

IR Receiver Modules for Remote Control Systems



DESCRIPTION

The TSOP75S..W series are miniaturized SMD IR receiver modules for infrared remote control systems. Two PIN diodes and a preamplifier are assembled on a PCB, the epoxy package contains an IR filter.

The demodulated output signal can be directly connected to a microprocessor for decoding. The TSOP75S..W is compatible with 12, 15, and 20 bit Sony codes. It is optimized to suppress almost all spurious pulses from energy saving fluorescent lamps but will also suppress some data signals.

These components have not been qualified according to automotive specifications.

FEATURES

- Individual IC settings to reach maximum performance
- Immunity against noise (lamps, LCD TV, Wi-Fi)
- Low supply current
- Photo detector and preamplifier in one package
- Supply voltage: 2.0 V to 5.5 V
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

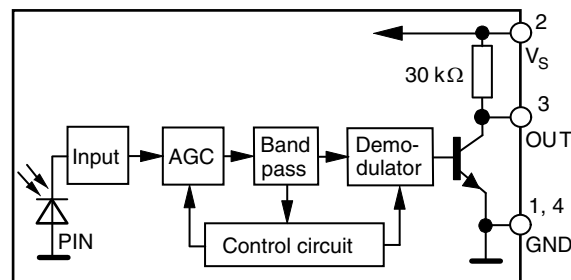
LINKS TO ADDITIONAL RESOURCES



DESIGN SUPPORT TOOLS

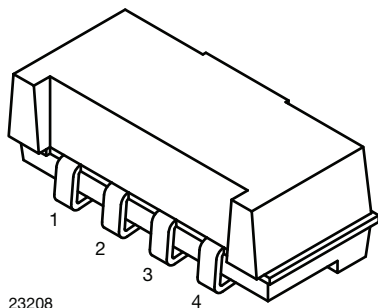
- [3D models](#)
- [Window size calculator](#)

BLOCK DIAGRAM



20445-1

MECHANICAL DATA
Pinning:

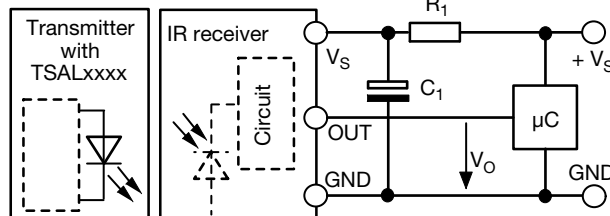
1, 4 = GND, 2 = V_S , 3 = OUT

ORDERING CODE
Taping:

TSOP75...WTT - top view taped, 2200 pcs/reel

TSOP75...WTR - side view taped, 2300 pcs/reel

APPLICATION CIRCUIT

17170-14


 R_1 and C_1 recommended in case there are strong ripple or spikes on the supply line.

PARTS TABLE

AGC		TV APPLICATIONS (AGC-S)
Carrier frequency	40 kHz	TSOP75S40W ⁽¹⁾
	56 kHz	TSOP75S56W ⁽²⁾
Package		Heimdall no lens
Pinning		1, 4 = GND, 2 = V_S , 3 = OUT
Dimensions (mm)		6.8 W x 2.3 H x 3.2 D
Mounting		SMD
Application		TV
Special options		<ul style="list-style-type: none"> Extended temperature range: www.vishay.com/doc?82738 Narrow optical filter: www.vishay.com/doc?81590 Wide optical filter: www.vishay.com/doc?82726

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V_S	-0.3 to +6	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	$T_{amb} \leq 85\text{ °C}$	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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		V_S	2.0	-	5.5	V
Supply current	$E_v = 0, V_S = 3.3\text{ V}$	I_{SD}	0.25	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, $I_F = 50\text{ mA}$	d	-	18	-	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	Test signal: RC5 code	$E_{e\text{ min.}}$	-	0.2	0.4	mW/m^2
	Test signal: NEC code	$E_{e\text{ min.}}$	-	0.25	0.5	mW/m^2
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 5/f_0$, test signal see Fig. 1	$E_{e\text{ max.}}$	30	-	-	W/m^2
Directivity	Angle of half transmission distance	$\Phi_{1/2}$	-	± 75	-	$^{\circ}$

