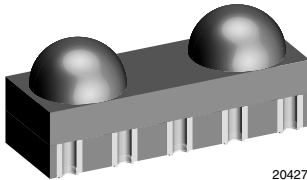


## IR Receiver Modules for Remote Control Systems



20427

### FEATURES

- Very low supply current
- Photo detectors 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
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Insensitive to supply voltage ripple and noise

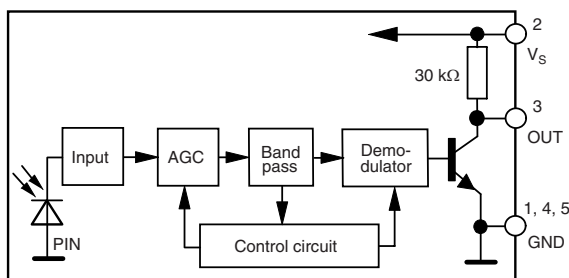


### DESCRIPTION

The TSOP852.., TSOP854 series are two lens miniaturized receiver modules for infrared remote control systems. One PIN diode per lens and a preamplifier are assembled on a PCB, the epoxy lens cap is designed as an IR filter. The demodulated output signal can be directly decoded by a microprocessor. The TSOP852.. is compatible with all common IR remote control data formats. The TSOP854.. 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.

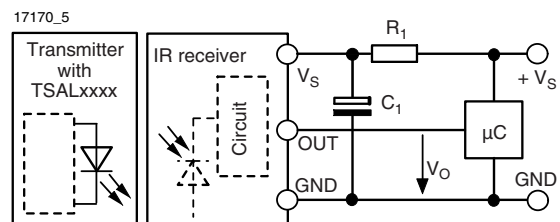
PARTS TABLE		
CARRIER FREQUENCY	STANDARD APPLICATIONS (AGC2/AGC8)	VERY NOISY ENVIRONMENTS (AGC4)
30 kHz	TSOP85230	TSOP85430
33 kHz	TSOP85233	TSOP85433
36 kHz	TSOP85236	TSOP85436
38 kHz	TSOP85238	TSOP85438
40 kHz	TSOP85240	TSOP85440
56 kHz	TSOP85256	TSOP85456

### BLOCK DIAGRAM



20445

### APPLICATION CIRCUIT



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



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	$T_{amb} \leq 85 \text{ }^\circ\text{C}$	$P_{tot}$	10	mW
Soldering temperature		$T_{sd}$	260	°C

**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	$V_S = 3.3 \text{ V}, E_v = 0$	$I_{SD}$	0.27	0.35	0.45	mA
	$E_v = 40 \text{ klx, sunlight}$	$I_{SH}$		0.45		mA
Transmission distance	$E_v = 0$ IR diode TSAL6200, $I_F = 250 \text{ mA}$ test signal see fig. 1	$d$		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	$E_e \text{ min.}$		0.1	0.25	$\text{mW/m}^2$
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e \text{ max.}$	30			$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 50$		deg

