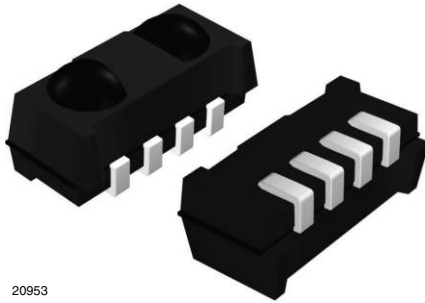


IR Receiver Modules for Remote Control Systems



20953

MECHANICAL DATA

Pinning:

1, 4 = GND, 2 = V_S , 3 = OUT

FEATURES

- Very low supply current
- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Supply voltage: 2.5 V to 5.5 V
- Improved immunity against ambient light
- Capable of side or top view
- Two lenses for high sensitivity and wide receiving angle
- Insensitive to supply voltage ripple and noise
- Narrow optical filter to reduce interference from plasma TV emissions
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



DESCRIPTION

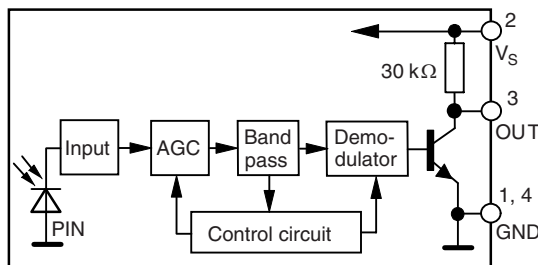
The TSOP752.., TSOP754.. series are two lens miniaturized receiver modules for infrared remote control systems. One PIN diode per lens and a preamplifier are assembled on a leadframe, the epoxy lens cap is designed as an IR filter. The demodulated output signal can be directly decoded by a microprocessor. The TSOP752.. is compatible with all common IR remote control data formats. The TSOP754.. is 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

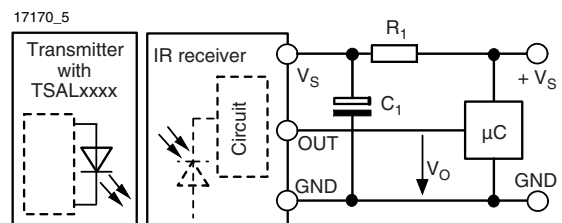
| CARRIER FREQUENCY | STANDARD APPLICATIONS (AGC2/AGC8) | VERY NOISY ENVIRONMENTS (AGC4) |
|-------------------|-----------------------------------|--------------------------------|
| 30 kHz | TSOP75230 | TSOP75430 |
| 33 kHz | TSOP75233 | TSOP75433 |
| 36 kHz | TSOP75236 | TSOP75436 |
| 38 kHz | TSOP75238 | TSOP75438 |
| 40 kHz | TSOP75240 | TSOP75440 |
| 56 kHz | TSOP75256 | TSOP75456 |

BLOCK DIAGRAM



20445-1

APPLICATION CIRCUIT



R_1 and C_1 are recommended for protection against EOS. Components should be in the range of $33 \Omega < R_1 < 1 \text{ k}\Omega$, $C_1 > 0.1 \mu\text{F}$.

** Please see document "Vishay Green and Halogen-Free Definitions (5-2008)": <http://www.vishay.com/doc?99902>

| ABSOLUTE MAXIMUM RATINGS (1) | | | | |
|------------------------------|------------------------------|-----------|--------------------------|------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Supply voltage | | V_S | - 0.3 to + 6.0 | V |
| Supply current | | I_S | 3 | 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} | - 40 to + 100 | °C |
| Operating temperature range | | T_{amb} | - 30 to + 85 | °C |
| Power consumption | $T_{amb} \leq 85 \text{ °C}$ | P_{tot} | 10 | mW |