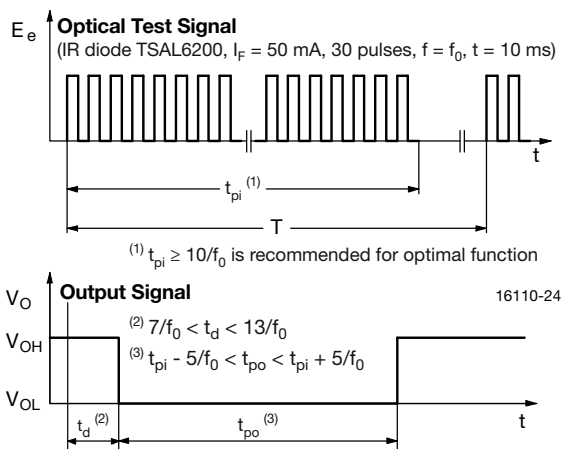
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Output Active Low

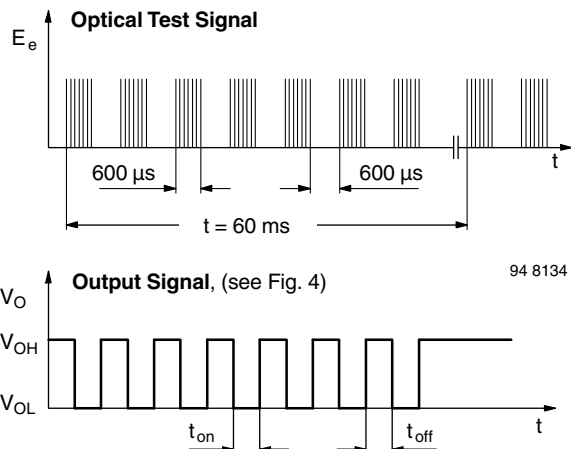


Fig. 3 - Output Function

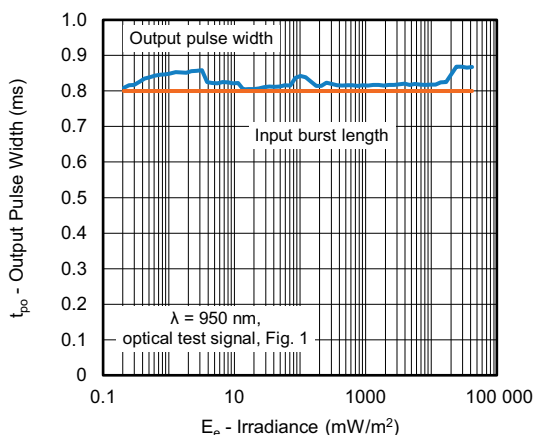


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

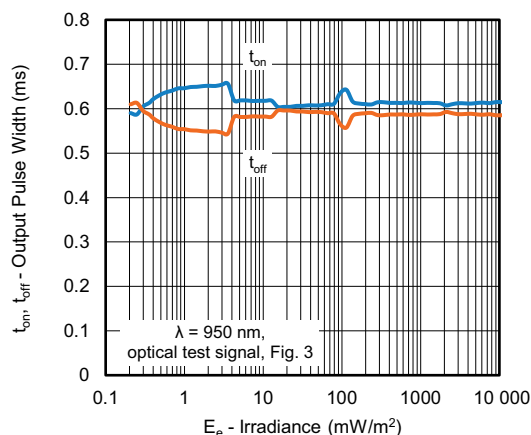


Fig. 4 - Output Pulse Diagram

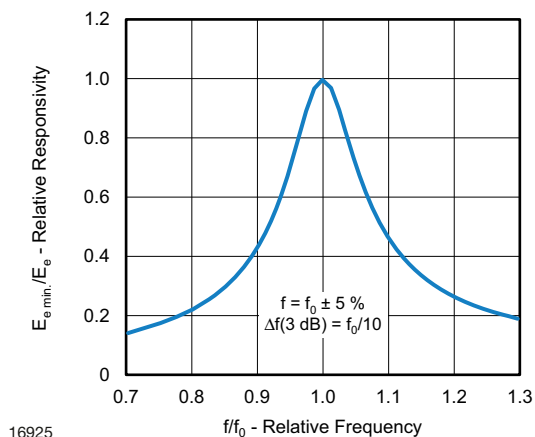


Fig. 5 - Frequency Dependence of Responsivity

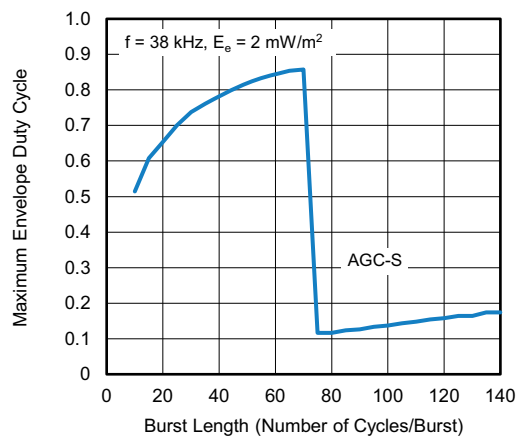


