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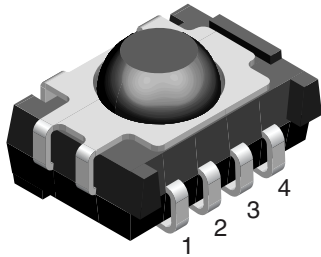
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IR Receiver Modules for Remote Control Systems



16797

MECHANICAL DATA

Pinning

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

Please see the document "Product Transition Schedule" at www.vishay.com/ir-receiver-modules/ for up-to-date info, when this product will be released.

FEATURES

- Low supply current
- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against EMI
- Supply voltage: 2.5 V to 5.5 V
- Improved immunity against ambient light
- Insensitive to supply voltage ripple and noise
- Taping available for top view and side view assembly
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



DESCRIPTION

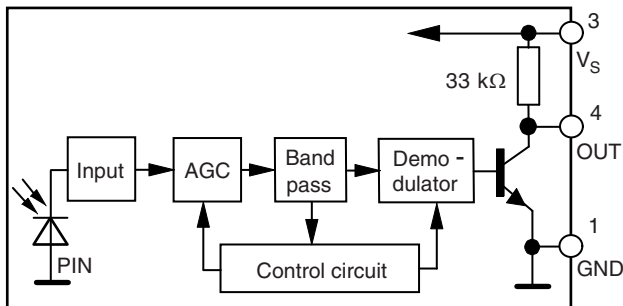
These products are miniaturized SMD-IR receivers for infrared remote control systems. A PIN diode and a preamplifier are assembled on a lead frame, the epoxy package acts as an IR filter.

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

This component has not been qualified according to automotive specifications.

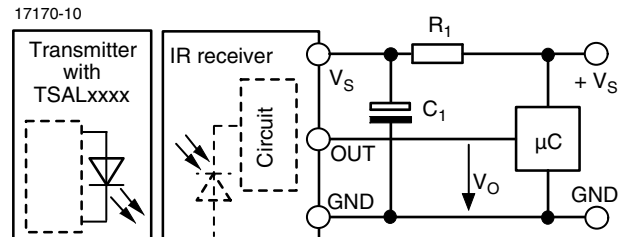
| PARTS TABLE | | |
|-------------------|-----------------------------------|--|
| CARRIER FREQUENCY | STANDARD APPLICATIONS (AGC2/AGC8) | NOISY ENVIRONMENTS AND SHORT BURSTS (AGC4) |
| 30 kHz | TSOP6230 | TSOP6430 |
| 33 kHz | TSOP6233 | TSOP6433 |
| 36 kHz | TSOP6236 | TSOP6436 |
| 38 kHz | TSOP6238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

BLOCK DIAGRAM



16839-1

APPLICATION CIRCUIT



The external components R₁ and C₁ are optional to improve the robustness against electrical overstress (typical values are R₁ = 100 Ω, C₁ = 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 | $T_{amb} \leq 85 \text{ °C}$ | 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 | 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 | | | W/m^2 |
| Directivity | Angle of half transmission distance | $\phi_{1/2}$ | | ± 50 | | deg |