**Note**

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

**TYPICAL CHARACTERISTICS**

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

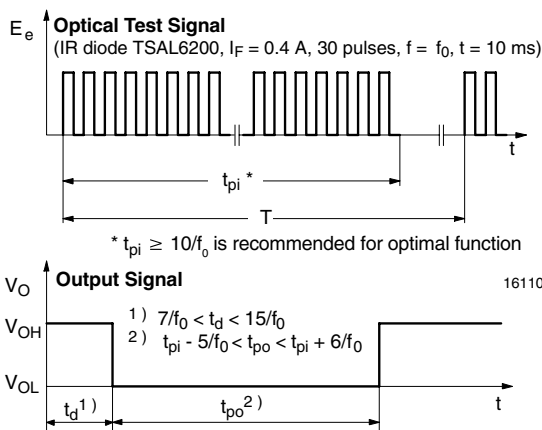


Fig. 1 - Output Active Low

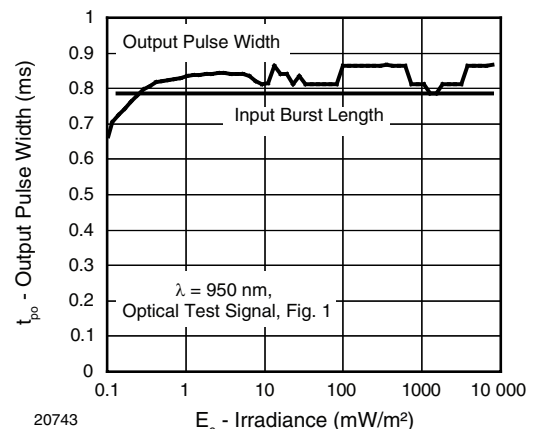


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

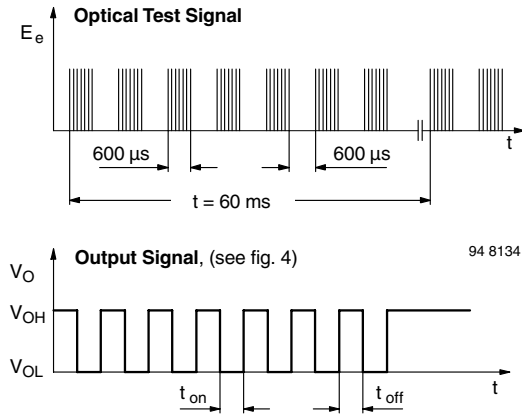


Fig. 3 - Output Function

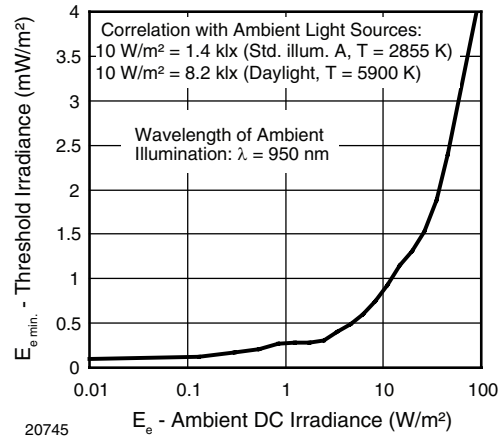


Fig. 6 - Sensitivity in Bright Ambient

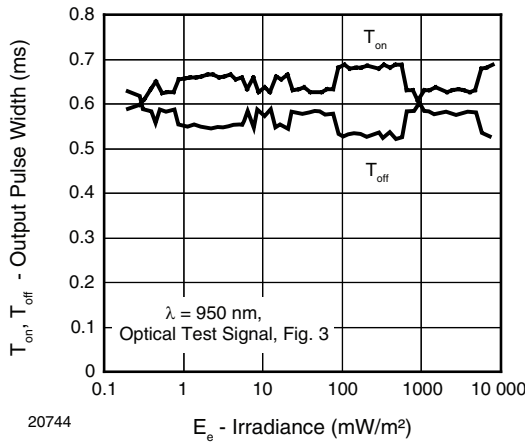


Fig. 4 - Output Pulse Diagram

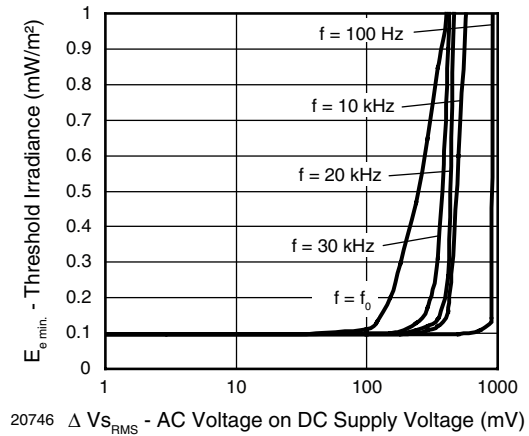


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

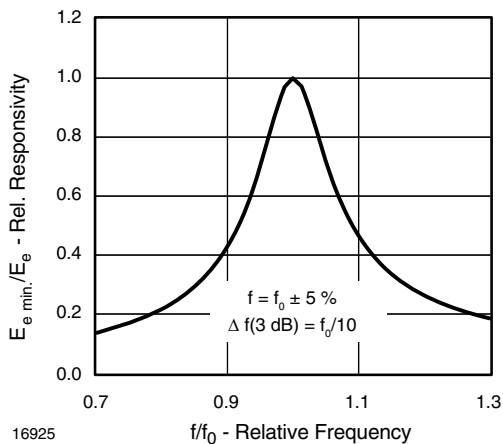