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

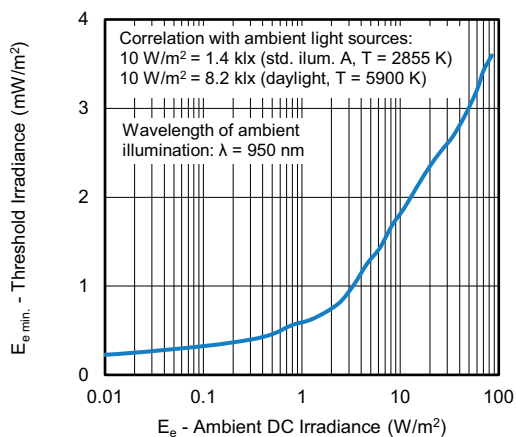


Fig. 6 - Sensitivity in Bright Ambient

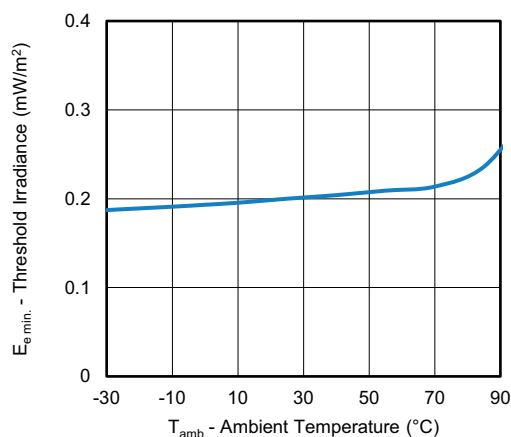


Fig. 9 - Sensitivity vs. Ambient Temperature

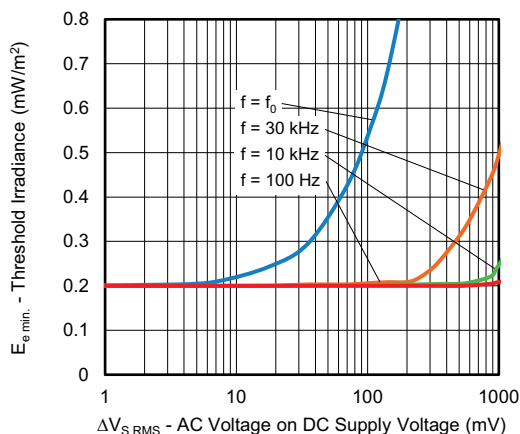


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

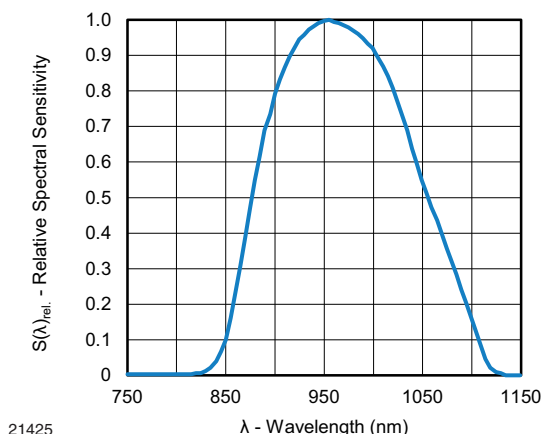


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

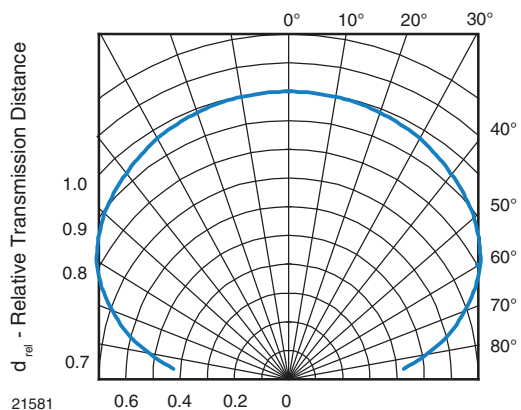