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

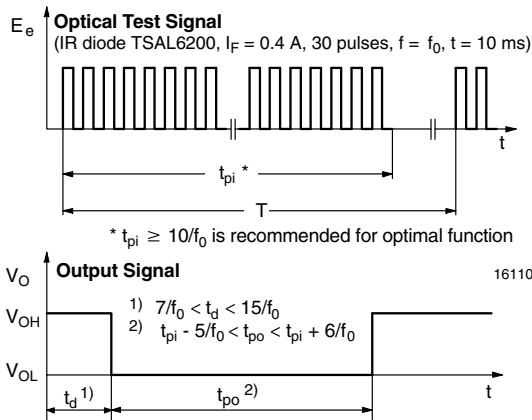


Fig. 1 - Output Active Low

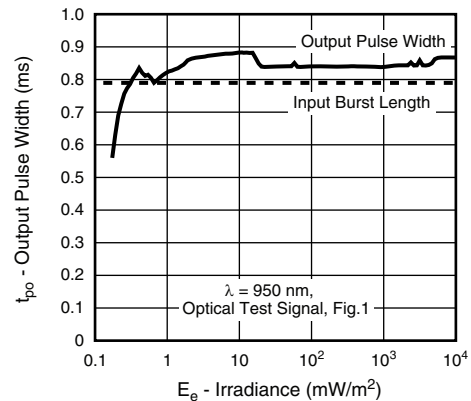


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



TSOP62.., TSOP64..

