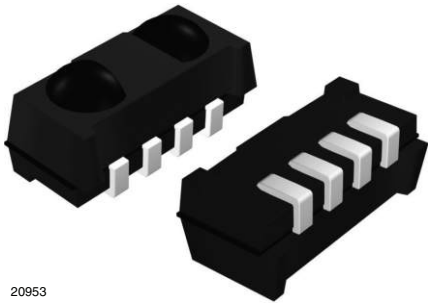
IR Receiver Modules for Remote Control Systems



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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
- 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
- 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

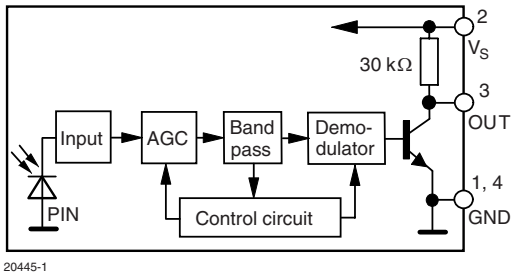
The TSOP753.. series is a two lens miniaturized receiver module for infrared remote control systems. One PIN diode per lens and a preamplifier are assembled on a leadframe, the epoxy lens cap is designed as an IR filter.

The demodulated output signal can be directly decoded by a microprocessor. The TSOP753.. 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	TSOP75330
33 kHz	TSOP75333
36 kHz	TSOP75336
38 kHz	TSOP75338
40 kHz	TSOP75340
56 kHz	TSOP75356

BLOCK DIAGRAM



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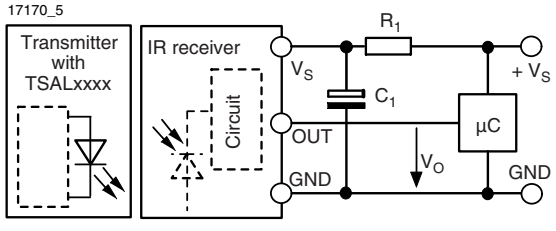
APPLICATION CIRCUIT



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		45		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	$E_{e\ min.}$		0.15	0.35	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	$\varphi_{1/2}$		± 50		deg