Fig. 5 - Frequency Dependence of Responsivity

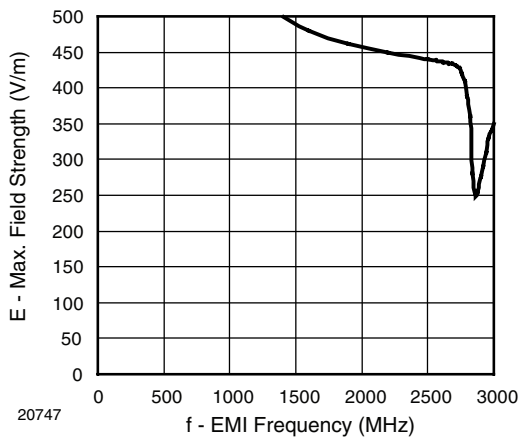


Fig. 8 - Sensitivity vs. Electric Field Disturbances

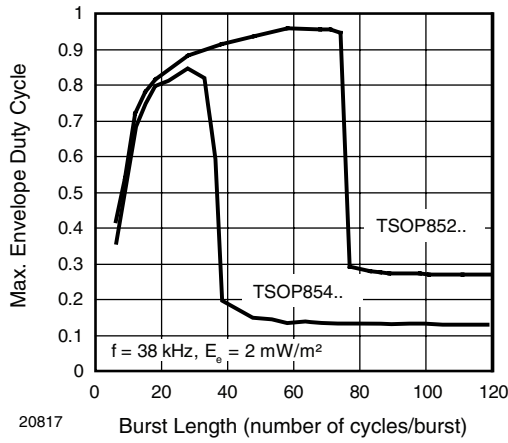


Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

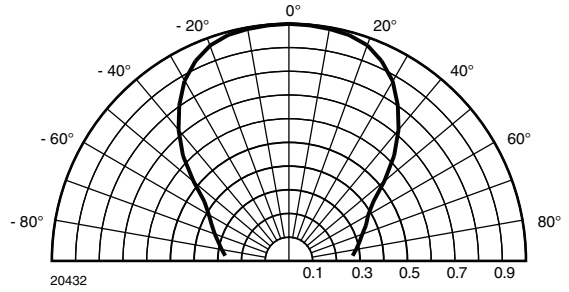


Fig. 12 - Directivity

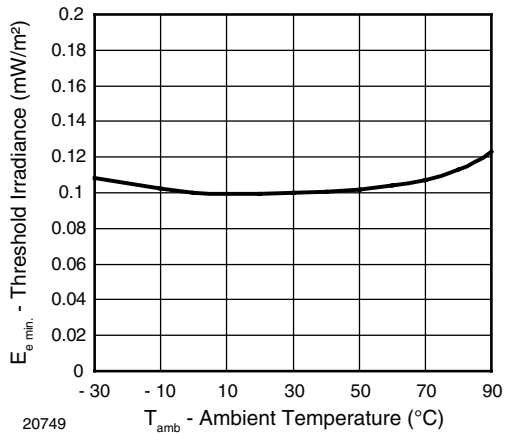


Fig. 10 - Sensitivity vs. Ambient Temperature

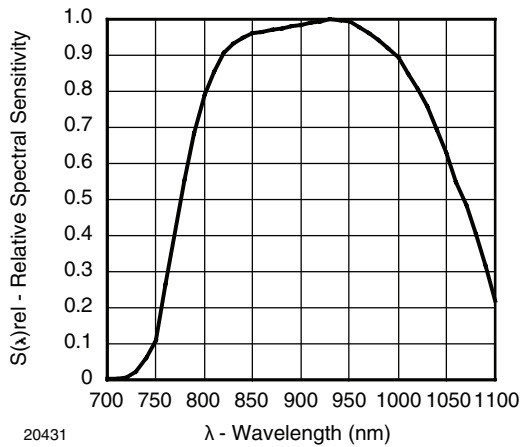


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

## SUITABLE DATA FORMAT

The TSOP852.., TSOP854 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 TSOP852.., TSOP854 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)

