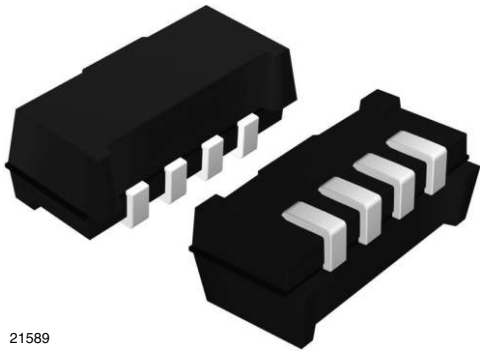
# IR Receiver Modules for Remote Control Systems



21589

## FEATURES

- Very low supply current
- Photo detector and preamplifier in one package
- Compatible also with short burst dataformats
- Supply voltage: 2.5 V to 5.5 V
- Improved immunity against ambient light
- Capable of side or top view
- Low profile 2.35 mm
- Insensitive to supply voltage ripple and noise
- Narrow optical filter to reduce interference from plasma TV emissions
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

GREEN (5-2008)**

## MECHANICAL DATA

**Pinning:**

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

## DESCRIPTION

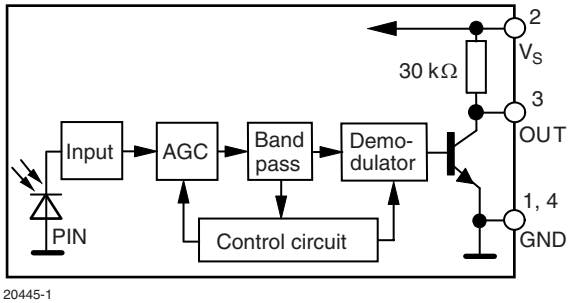
The TSOP753..W series is a miniaturized receiver module for infrared remote control systems. Two PIN diodes and a preamplifier are assembled on a leadframe, the epoxy package is designed as an IR filter.

The demodulated output signal can be directly decoded by a microprocessor. The TSOP753..W is compatible with all common IR remote control data formats. It is optimized to suppress almost all spurious pulses from energy saving fluorescent lamps including dimmed LCD backlightings.

This component has not been qualified according to automotive specifications.

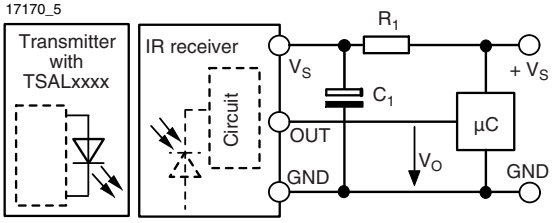
| PARTS TABLE | |
|---|---|
| CARRIER FREQUENCY | NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3) |
| 30 kHz | TSOP75330W |
| 33 kHz | TSOP75333W |
| 36 kHz | TSOP75336W |
| 38 kHz | TSOP75338W |
| 40 kHz | TSOP75340W |
| 56 kHz | TSOP75356W |

## 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 Ω < $R_1$ < 1 kΩ, $C_1$ > 0.1 µF.

** Please see document “Vishay Material Category Policy”: 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 | | $T_{stg}$ | - 25 to + 85 | °C |
| Operating temperature range | | $T_{amb}$ | - 25 to + 85 | °C |
| Power consumption | $T_{amb} \leq 85$ °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 condtions 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 V | $I_{SD}$ | 0.27 | 0.35 | 0.45 | mA |
| | $E_v$ = 40 klx, sunlight | $I_{SH}$ | | 0.45 | | mA |
| Transmission distance | $E_v$ = 0, test signal see fig. 1, IR diode TSAL6200, $I_F$ = 250 mA | d | | 30 | | m |
| Output voltage low | $I_{OSL}$ = 0.5 mA, $E_e$ = 0.7 mW/m², test signal see fig. 1 | $V_{OSL}$ | | | 100 | mV |
| Minimum irradiance | Pulse width tolerance: $t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$, test signal see fig. 1 | $E_{e\ min.}$ | | 0.3 | 0.7 | mW/m² |
| Maximum irradiance | $t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$, test signal see fig. 1 | $E_{e\ max.}$ | 30 | | | W/m² |
| Directivity | Angle of half transmission distance | $\varphi_{1/2}$ | | ± 75 | | deg |