Note

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

TYPICAL CHARACTERISTICS

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

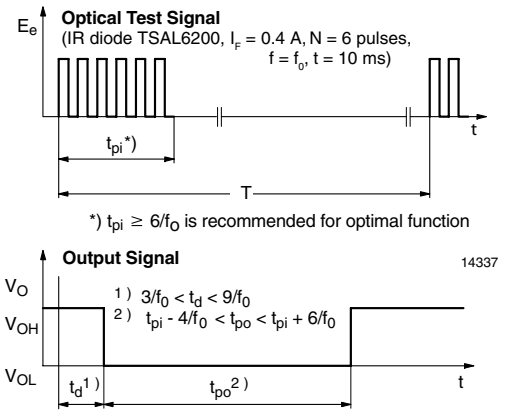


Fig. 1 - Output Active Low

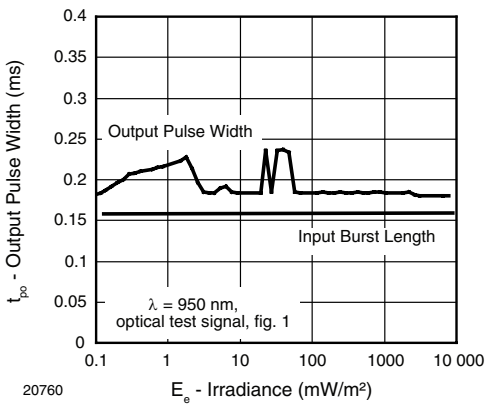


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

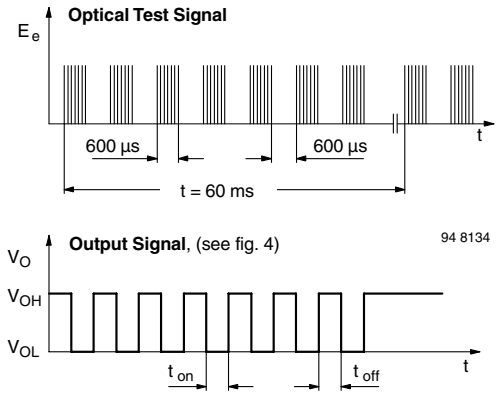


Fig. 3 - Output Function

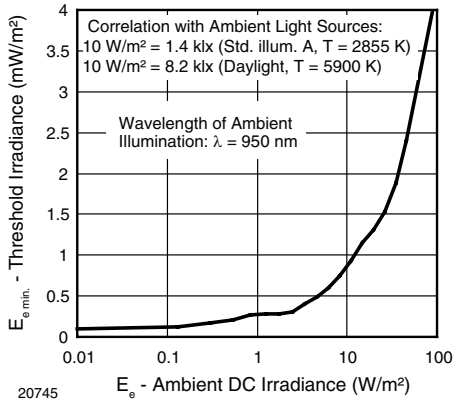


Fig. 6 - Sensitivity in Bright Ambient

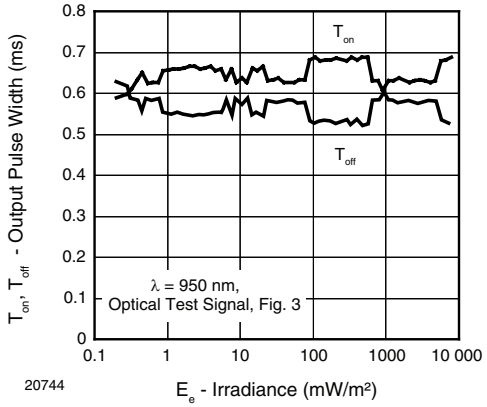


Fig. 4 - Output Pulse Diagram

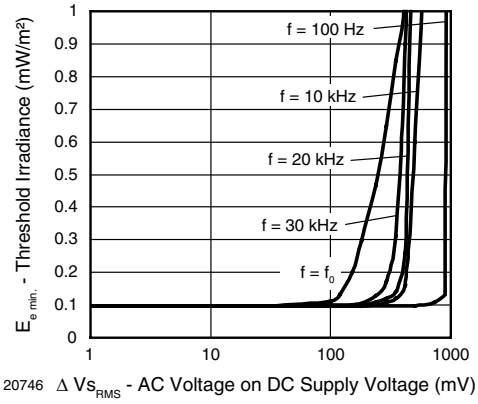


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

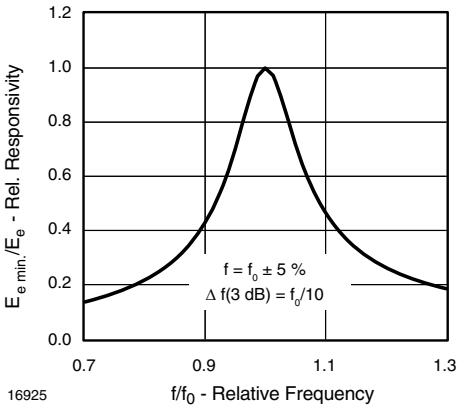


Fig. 5 - Frequency Dependence of Responsivity