Note

(1) 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 (1) | | | | | | |
|--|--|--------------------|------|----------|------|-----------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Supply voltage | | V_S | 2.5 | | 5.5 | V |
| Supply current | $E_v = 0, V_S = 3.3 \text{ V}$ | I_{SD} | 0.27 | 0.35 | 0.45 | mA |
| | $E_v = 40 \text{ klx, sunlight}$ | I_{SH} | | 0.45 | | mA |
| Transmission distance | $E_v = 0$, test signal see fig. 1, IR diode TSAL6200, $I_F = 250 \text{ mA}$ | d | | 45 | | 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 | $E_e \text{ min.}$ | | 0.15 | 0.35 | 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 |

Note

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

TYPICAL CHARACTERISTICS

$T_{amb} = 25 \text{ °C}$, unless otherwise specified

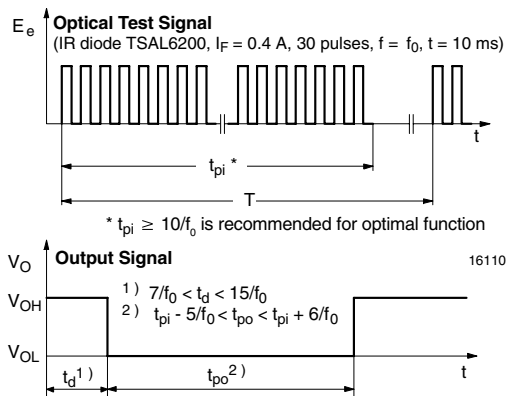


Fig. 1 - Output Active Low

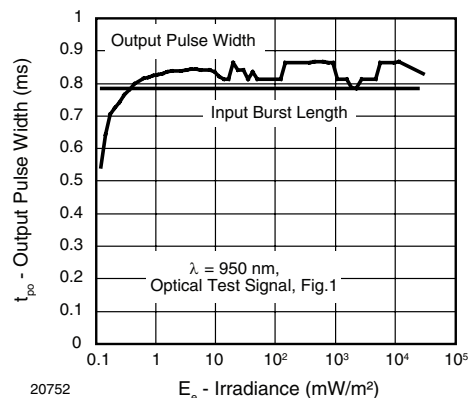


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