Vishay Semiconductors

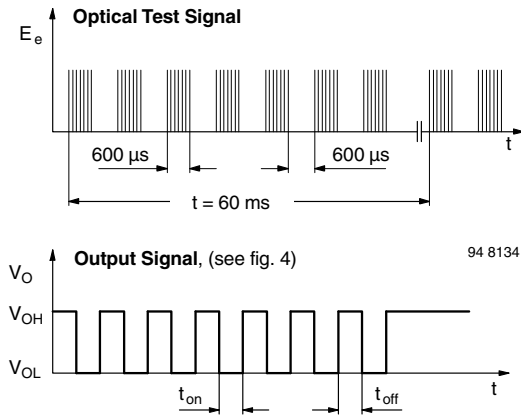


Fig. 3 - Output Function

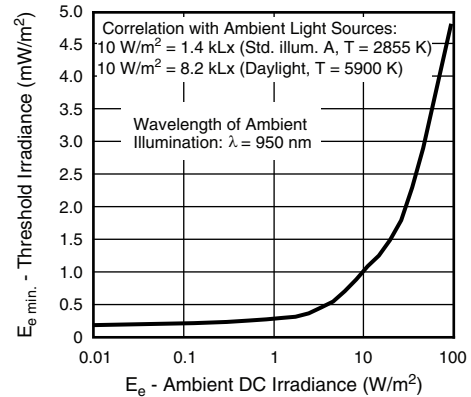


Fig. 6 - Sensitivity in Bright Ambient

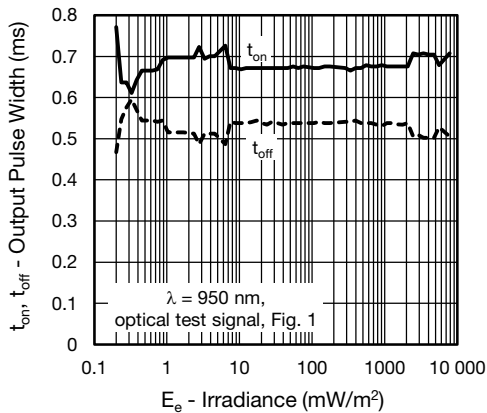


Fig. 4 - Output Pulse Diagram

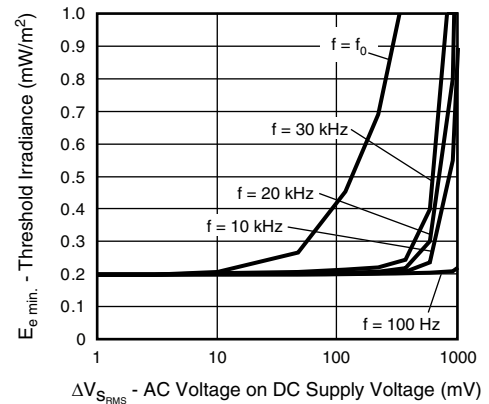


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

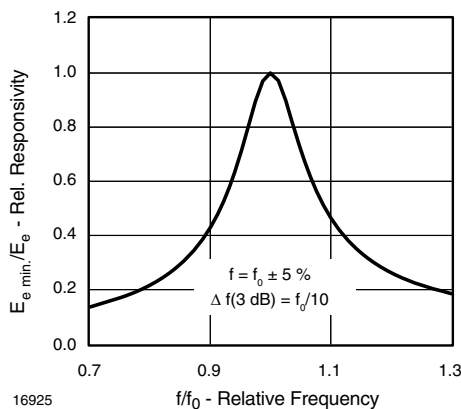


Fig. 5 - Frequency Dependence of Responsivity

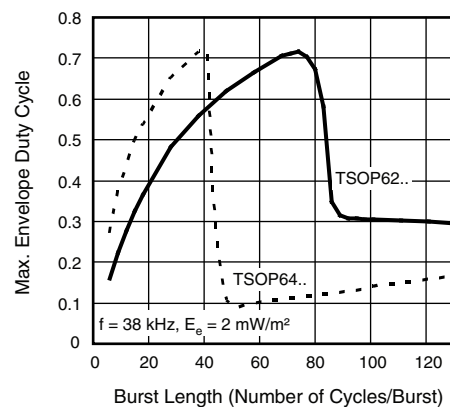


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

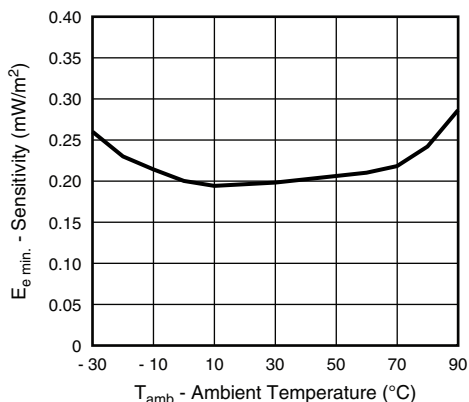


Fig. 9 - Sensitivity vs. Ambient Temperature

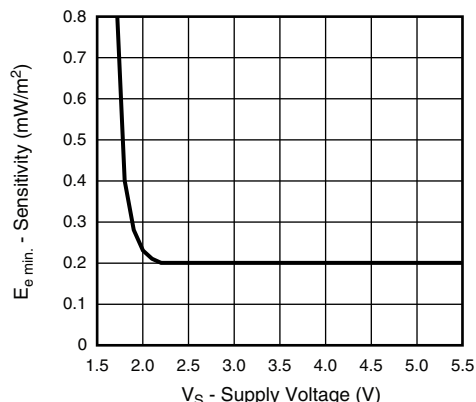


Fig. 12 - Sensitivity vs. Supply Voltage

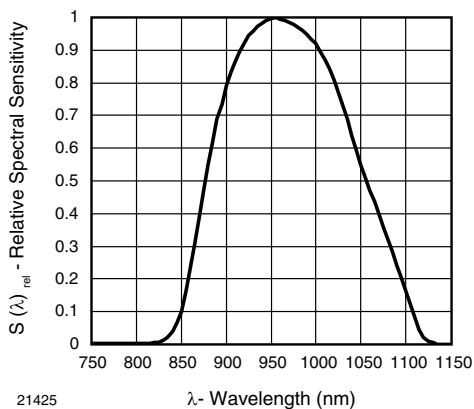


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

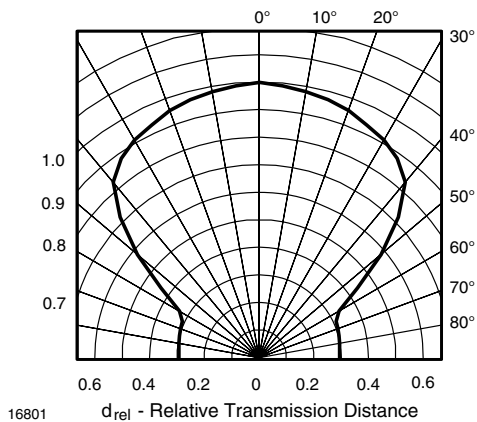


Fig. 11 - Horizontal Directivity



SUITABLE DATA FORMAT

These products 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 IR receiver 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 13 or figure 14)