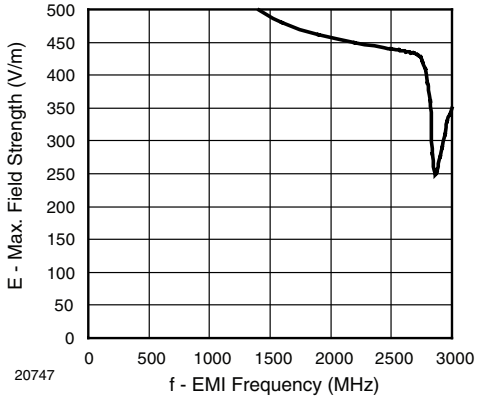


Fig. 8 - Sensitivity vs. Electric Field Disturbances

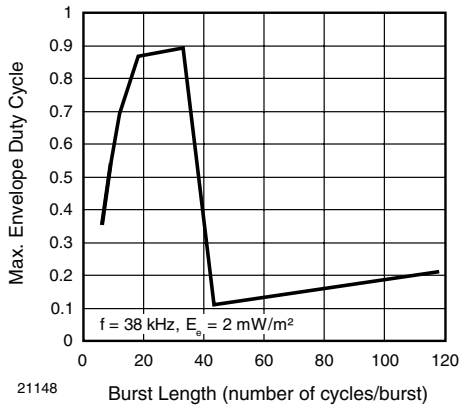


Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

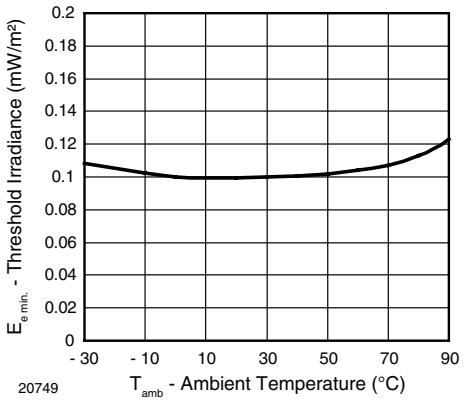


Fig. 10 - Sensitivity vs. Ambient Temperature

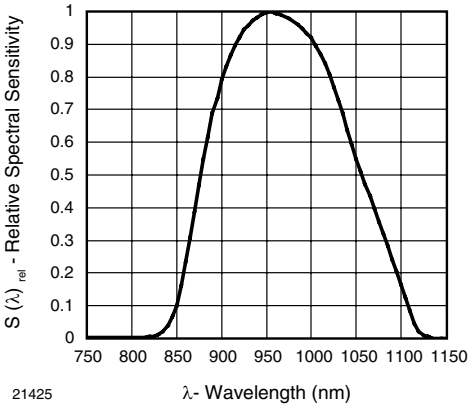


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

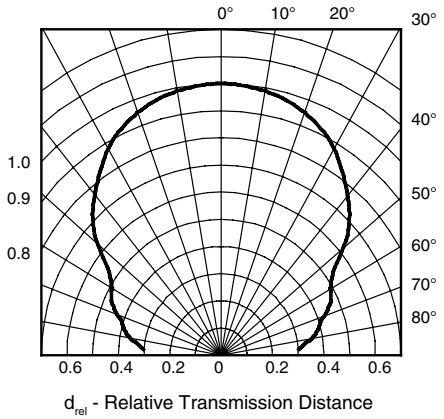


Fig. 12 - Horizontal Directivity

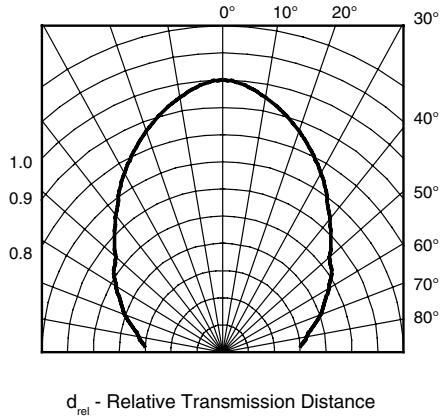


Fig. 13 - Vertical Directivity

SUITABLE DATA FORMAT

The TSOP753.. 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.. 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)

