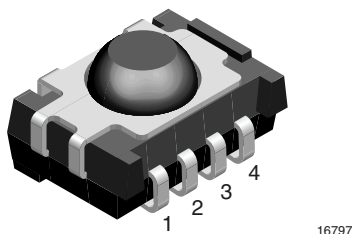




IR Receiver Modules for Remote Control Systems



MECHANICAL DATA

Pinning

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

DESCRIPTION

The TSOP62.., TSOP64.. series are miniaturized SMD-IR receiver modules for infrared remote control systems. PIN diode and preamplifier are assembled on a lead frame, the epoxy package is designed as IR filter.

The demodulated output signal can directly be decoded by a microprocessor. The TSOP62.. is compatible with all common IR remote control data formats. The TSOP64.. is optimized to better suppress spurious pulses from energy saving lamps but will also suppress some data signals.

This component has not been qualified according to automotive specifications.

FEATURES

- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Supply voltage: 2.7 V to 5.5 V
- Output active low
- Low power consumption
- High immunity against ambient light
- Low power consumption
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
GREEN
(5-2008)

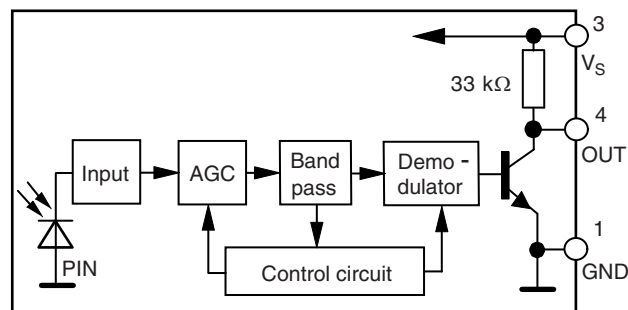
SPECIAL FEATURES

- Improved immunity against ambient light
- Suitable burst length ≥ 10 cycles/burst
- Taping available for top view and side view assembly

PARTS TABLE

CARRIER FREQUENCY	STANDARD APPLICATIONS (AGC2/AGC8)	NOISY ENVIRONMENTS AND SHORT BURSTS (AGC4)
30 kHz	TSOP6230	TSOP6430
33 kHz	TSOP6233	TSOP6433
36 kHz	TSOP6236	TSOP6436
36.7 kHz	TSOP6237	TSOP6437
38 kHz	TSOP6238	TSOP6438
40 kHz	TSOP6240	TSOP6440
56 kHz	TSOP6256	TSOP6456

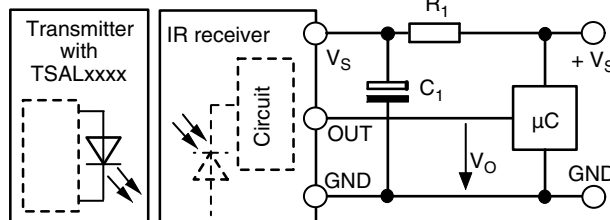
BLOCK DIAGRAM



16839-1

APPLICATION CIRCUIT

17170_7



The external components R_1 and C_1 are optional to improve the robustness against electrical overstress (typical values are $R_1 = 100 \Omega$, $C_1 = 0.1 \mu F$). The output voltage V_O should not be pulled down to a level below 1 V by the external circuit. The capacitive load at the output should be less than 2 nF.

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage (pin 3)		V_S	- 0.3 to + 6	V
Supply current (pin 3)		I_S	5	mA
Output voltage (pin 4)		V_O	- 0.3 to 5.5	V
Voltage at output to supply		$V_S - V_O$	- 0.3 to $(V_S + 0.3)$	V
Output current (pin 4)		I_O	5	mA
Junction temperature		T_j	100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°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}	0.65	0.85	1.05	mA
	$E_v = 40\text{ klx, sunlight}$	I_{SH}		0.95		mA
Supply voltage		V_S	2.7		5.5	V
Transmission distance	$E_v = 0$, test signal see fig. 1, IR diode TSAL6200, $I_F = 400\text{ mA}$	d		40		m
Output voltage low (pin 4)	$I_{OSL} = 0.5\text{ mA}$, $E_e = 0.7\text{ mW/m}^2$, 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	$E_e\text{ min.}$		0.3	0.45	mW/m ²
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see fig. 1	$E_e\text{ max.}$	30			W/m ²
Directivity	Angle of half transmission distance	$\phi_{1/2}$		± 50		deg