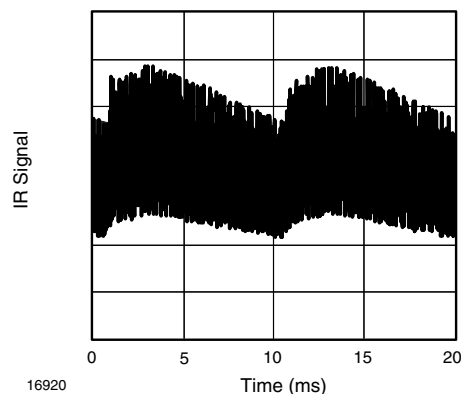


Fig. 13 - IR Signal from Fluorescent Lamp with Low Modulation

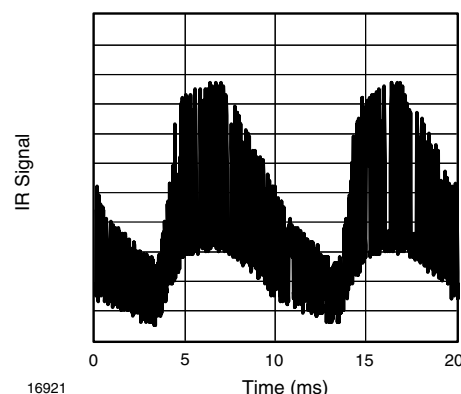


Fig. 14 - IR Signal from Fluorescent Lamp with High Modulation

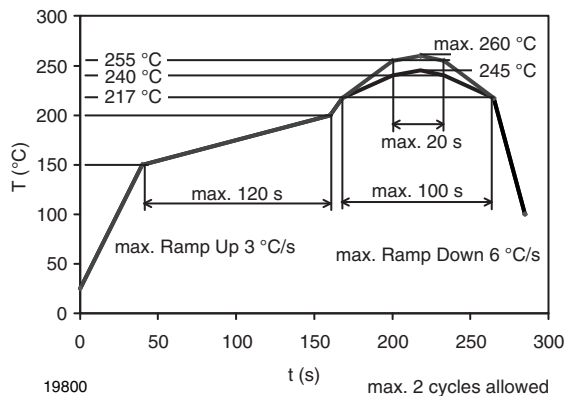
| | TSOP62.. | TSOP64.. |
|--|--|---|
| Minimum burst length | 10 cycles/burst | 10 cycles/burst |
| After each burst of length a minimum gap time is required of | 10 to 70 cycles ≥ 12 cycles | 10 to 35 cycles ≥ 12 cycles |
| For bursts greater than a minimum gap time in the data stream is needed of | 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