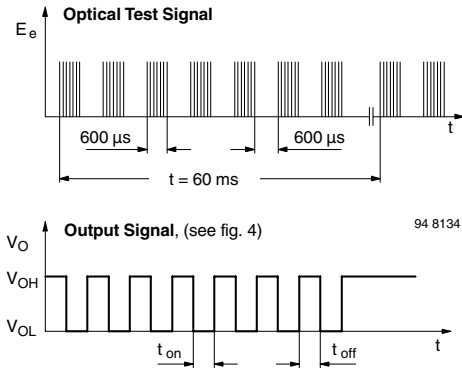


Fig. 3 - Output Function

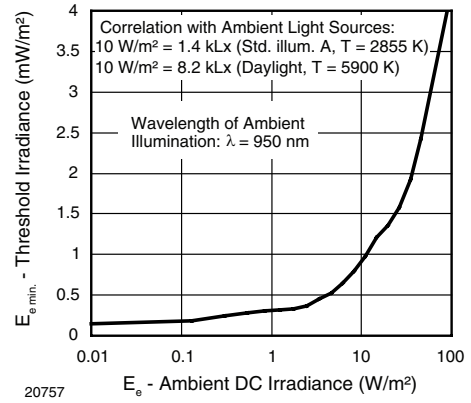


Fig. 6 - Sensitivity in Bright Ambient

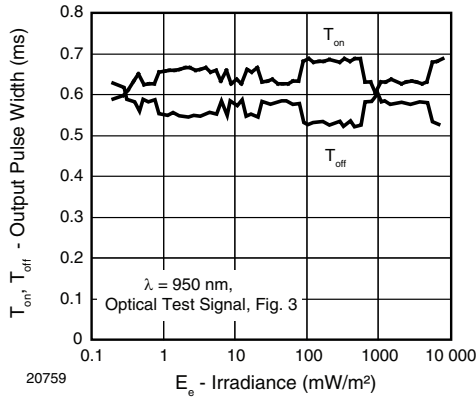


Fig. 4 - Output Pulse Diagram

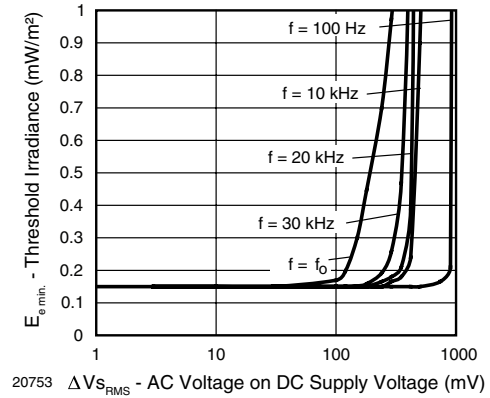


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

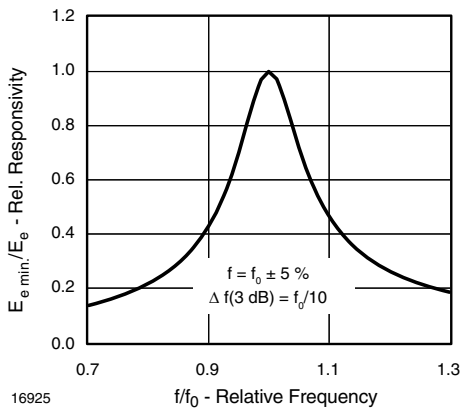


Fig. 5 - Frequency Dependence of Responsivity

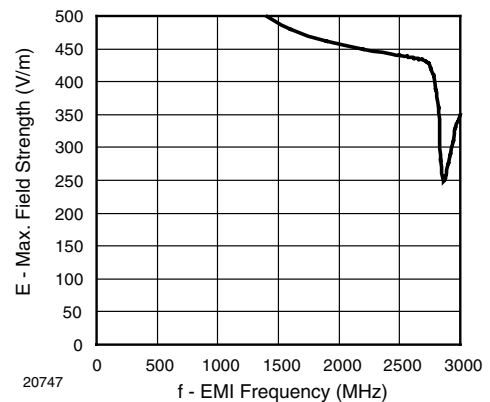


Fig. 8 - Sensitivity vs. Electric Field Disturbances

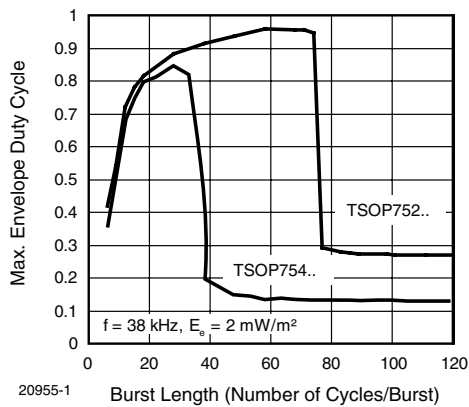


Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

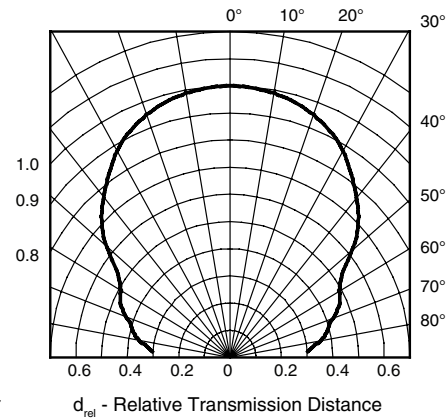


Fig. 12 - Horizontal Directivity

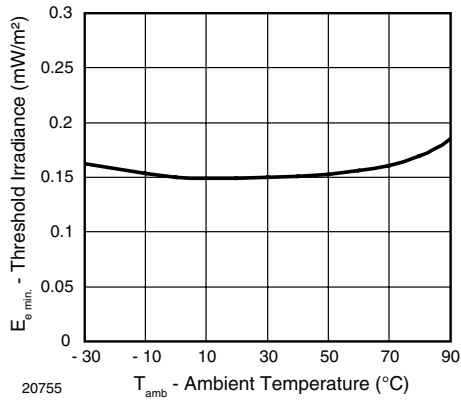


Fig. 10 - Sensitivity vs. Ambient Temperature

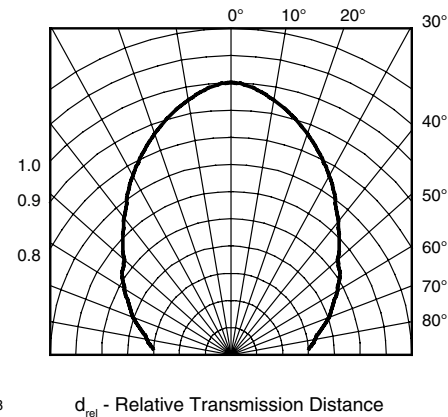


Fig. 13 - Vertical Directivity

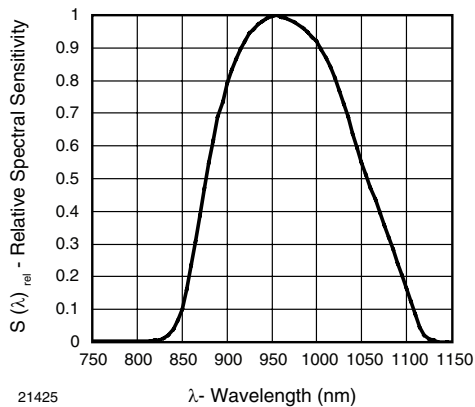


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

