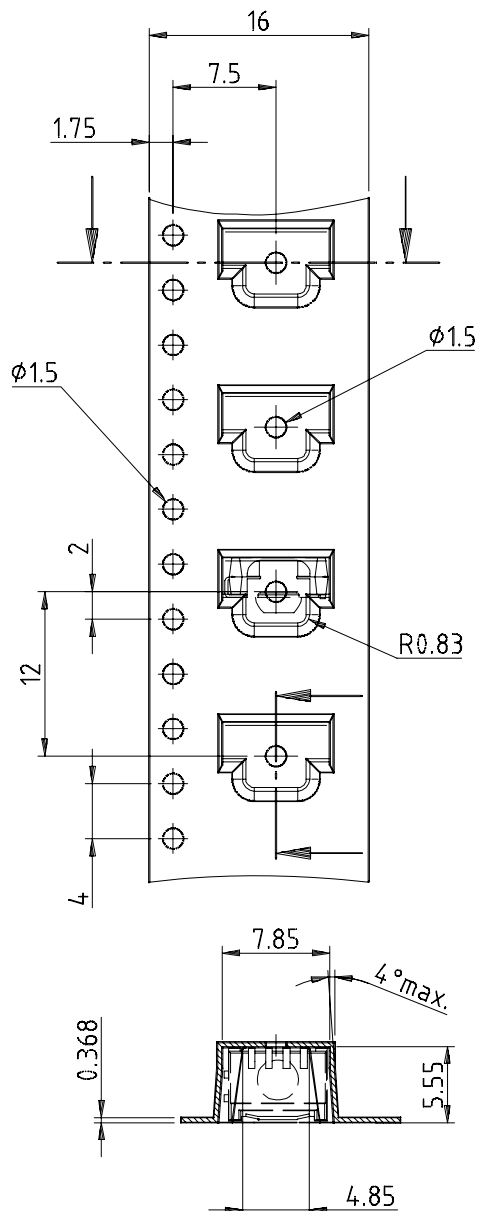
Drawing-No.: 9.700-5259.01-4
Issue: 1; 05.09.01