**Note**

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

## TYPICAL CHARACTERISTICS

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

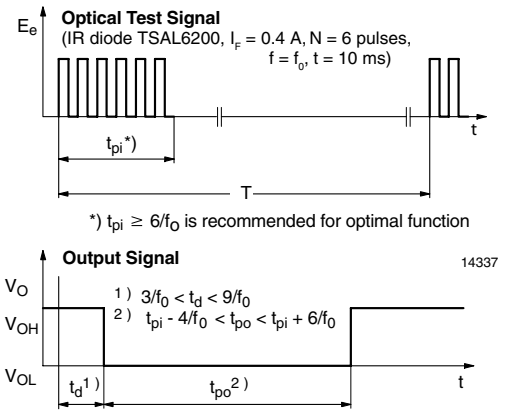



Fig. 1 - Output Active Low

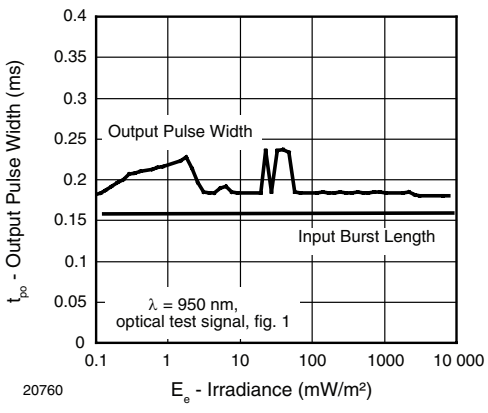



Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

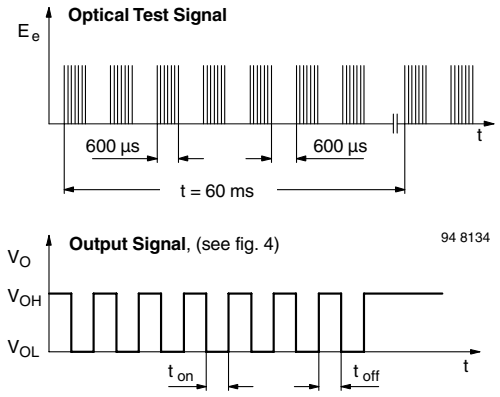



Fig. 3 - Output Function

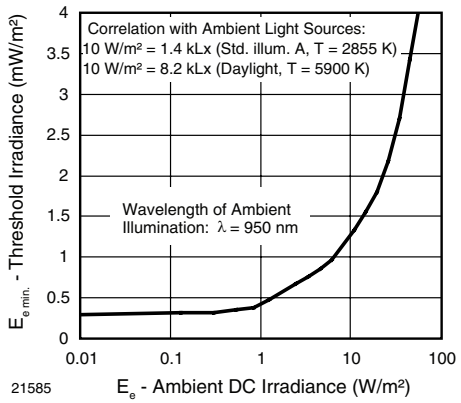



Fig. 6 - Sensitivity in Bright Ambient

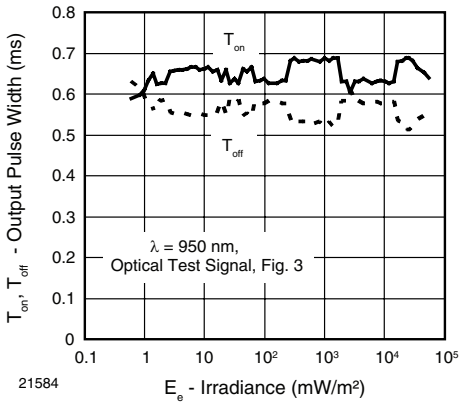



Fig. 4 - Output Pulse Diagram

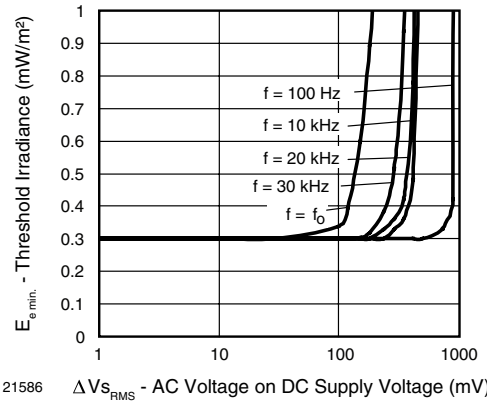



Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

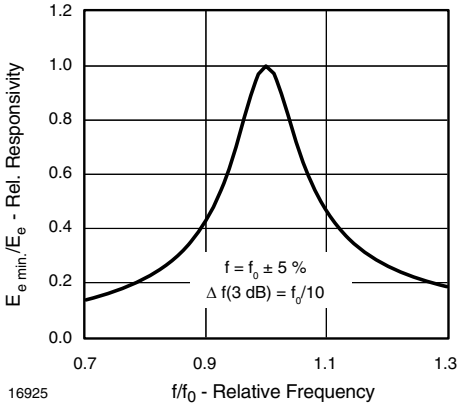



Fig. 5 - Frequency Dependence of Responsivity