SUITABLE DATA FORMAT

The TSOP752.., TSOP754.. series is 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 TSOP752.., TSOP754.. 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)

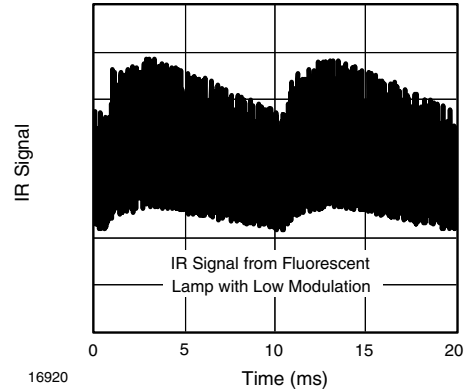


Fig. 14 - IR Signal from Fluorescent Lamp with Low Modulation

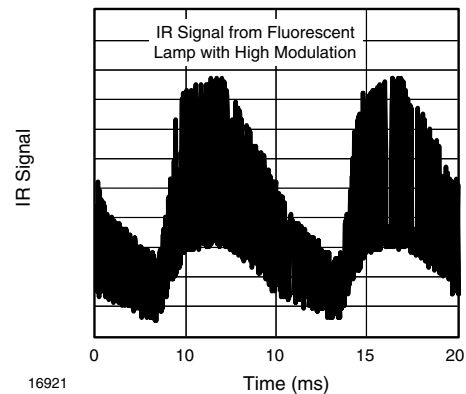


Fig. 15 - IR Signal from Fluorescent Lamp with High Modulation

| | TSOP752.. | TSOP754.. |
|---|--|---|
| 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 ≥ 10 cycles | 10 to 35 cycles ≥ 10 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 | 1800 | 1500 |
| Compatible to NEC code | yes | yes |
| Compatible to RC5/RC6 code | yes | yes |
| Compatible to Sony code | yes | no |
| Compatible to Thomson 56 kHz code | yes | yes |
| Compatible to Mitsubishi code (38 kHz, preburst 8 ms, 16 bit) | yes | no |
| Compatible to 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 for TSOP753..