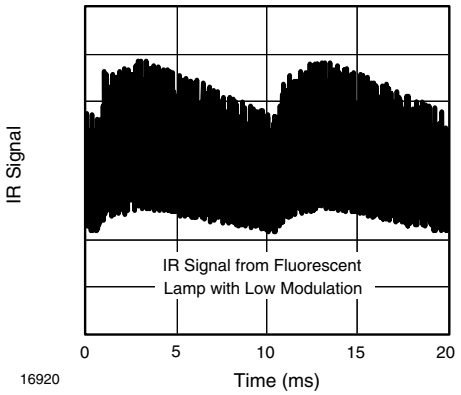


Fig. 14 - IR Signal from Fluorescent Lamp with Low Modulation

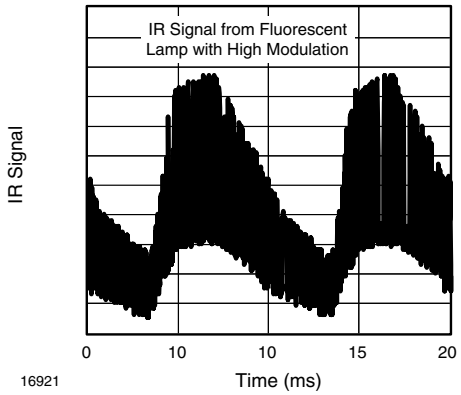


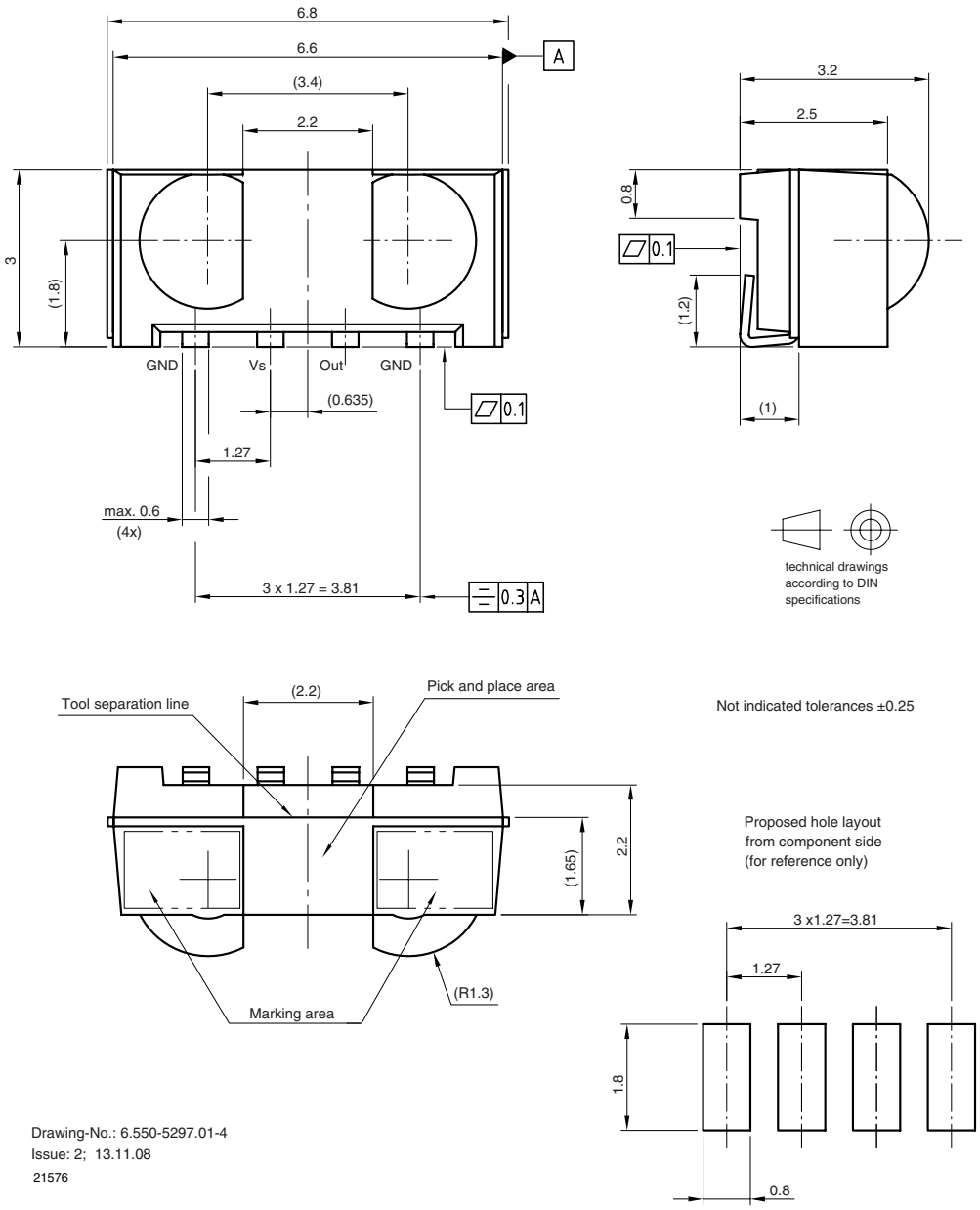
Fig. 15 - IR Signal from Fluorescent Lamp with High Modulation