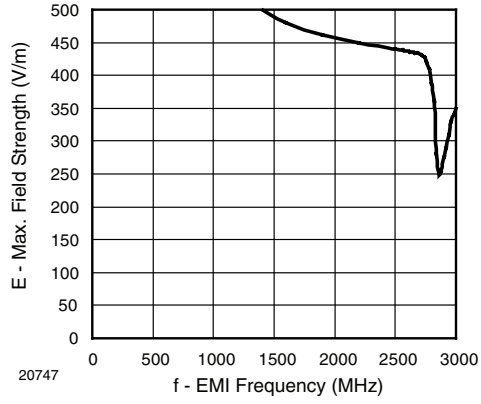



Fig. 8 - Sensitivity vs. Electric Field Disturbances

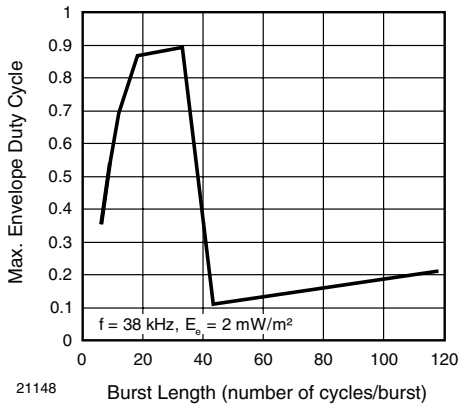



Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

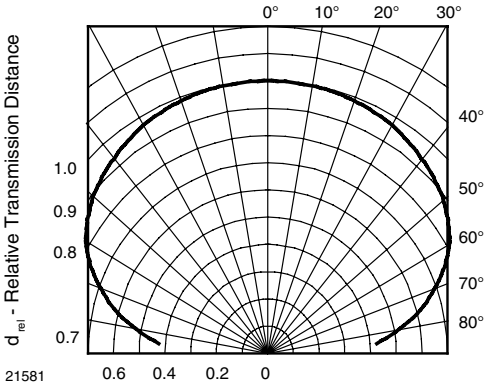



Fig. 12 - Horizontal Directivity

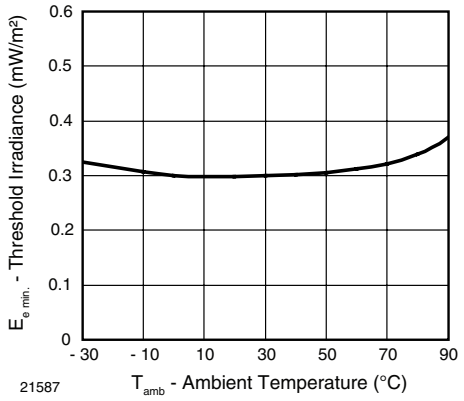



Fig. 10 - Sensitivity vs. Ambient Temperature

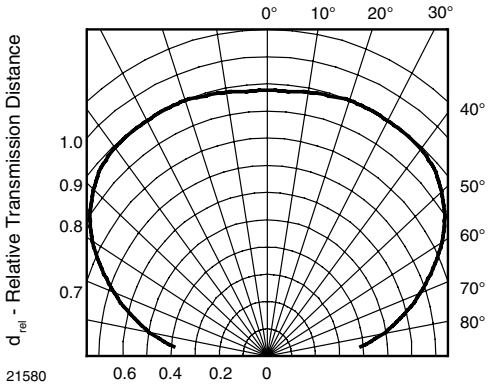



Fig. 13 - Vertical Directivity

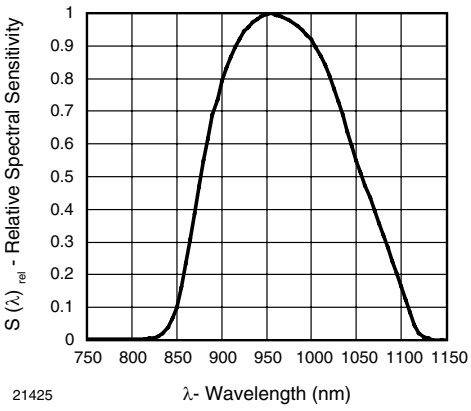



Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

## SUITABLE DATA FORMAT

The TSOP753..W 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 TSOP753..W 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)