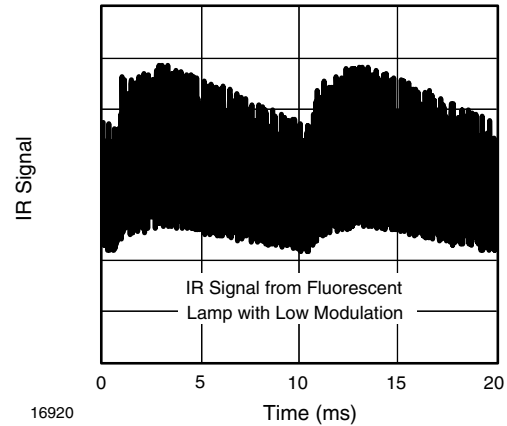


Fig. 13 - IR Signal from Fluorescent Lamp with Low Modulation

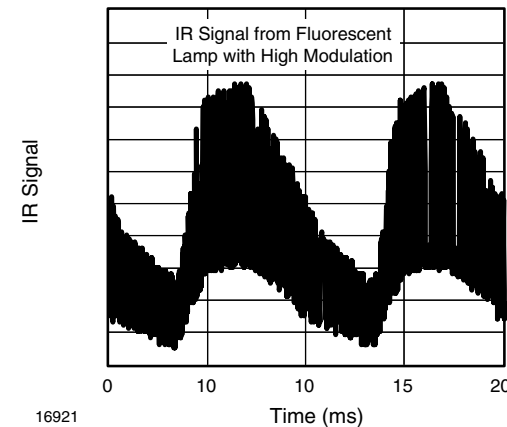


Fig. 14 - IR Signal from Fluorescent Lamp with High Modulation

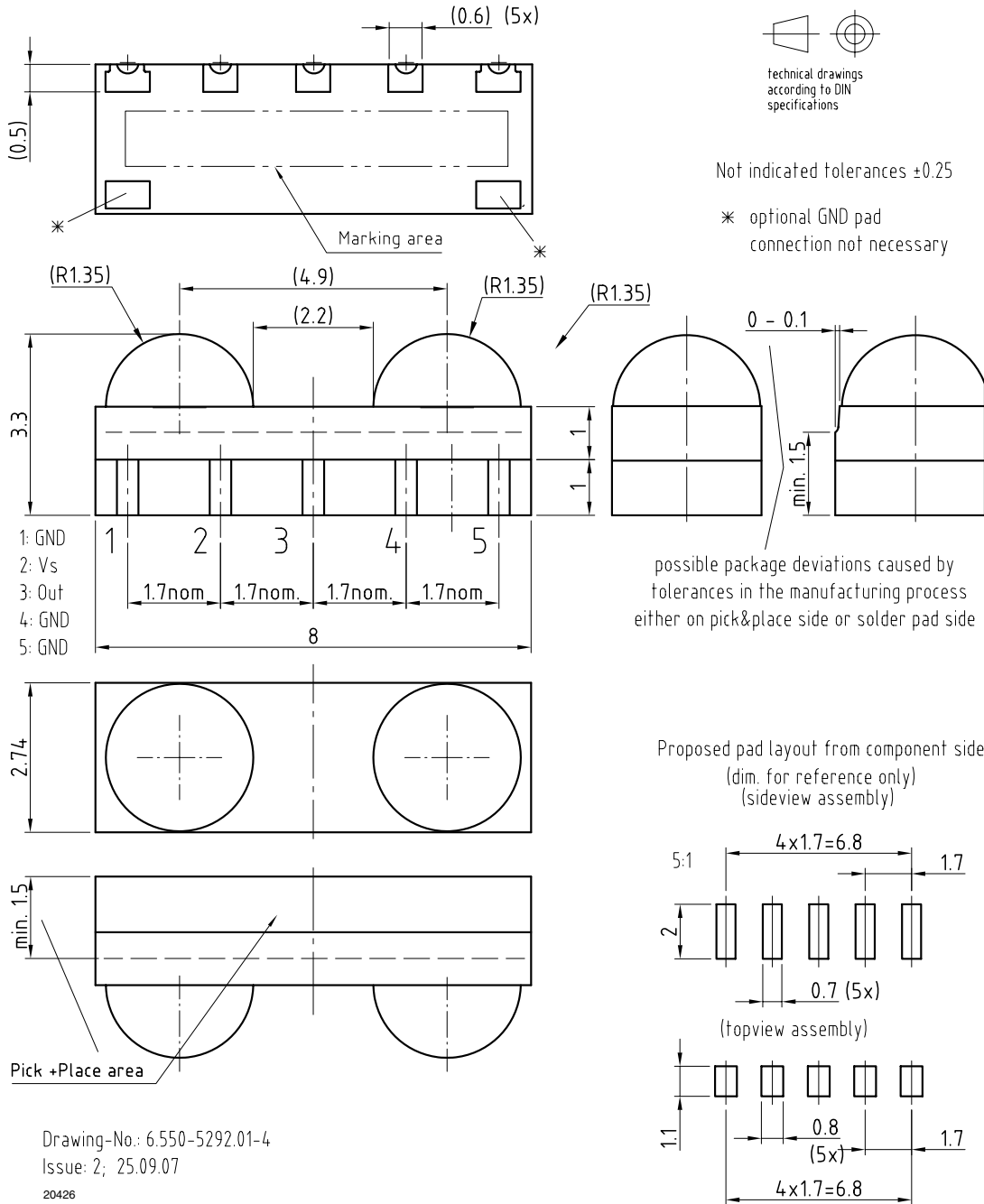
	TSOP852..	TSOP854..
Minimum burst length	10 cycles/burst	10 cycles/burst
After each burst of length a minimum gap time is required of	10 to 70 cycles ≥ 10 cycles	10 to 35 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 4 x burst length	35 cycles > 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 data sheet for TSOP853..