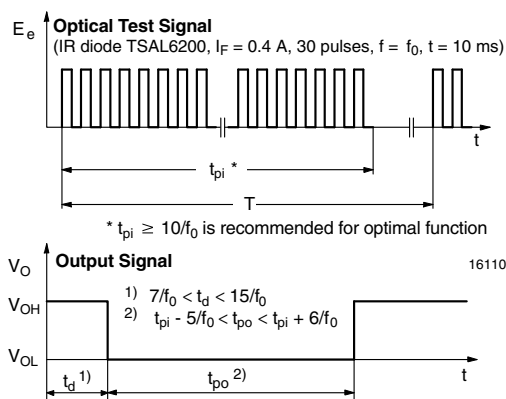
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)

Fig. 1 - Output Active Low

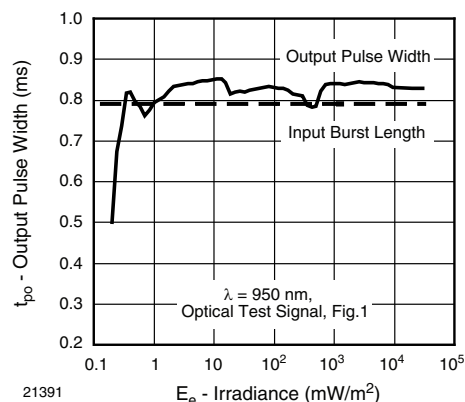


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

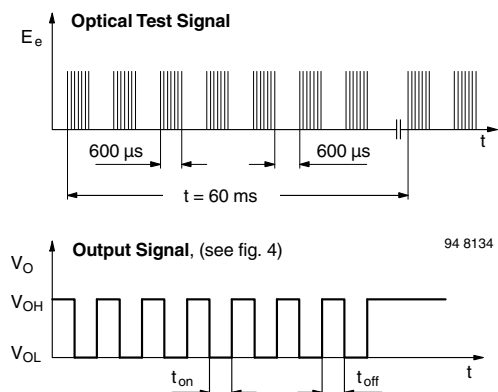


Fig. 3 - Output Function

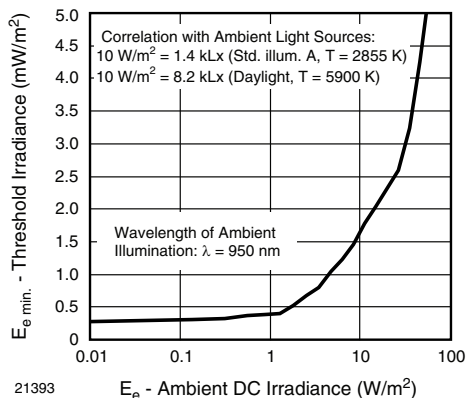


Fig. 6 - Sensitivity in Bright Ambient

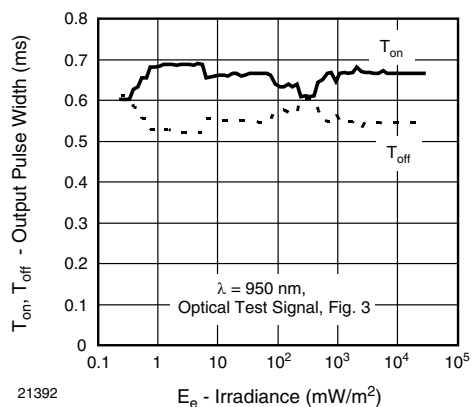


Fig. 4 - Output Pulse Diagram

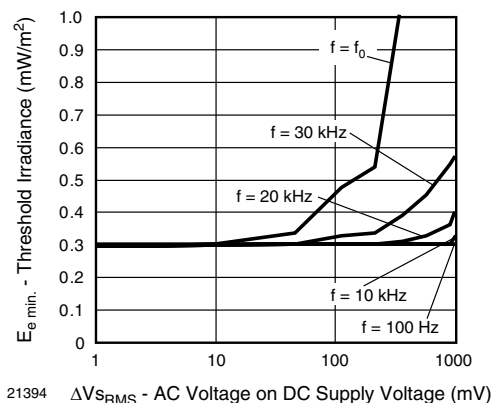


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

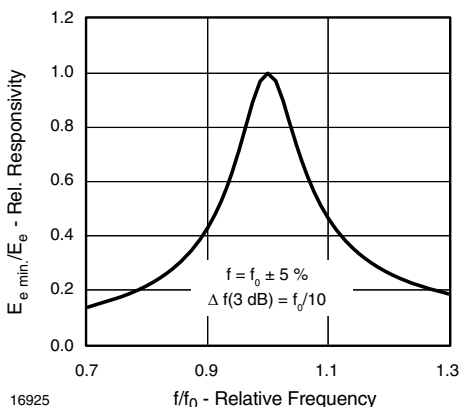


Fig. 5 - Frequency Dependence of Responsivity

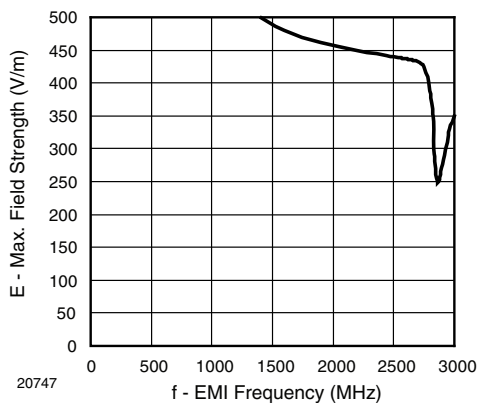
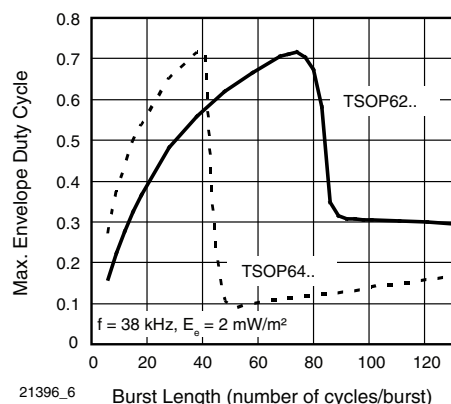
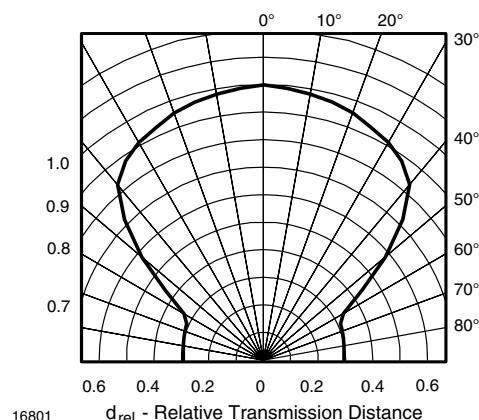