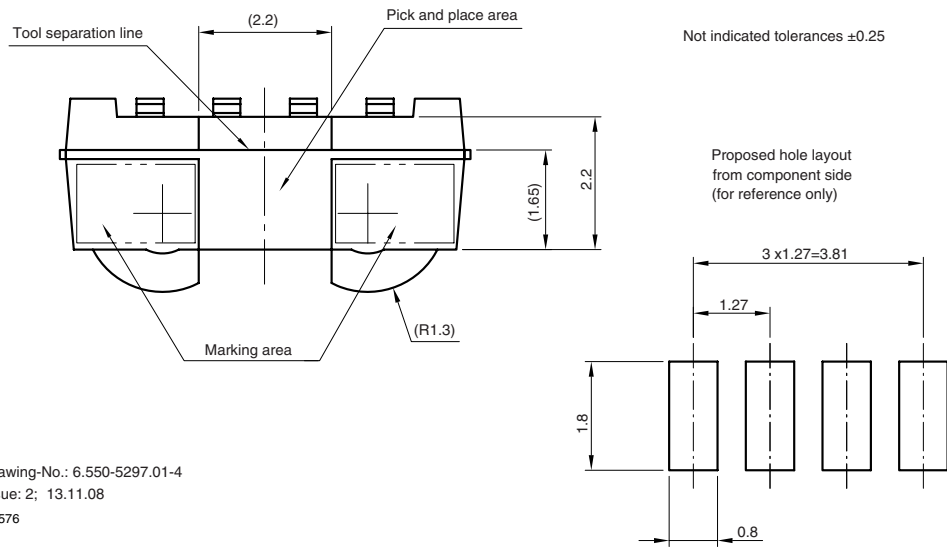
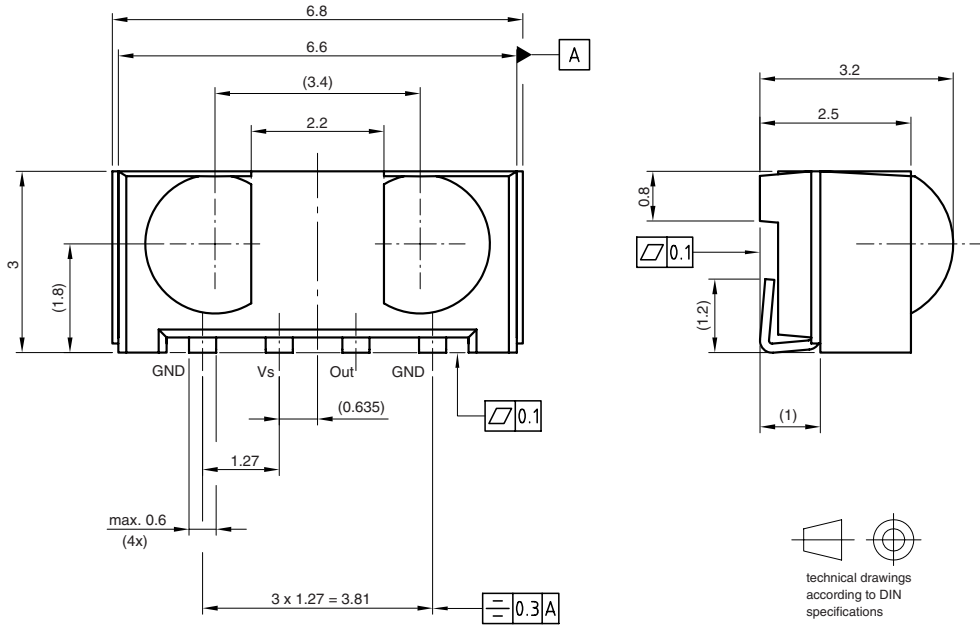
TSOP752.., TSOP754..