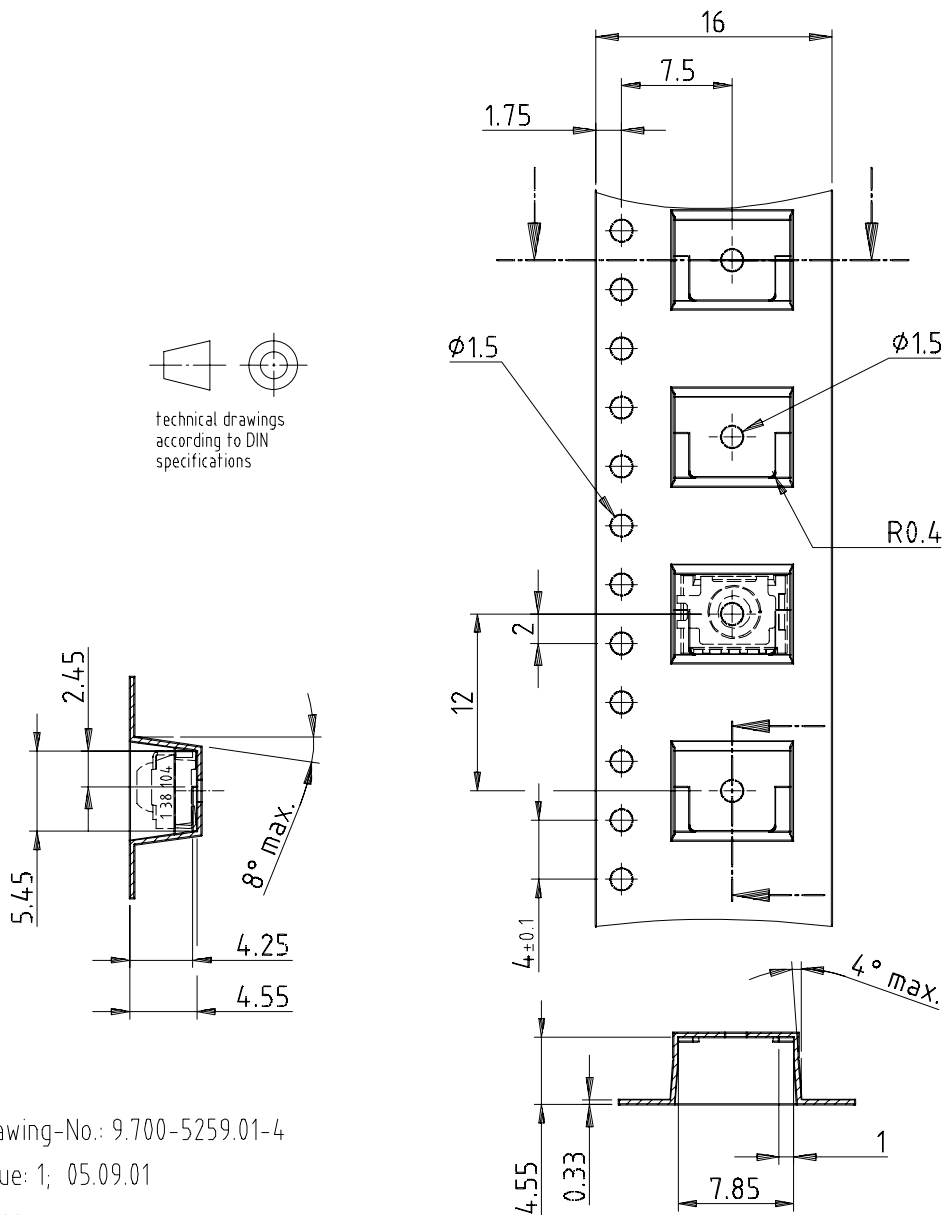
- For data formats with short bursts please see the datasheet of TSOP61.., TSOP63.., TSOP65..



VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE



TAPING VERSION TSOP..TT DIMENSIONS in millimeters



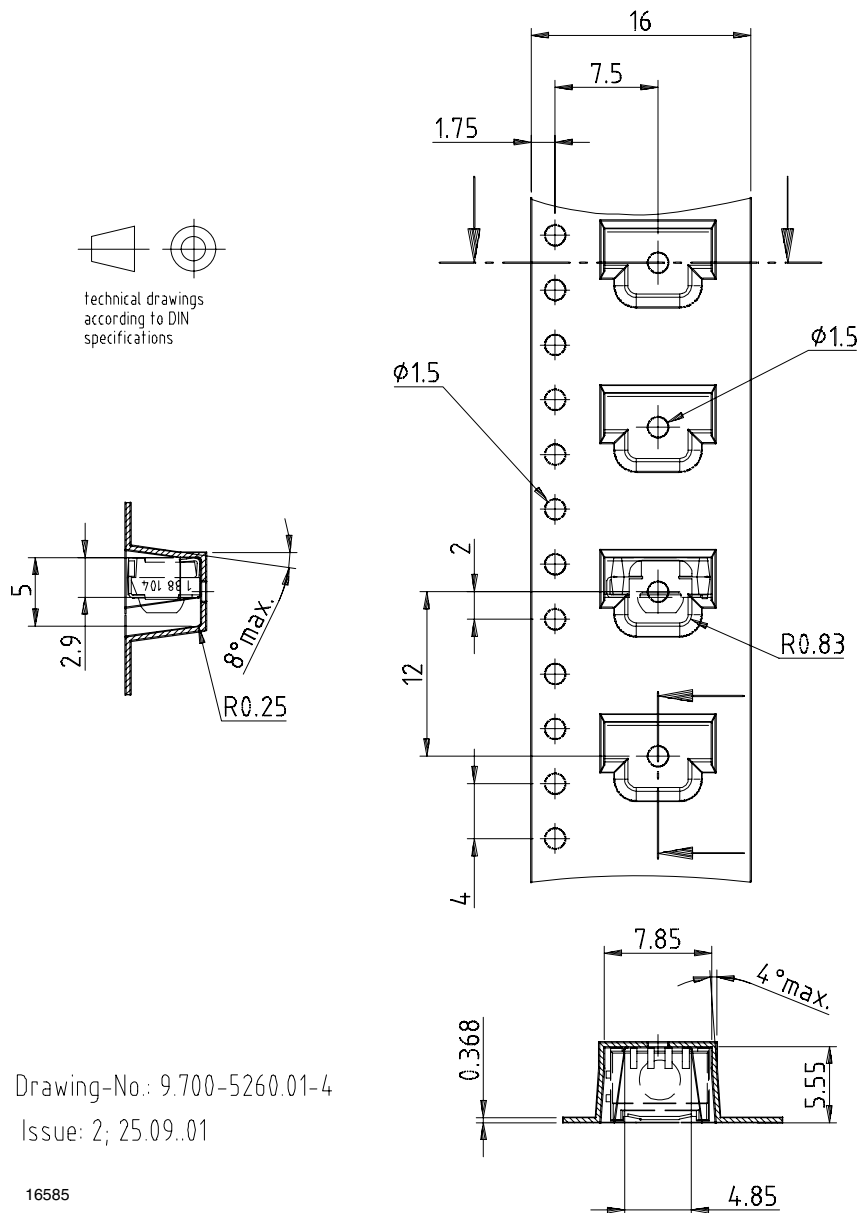
Drawing-No.: 9.700-5259.01-4

Issue: 1; 05.09.01

16584



TAPING VERSION TSOP..TR DIMENSIONS in millimeters



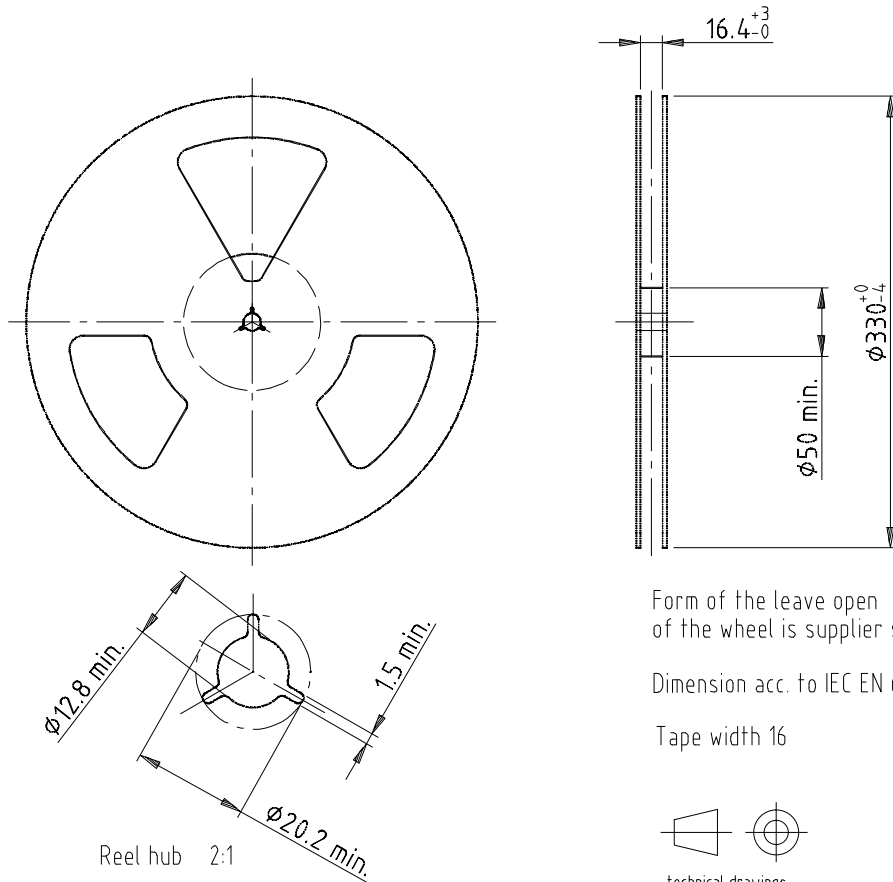
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Issue: 2; 25.09..01

16585



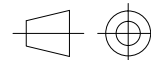
REEL DIMENSIONS in millimeters



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

Dimension acc. to IEC EN 60 286-3

Tape width 16



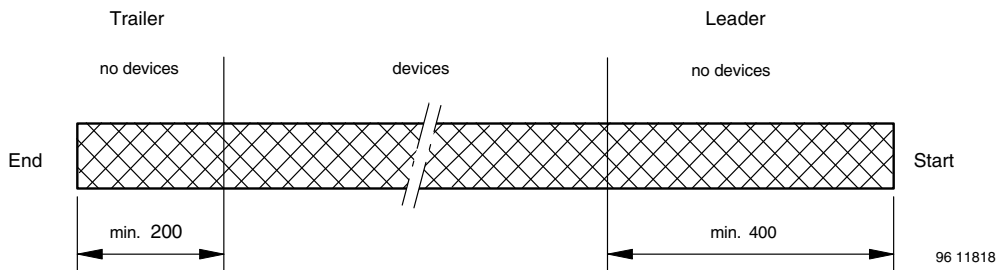
technical drawings according to DIN specifications