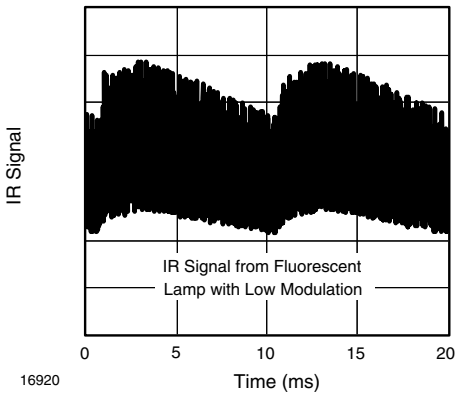



Fig. 14 - IR Signal from Fluorescent Lamp with Low Modulation

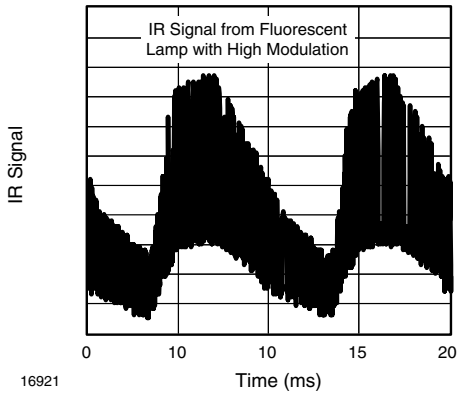


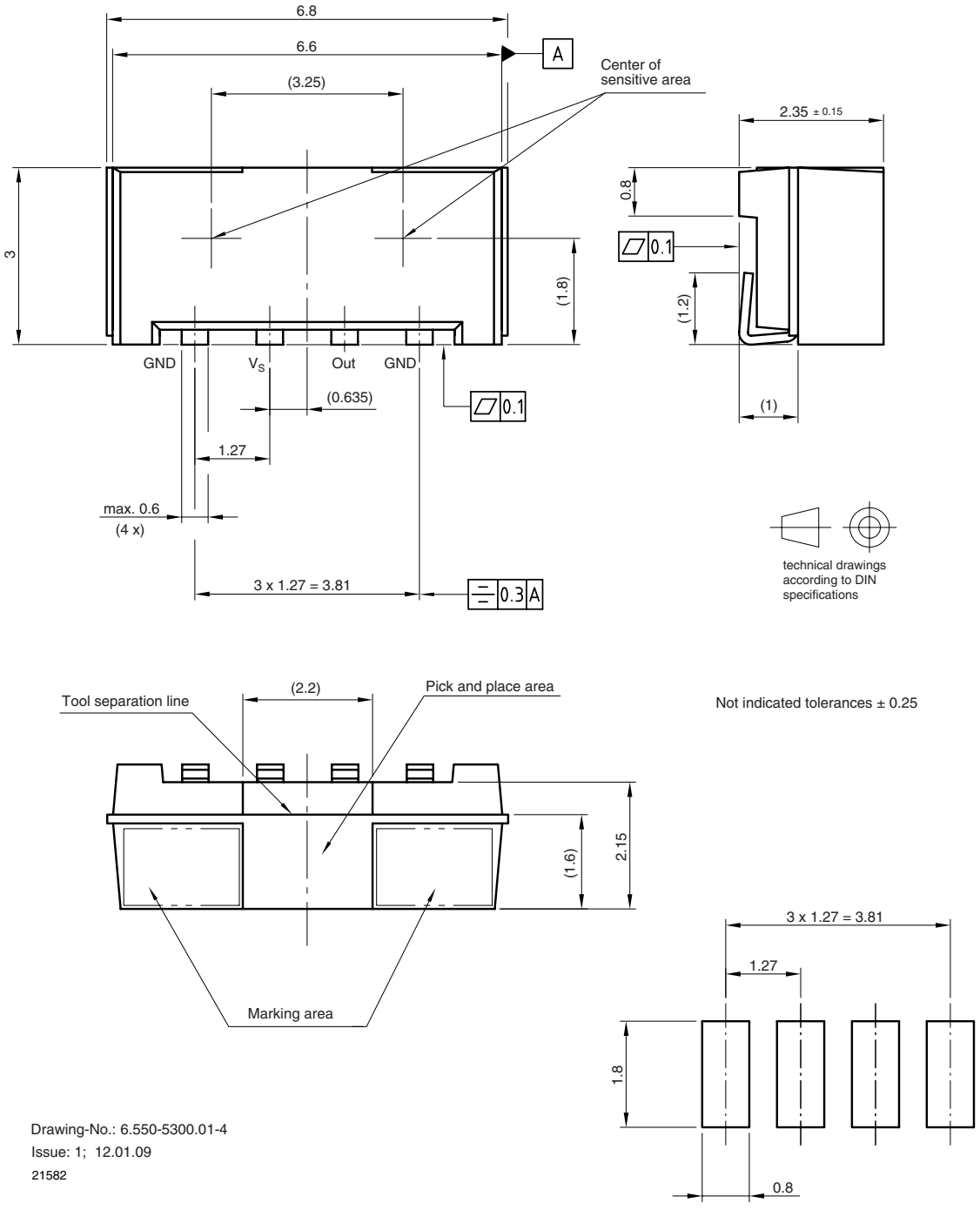

Fig. 15 - IR Signal from Fluorescent Lamp with High Modulation

| | TSOP753..W |
|---|---|
| Minimum burst length | 6 cycles/burst |
| After each burst of length<br>a minimum gap time is required of | 6 to 35 cycles<br>≥ 10 cycles |
| For bursts greater than<br>a minimum gap time in the data stream is needed of | 35 cycles<br>> 4 x burst length |
| Maximum number of continuous short bursts/second | 2000 |
| Recommended for NEC code | yes |
| Recommended for RC5/RC6 code | yes |
| Recommended for Sony code | no |
| Recommended for XMP format | yes |
| Recommended for RCMM code | yes |
| Recommended for RECS-80 code | yes |
| Suppression of interference from fluorescent lamps | Most common disturbance signals are suppressed |