	TSOP753..
Minimum burst length	6 cycles/burst
After each burst of length a minimum gap time is required of	6 to 35 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	35 cycles > 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

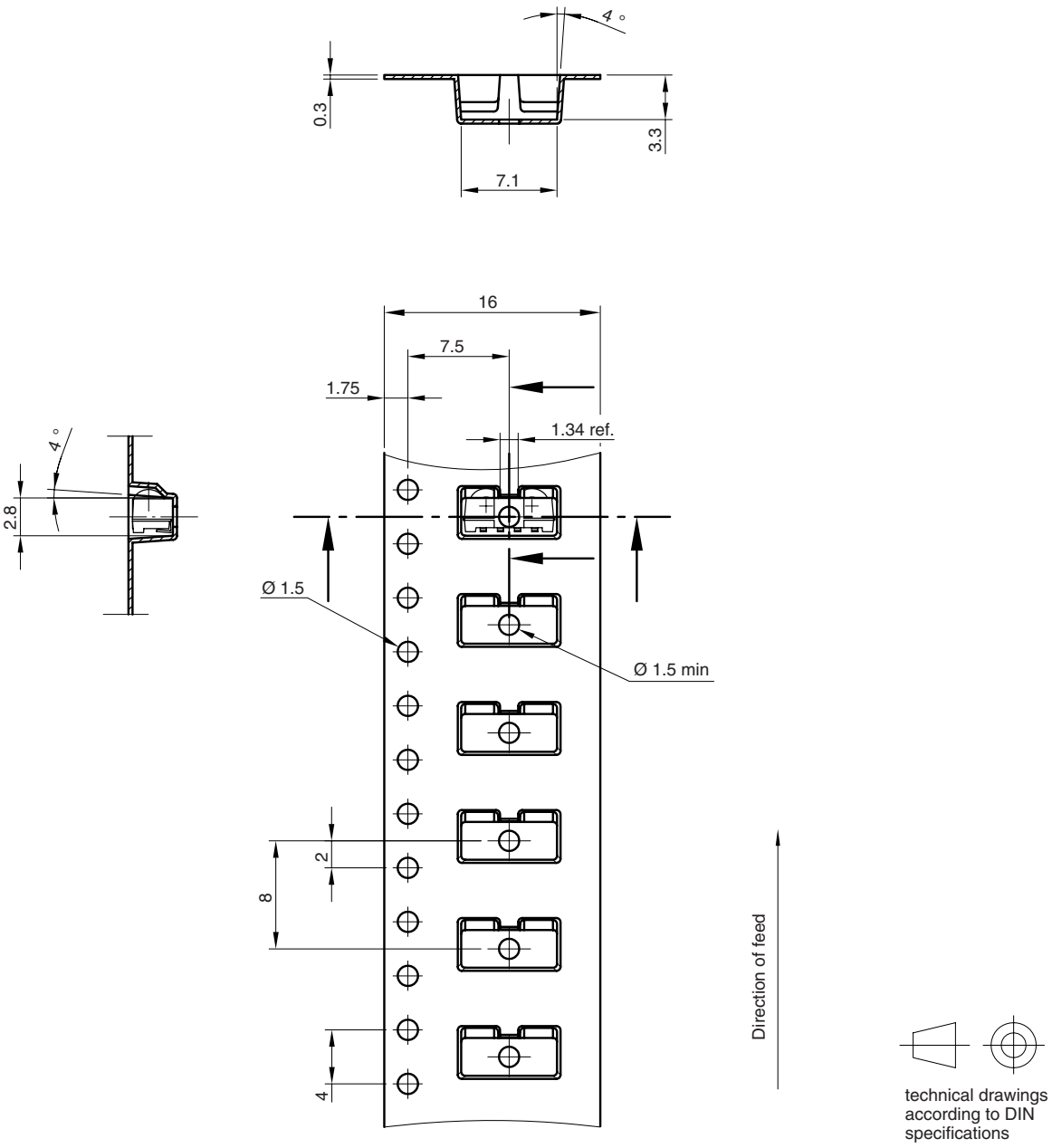
For data formats with long bursts please see the datasheet for TSOP752..