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. ± 10 mm/min.
 165° to 180° peel angle

LABEL

Standard bar code labels for finished goods

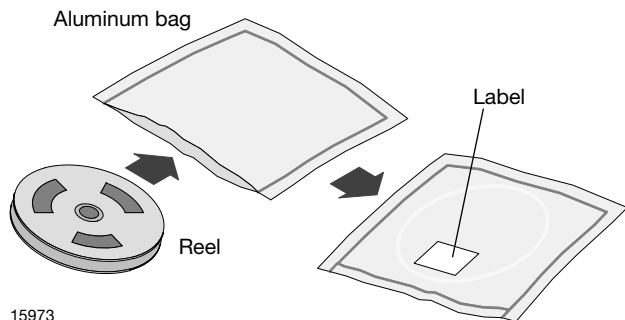
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain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

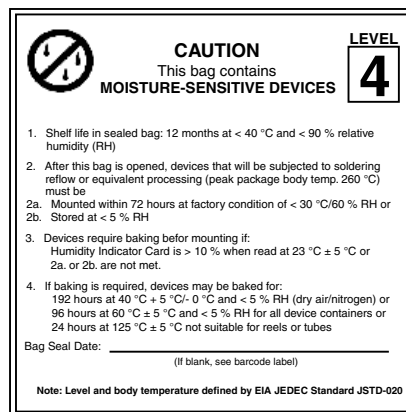
Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- 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



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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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.

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