Fig. 8 - Sensitivity vs. Electric Field Disturbances



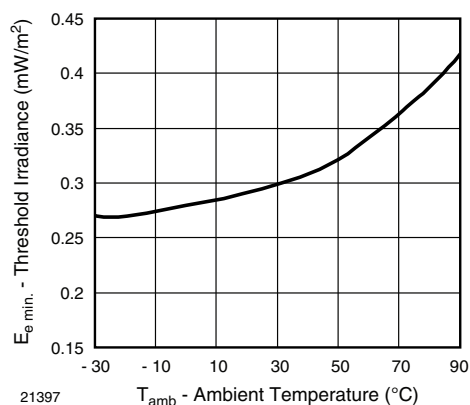
21396_6

Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length



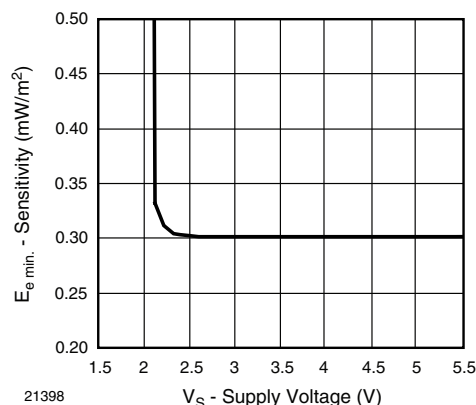
16801

Fig. 12 - Horizontal Directivity



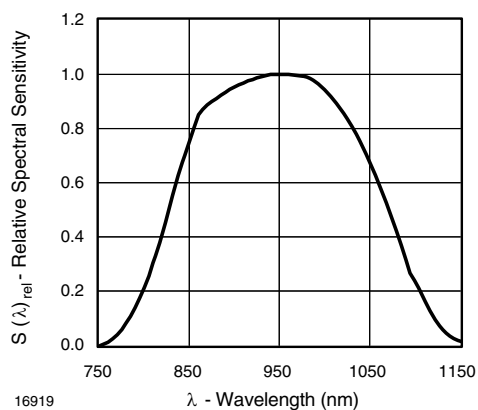
21397

Fig. 10 - Sensitivity vs. Ambient Temperature



21398

Fig. 13 - Sensitivity vs. Supply Voltage



16919

Fig. 11 - Relative Spectral Sensitivity vs. Wavelength



SUITABLE DATA FORMAT

The TSOP62.., TSOP64.. series are 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 TSOP62.., TSOP64.. 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 14 or figure 15)