**Note**

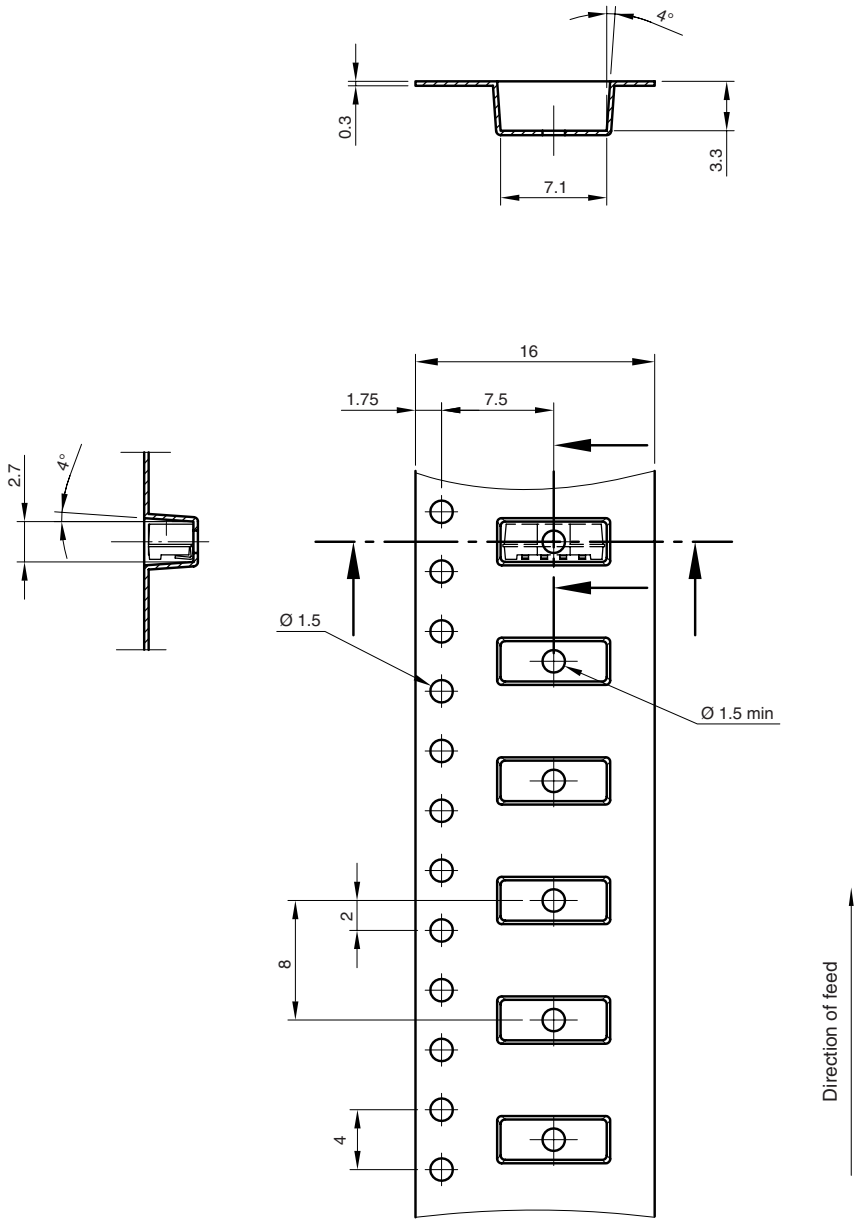
For data formats with long bursts please see the datasheet for TSOP752..W