Fig. 11 - Horizontal Directivity

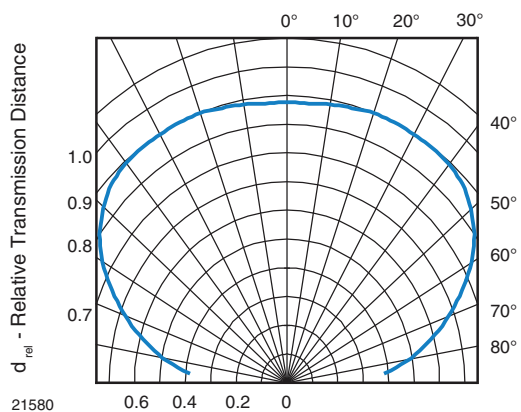


Fig. 12 - Vertical Directivity

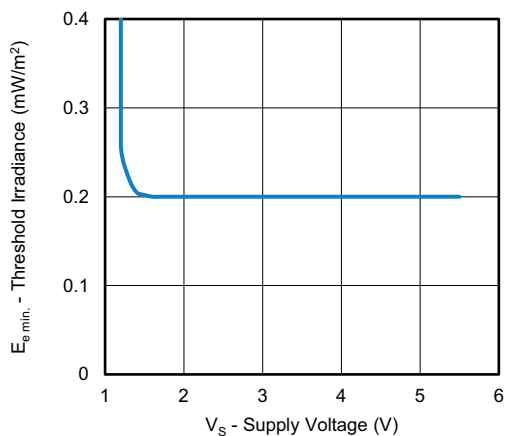


Fig. 13 - Sensitivity vs. Supply Voltage

SUITABLE DATA FORMAT

The TSOP75S..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 and fulfill the conditions in the table below.

When a data signal is applied to the TSOP75S..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 Fig. 14 or Fig. 15)