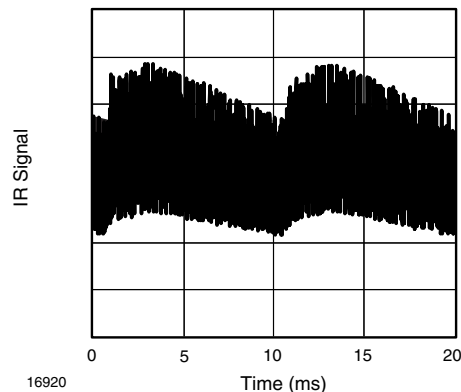


Fig. 14 - IR Signal from Fluorescent Lamp with Low Modulation

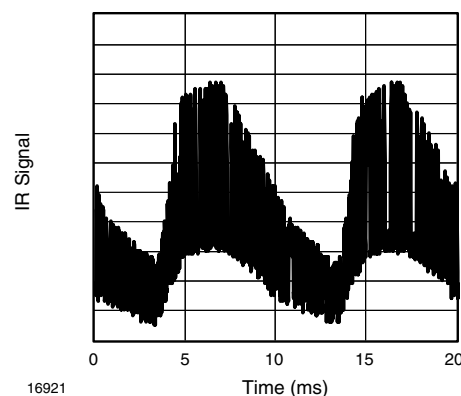


Fig. 15 - IR Signal from Fluorescent Lamp with High Modulation

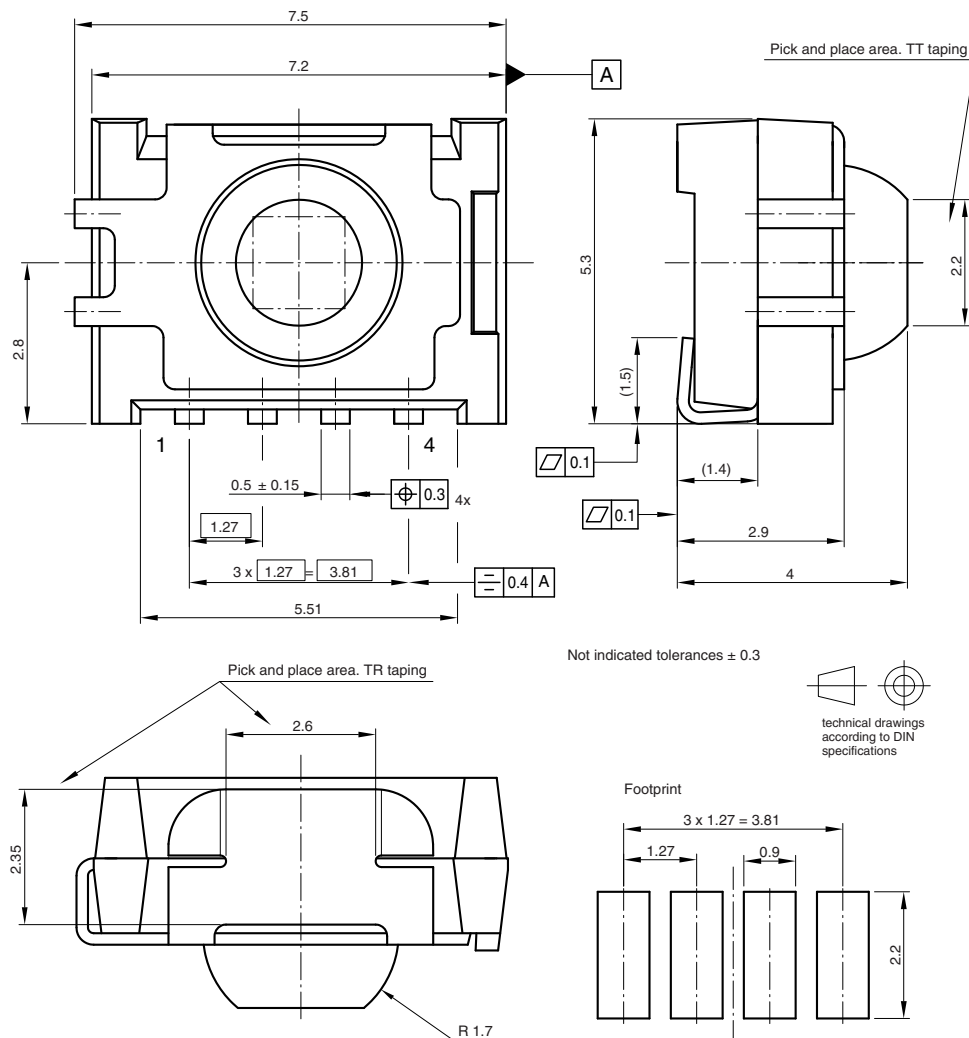
	TSOP62..	TSOP64..
Minimum burst length	10 cycles/burst	10 cycles/burst
After each burst of length a minimum gap time is required of	10 to 70 cycles ≥ 12 cycles	10 to 35 cycles ≥ 12 cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 4 x burst length	35 cycles > 10 x burst length
Maximum number of continuous short bursts/second	800	1300
Recommended for NEC code	yes	yes