## PACKAGE DIMENSIONS in millimeters




Drawing-No.: 6.550-5300.01-4
Issue: 1; 12.01.09
21582

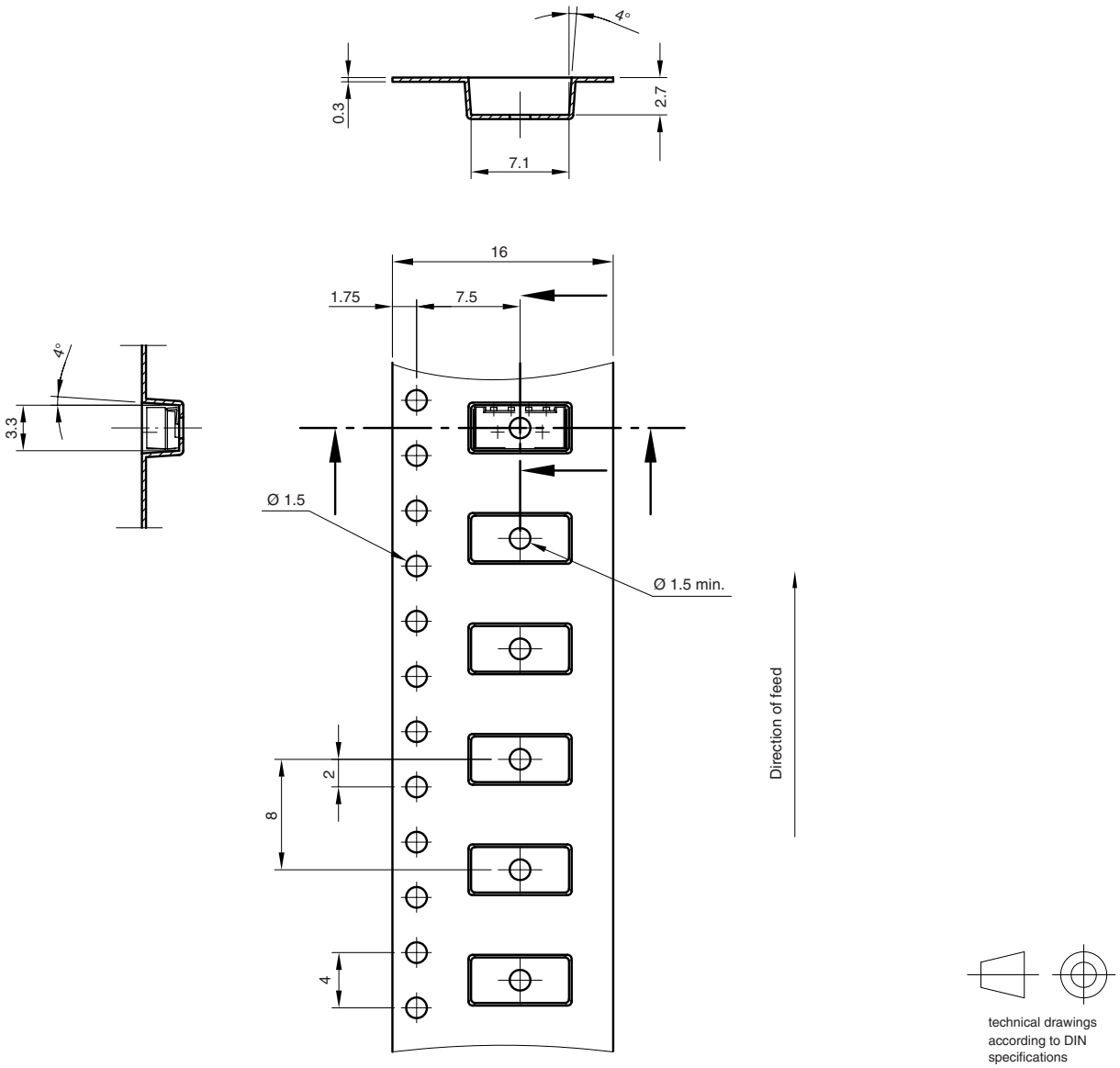
## TAPING VERSION TSOP..TR DIMENSIONS in millimeters




Drawing-No.: 9.700-5342.01-4
Issue: 1: 23.03.09
21785

technical drawings
according to DIN
specifications

## TAPING VERSION TSOP..TT DIMENSIONS in millimeters




Drawing-No.: 9.700-5341.01-4
Issue: 2: 23.03.09
21666

# Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

**Данный компонент на территории Российской Федерации**

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

**Офис по работе с юридическими лицами:**

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9