PACKAGE DIMENSIONS in millimeters



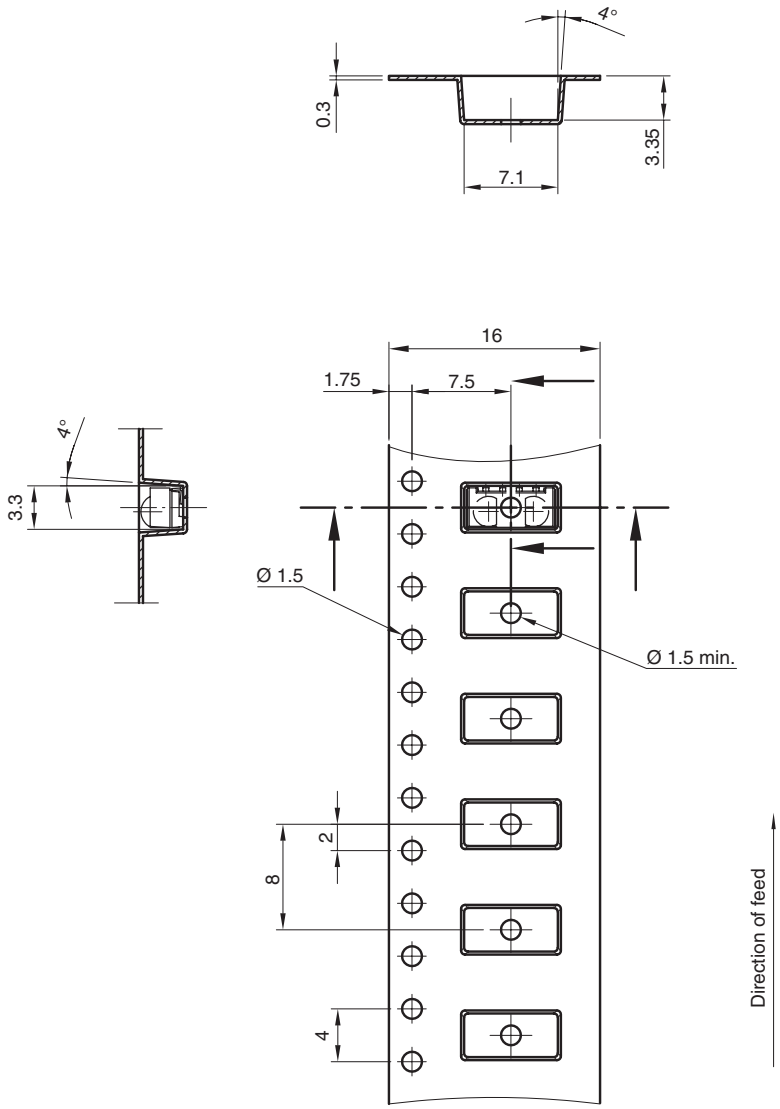
Drawing-No.: 6.550-5297.01-4
Issue: 2; 13.11.08
21576

TAPING VERSION TSOP..TR DIMENSIONS in millimeters



Drawing-No.: 9.700-5337.01-4
Issue: 1; 16.10.08
21577

TAPING VERSION TSOP..TT DIMENSIONS in millimeters



technical drawings
according to DIN
specifications

Drawing-No.: 9.700-5338.01-4
Issue: 3; 09.06.09
21578

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