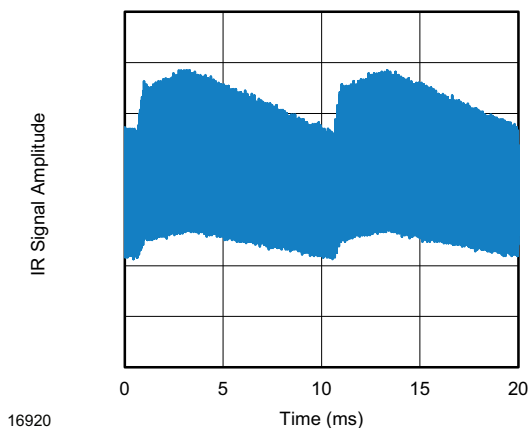


Fig. 14 - IR Disturbance from Fluorescent Lamp With Low Modulation

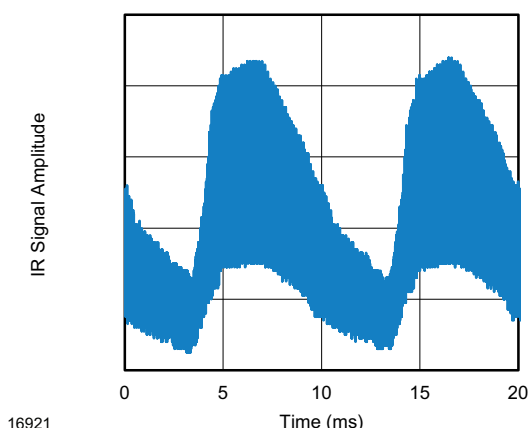
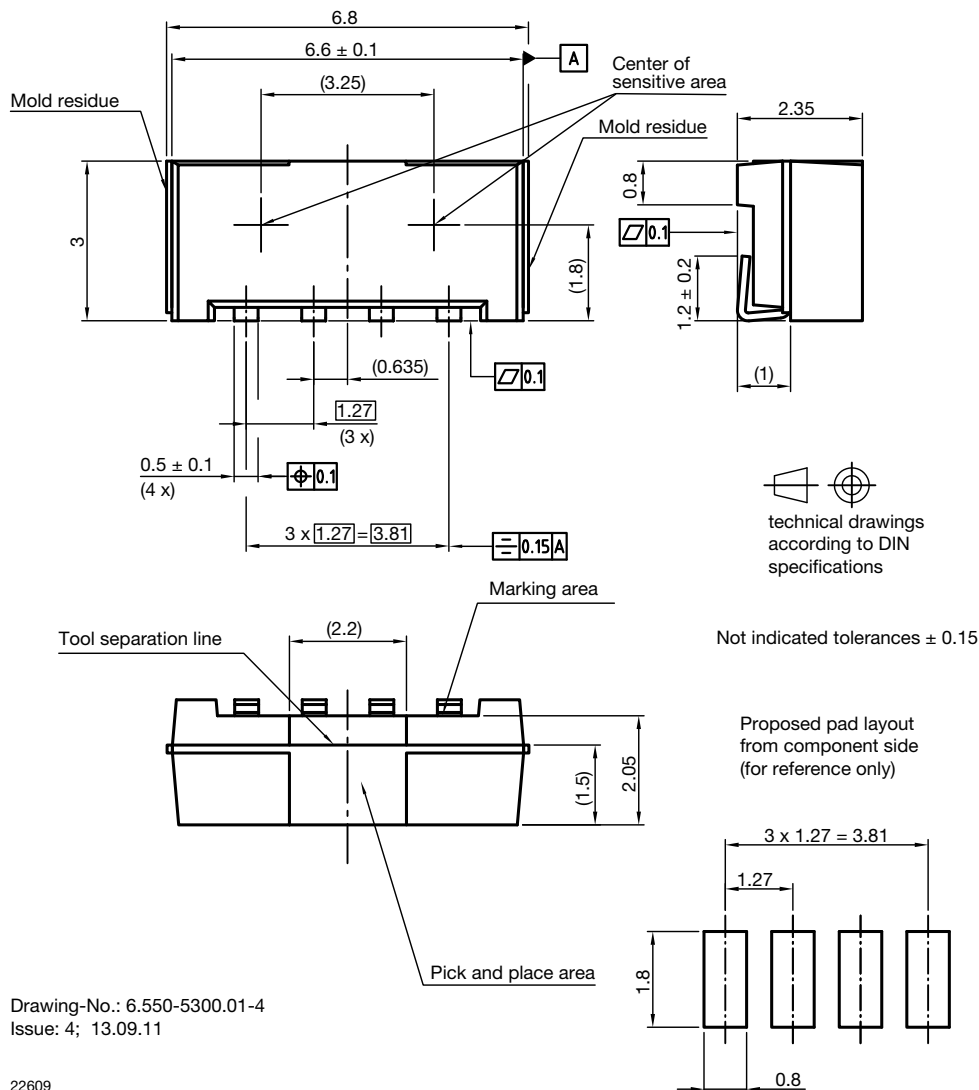


Fig. 15 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP75S..W
Minimum burst length	10 cycles/burst
After each burst of length a minimum gap time is required of	10 to 70 cycles ≥ 12 cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 9 x burst length
Maximum number of continuous short bursts/second	1700
Suppression of interference from fluorescent lamps	Most common disturbance patterns are suppressed