Recommended for RC5/RC6 code	yes	yes
Recommended for Sony code	yes	no
Recommended for Thomson 56 kHz code	yes	yes
Recommended for Mitsubishi code (38 kHz, preburst 8 ms, 16 bit)	yes	yes
Recommended for Sharp 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 short bursts please see the datasheet of TSOP61..., TSOP63..



PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5341.01-4
Issue: 8; 02.09.09
16776

ASSEMBLY INSTRUCTIONS

Reflow Soldering

- Reflow soldering must be done within 72 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

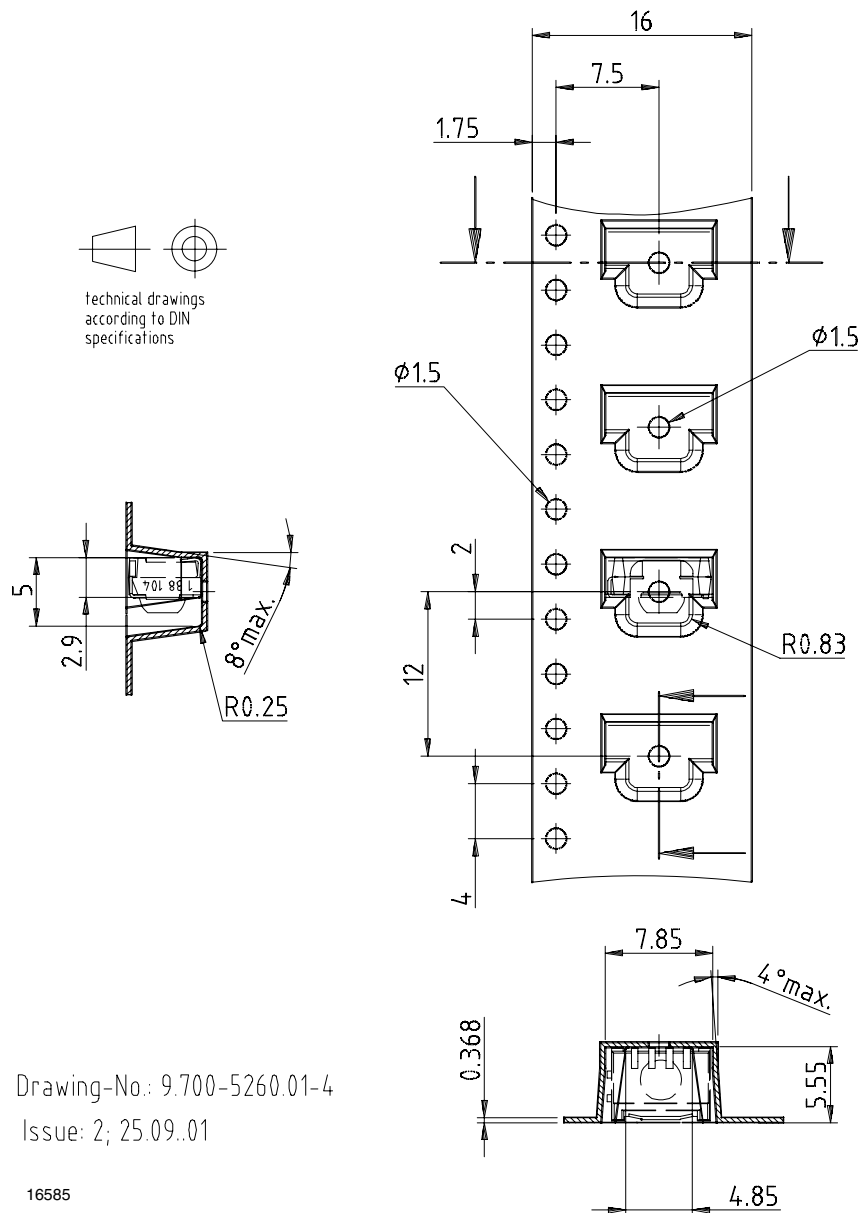
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off