**PACKAGE** Dimensions in millimeters



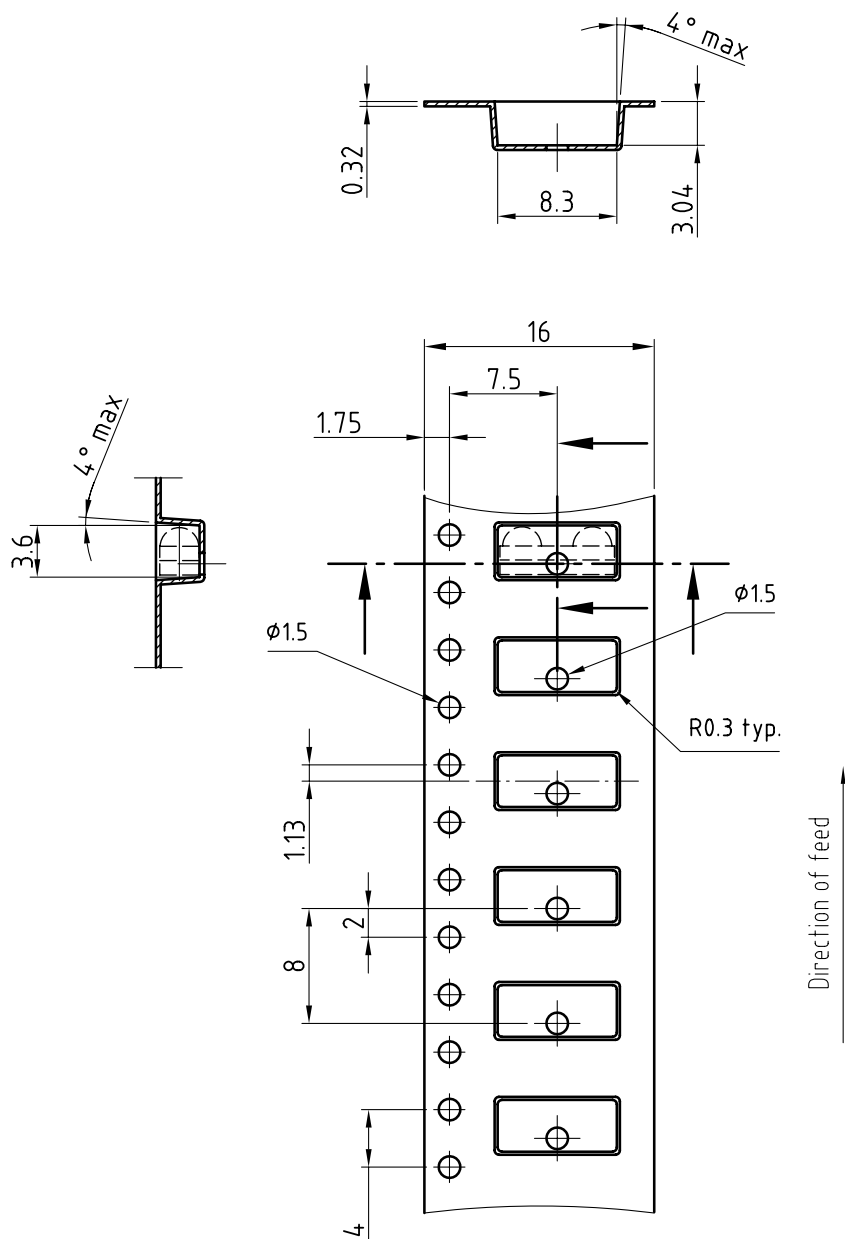
# New TSOP852.., TSOP854..