Note

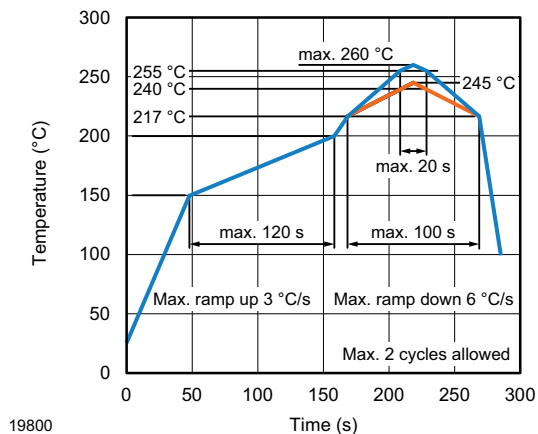
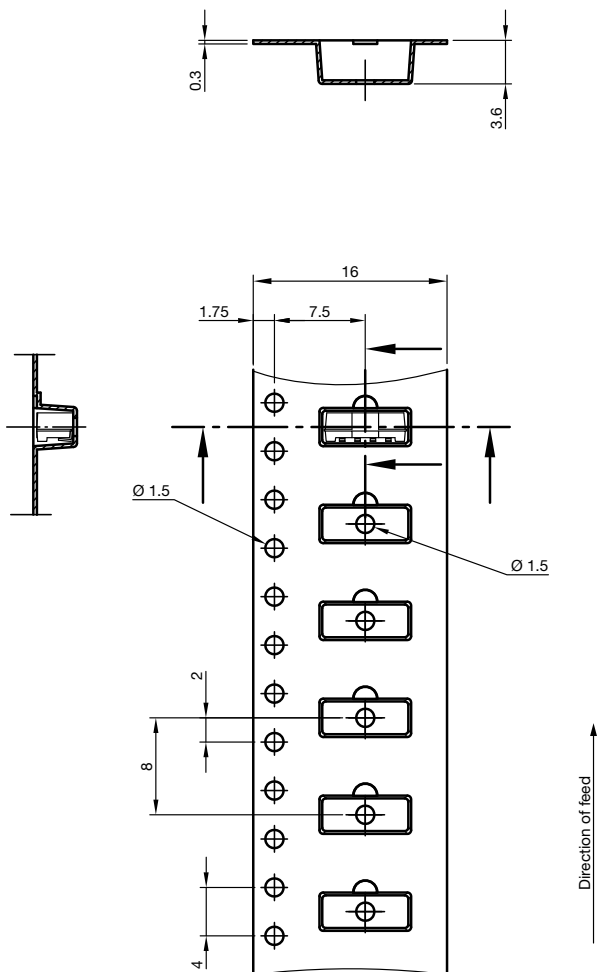
- Best choice of AGC for some popular IR-codes:
 - TSOP75S40W: Sony 12 bit, 15 bit, and 20 bit IR-codes
 - TSOP75S56W: Cisco SA code

PACKAGE DIMENSIONS in millimeters

ASSEMBLY INSTRUCTIONS
Reflow Soldering

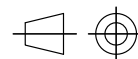
- Reflow soldering must be done within 72 h while stored under a max. temperature of 30 °C, 60 % RH after opening the dry pack envelope
- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Exercise extreme care to keep the maximum temperature below 260 °C. The temperature shown in the profile means the temperature at the device surface. Since there is a temperature difference between the component and the circuit board, it should be verified that the temperature of the device is accurately being measured
- Handling after reflow should be done only after the work surface has been cooled off