Figure 1 is a line graph showing the temperature profile of the test. The y-axis represents Temperature T in $^{\circ}\text{C}$, ranging from 0 to 300. The x-axis represents time t in seconds (s), ranging from 0 to 300. The profile starts at 25°C at $t=0$, ramps up at 3°C/s to 150°C at $t=40$ s. It then continues to ramp up to 200°C at $t=160$ s. A horizontal segment at 200°C is labeled "max. 20 s". The temperature then ramps up to a peak of 260°C at $t=220$ s, holds at 260°C for "max. 20 s", and then ramps down to 245°C at $t=260$ s. A horizontal segment at 245°C is labeled "max. 100 s". Finally, the temperature ramps down at 6°C/s to 100°C at $t=280$ s. Key temperatures marked on the y-axis are 255°C , 240°C , 217°C , and 245°C . The x-axis is labeled "max. 120 s" for the first ramp, "max. 20 s" for the first hold, "max. 100 s" for the second hold, and "max. 2 cycles allowed" for the final ramp.

Technical drawing of a 4-hole 16mm wide plate. The drawing includes a top view, a side view, and a detail view of the corner. The top view shows a rectangular plate with a width of 16mm and a height of 12mm. There are four holes, each with a diameter of $\phi 1.5$. The distance between the centers of the holes is 7.5mm. The distance from the center of the holes to the top and bottom edges is 4.25mm. The distance from the center of the holes to the left and right edges is 4.55mm. The side view shows the plate has a thickness of 1mm. The detail view shows the corner with a radius of R0.4 and a chamfer of 8° max. The drawing is labeled with the part number 00-5259.01-4 and the drawing number 1.