16584

technical drawings
according to DIN
specifications



16585



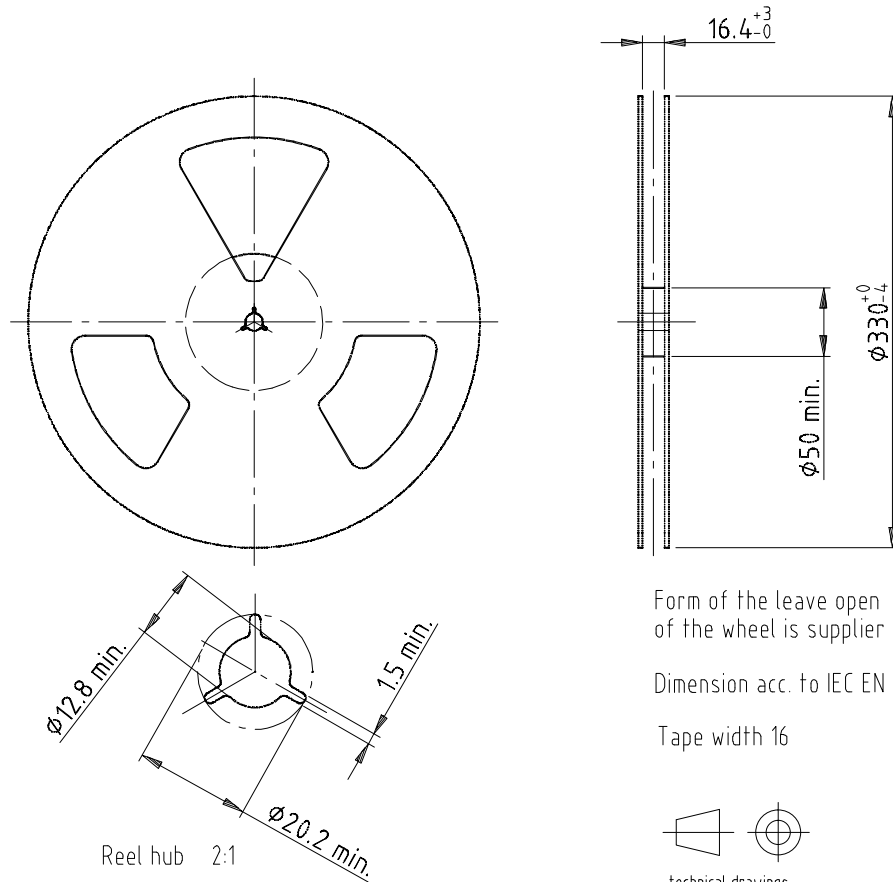


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TSOP61.., TSOP63.., TSOP65..

Vishay Semiconductors

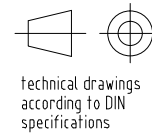
REEL DIMENSIONS in millimeters



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

Dimension acc. to IEC EN 60 286-3

Tape width 16

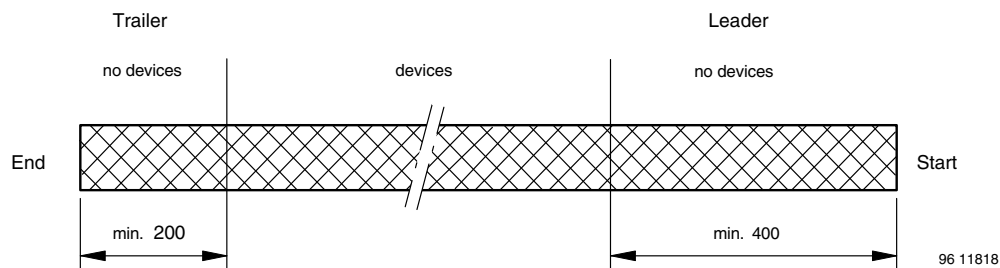


Drawing-No.: 9.800-5052.V2-4

Issue: 1; 07.05.02

16734

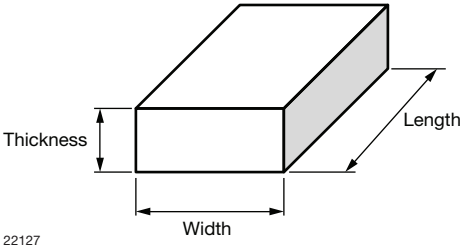
LEADER AND TRAILER DIMENSIONS in millimeters





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

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

LABEL

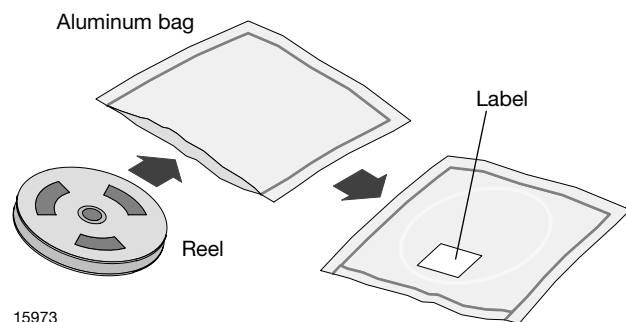
Standard bar code labels for finished goods

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.

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.

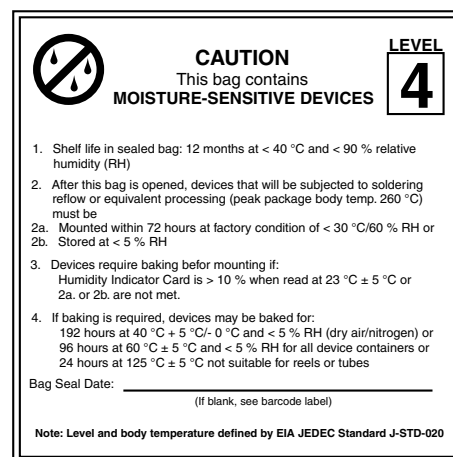
After more than 72 h under these conditions moisture content will be too high for reflow soldering.

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.



22645



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