Manual Soldering

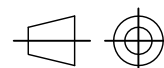
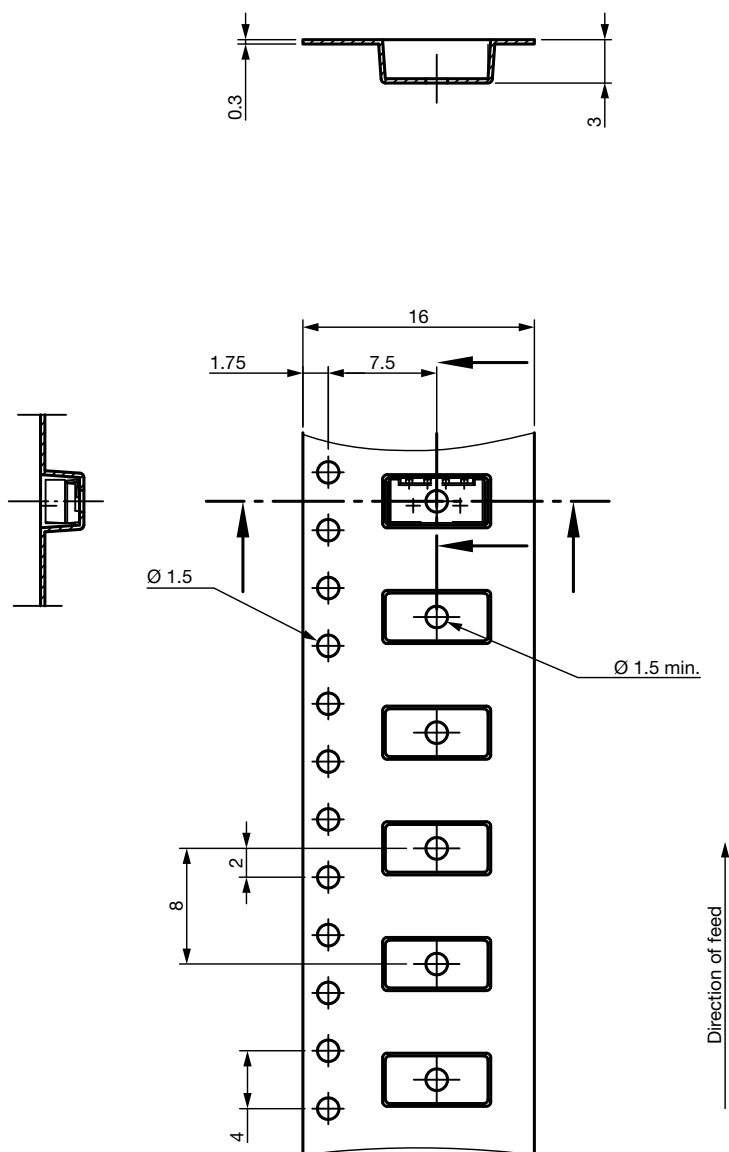
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off

VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE

TAPING VERSION TSOP..TR DIMENSIONS in millimeters


Drawing-No.: 9.700-5342.01-4
Issue: 2; 12.06.13

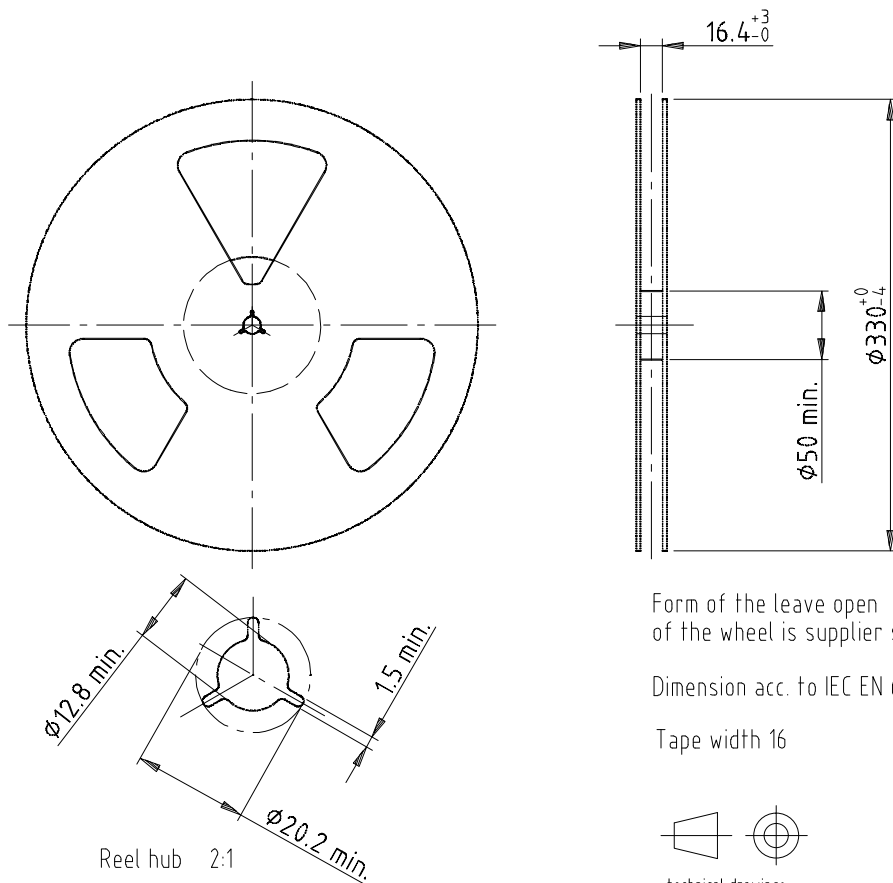

technical drawings
according to DIN
specifications

TAPING VERSION TSOP..TT DIMENSIONS in millimeters



technical drawings
according to DIN
specifications

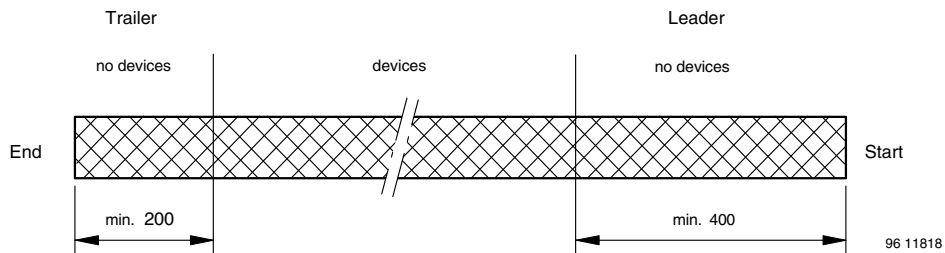
Drawing-No.: 9.700-5341.01-4
Issue: 3; 06.10.15

REEL DIMENSIONS in millimeters


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 ± 10 mm/min.

165° to 180° peel angle

OUTER PACKAGING

The sealed reel is packed into a pizza box.

CARTON BOX DIMENSIONS in millimeters



	THICKNESS	WIDTH	LENGTH
Pizza box (SMD and heimdall) (taping in reels)	50	340	340

LABEL

Standard bar code labels for finished goods

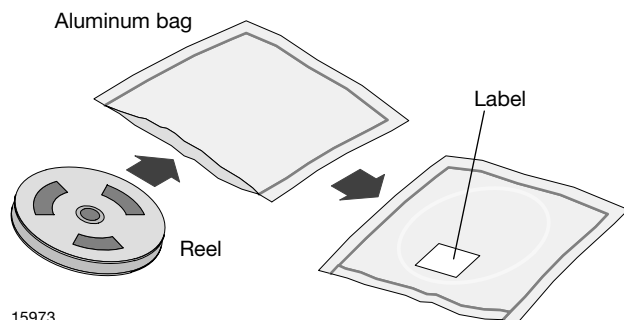
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain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



15973

FINAL PACKING

The sealed reel is packed into a cardboard box.

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.

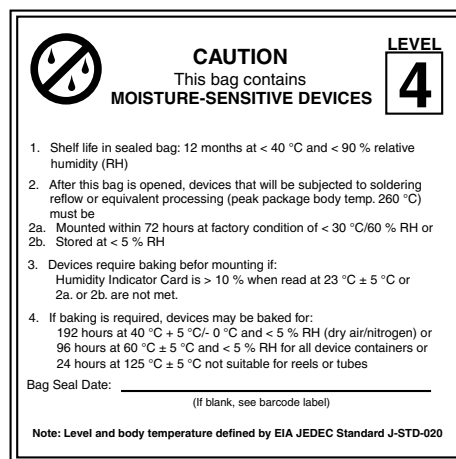
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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 J-STD-020 level 4 label is included on all dry bags.



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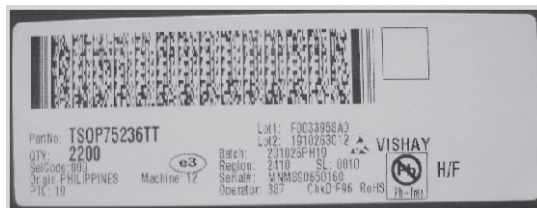
EIA JEDEC standard J-STD-020 level 4 label is included on all dry bags

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. Electrostatic 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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