16584

TAPING VERSION TSOP..TR DIMENSIONS in millimeters



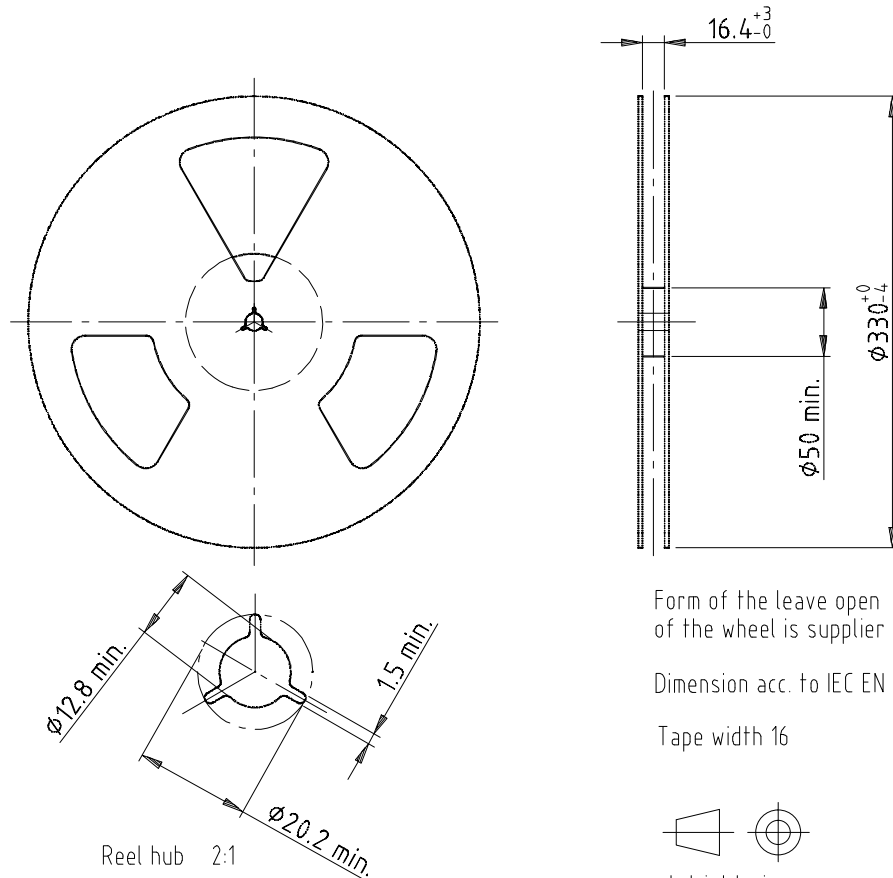
Drawing-No.: 9.700-5260.01-4

Issue: 2; 25.09..01

16585



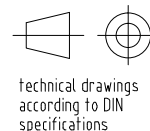
REEL DIMENSIONS in millimeters



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

Dimension acc. to IEC EN 60 286-3

Tape width 16

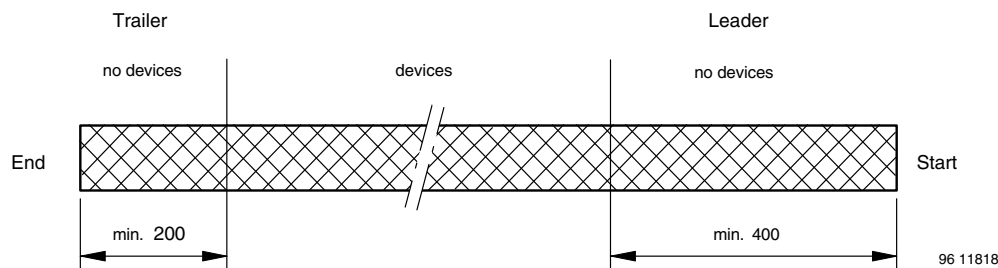


Drawing-No.: 9.800-5052.V2-4

Issue: 1; 07.05.02

16734

LEADER AND TRAILER DIMENSIONS in millimeters



COVER TAPE PEEL 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

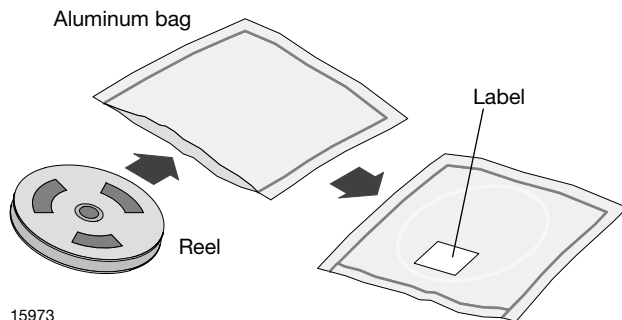
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain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

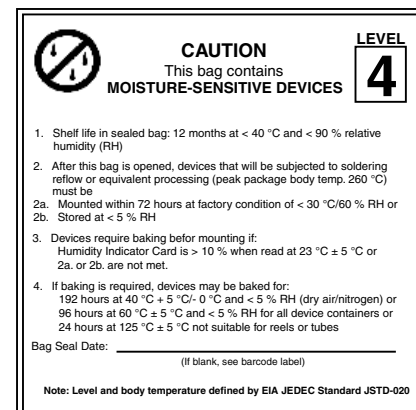
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 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.



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



www.vishay.com

TSOP62.., TSOP64..

Vishay Semiconductors

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.





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Material Category Policy

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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.