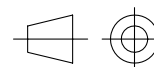
Vishay Semiconductors

IR Receiver Modules for  
Remote Control Systems



## TAPING VERSION TSOP..TR Dimensions in millimeters



  
technical drawings  
according to DIN  
specifications

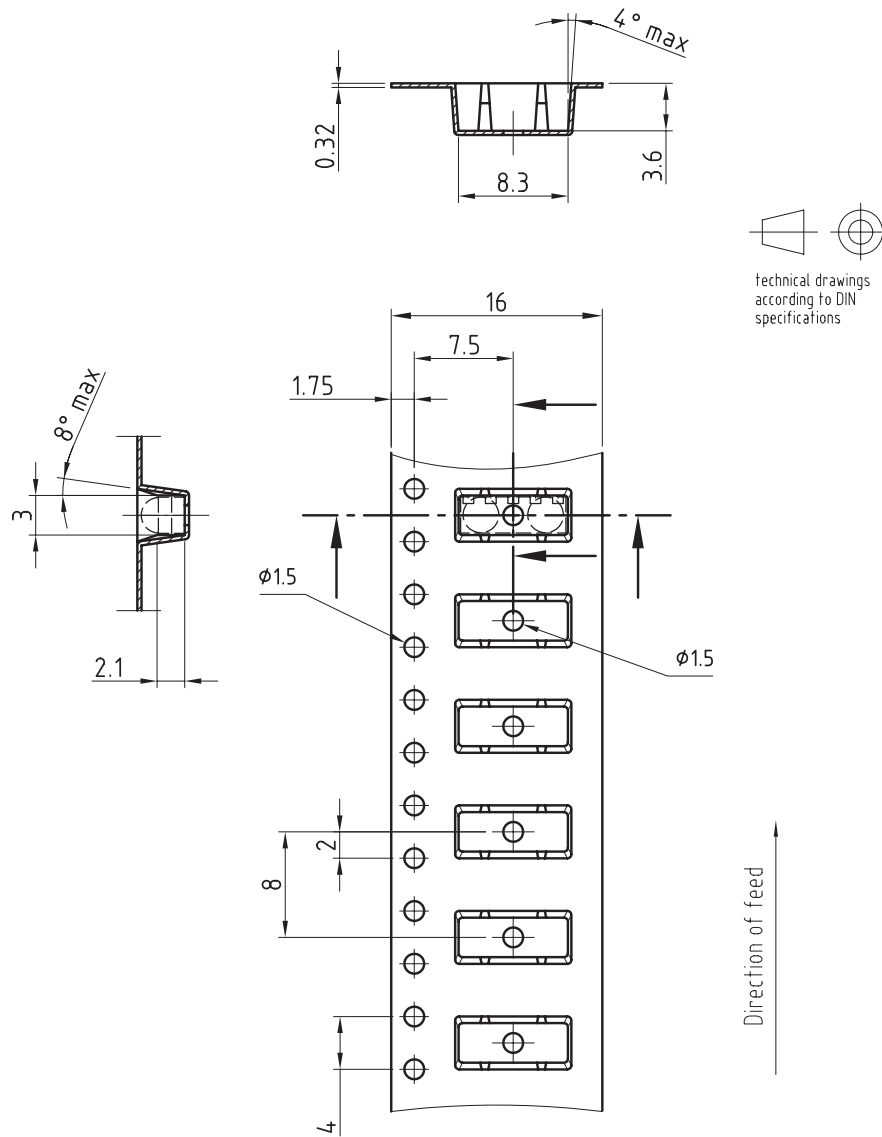
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Issue: 1; 12.02.07

20628



**TAPING VERSION TSOP..TT** Dimensions in millimeters



Drawing-No.: 9.700-5317.01-4

Issue: 2; 10.04.08

20629





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1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design  
and may do so without further notice.

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