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IR Receiver Modules for Remote Control Systems

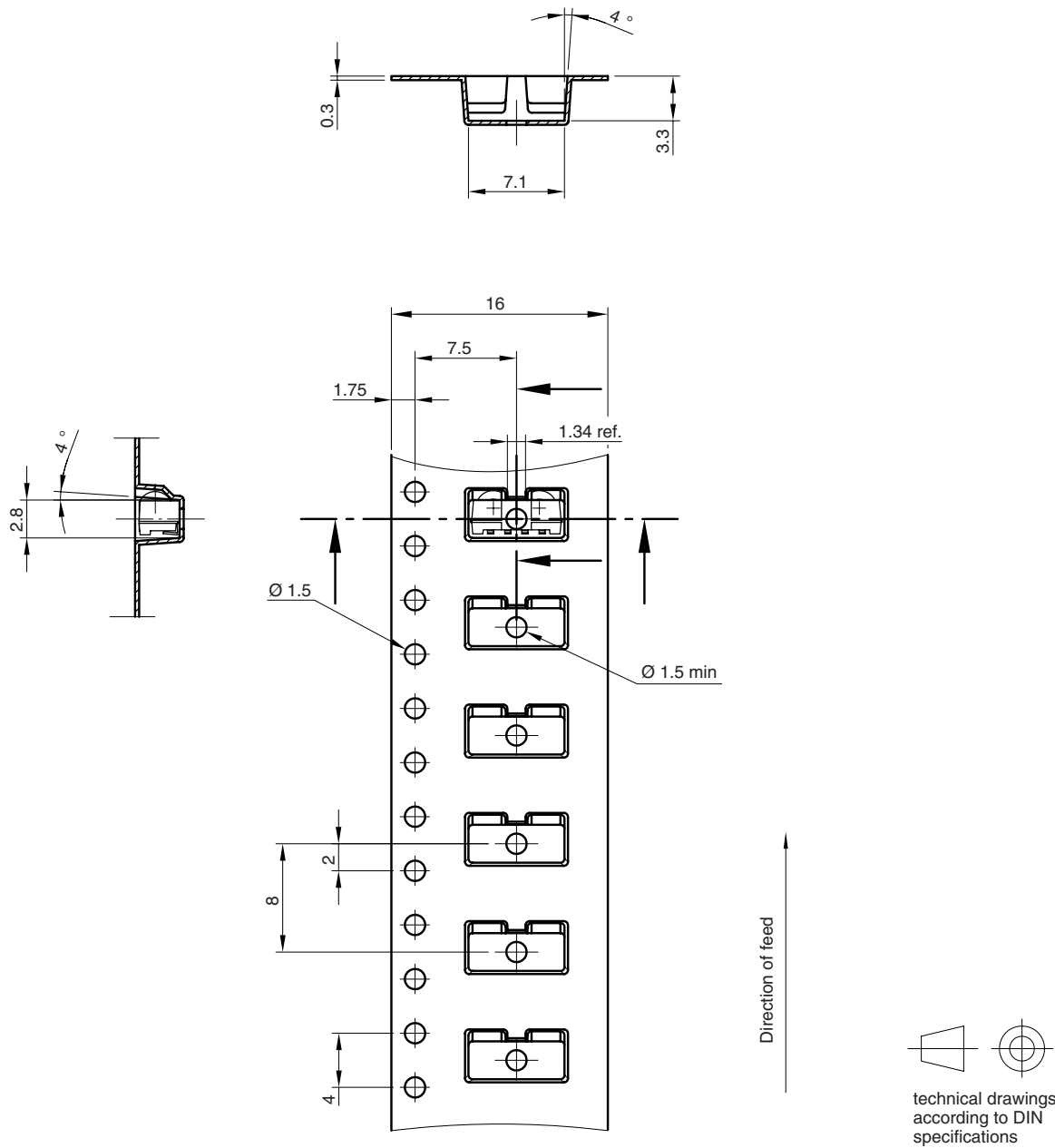
PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5297.01-4
 Issue: 2; 13.11.08
 21576



TAPING VERSION TSOP..TR DIMENSIONS in millimeters



Drawing-No.: 9.700-5337.01-4

Issue: 1; 16.10.08

21577

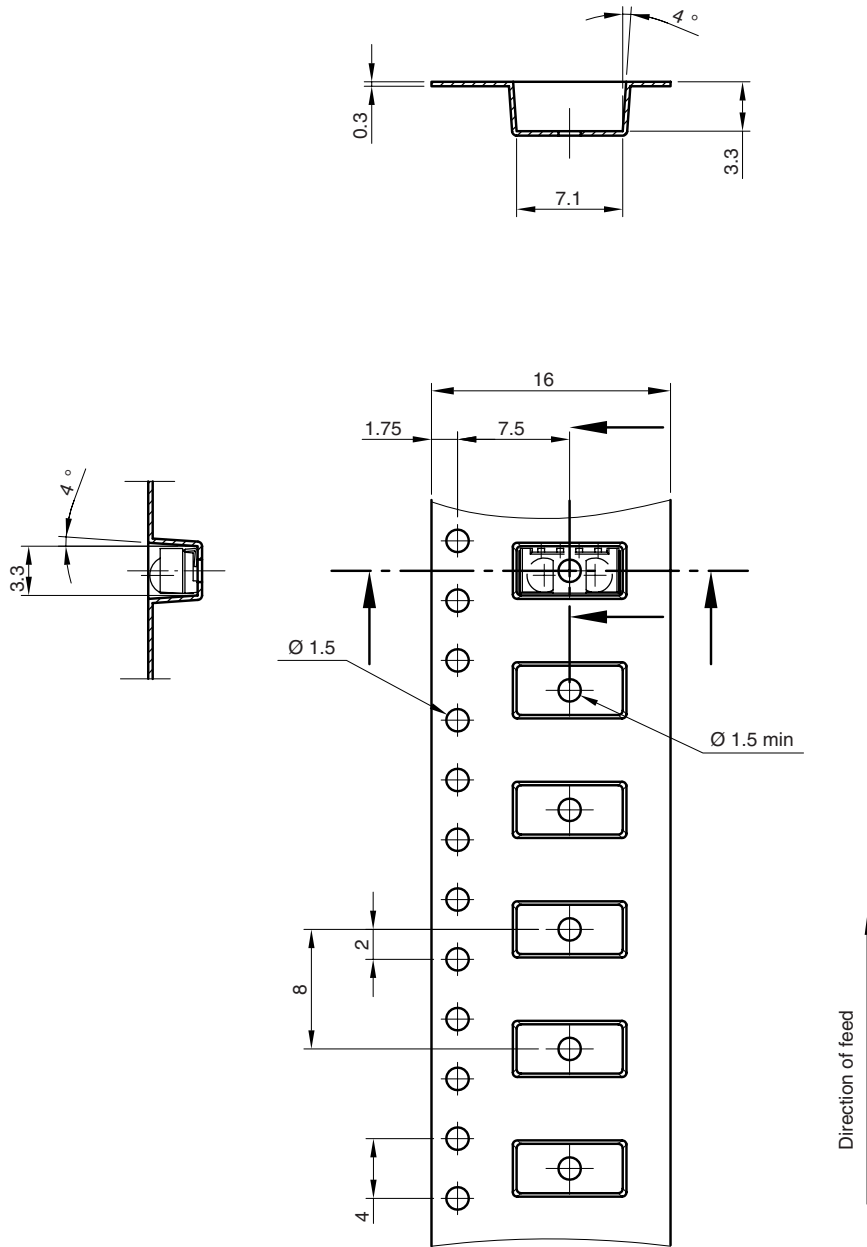
TSOP752.., TSOP754..

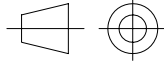


Vishay Semiconductors

IR Receiver Modules for
Remote Control Systems

TAPING VERSION TSOP..TT DIMENSIONS in millimeters




technical drawings
according to DIN
specifications

Drawing-No.: 9.700-5338.01-4
Issue: 1; 16.10.08
21578



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