

Vishay Semiconductors

### **IR Receiver Modules for Remote Control Systems**



www.vishay.com

#### **LINKS TO ADDITIONAL RESOURCES**





#### **DESCRIPTION**

This IR receiver series is optimized for long burst remote control systems in different environments. The customer can chose between different IC settings (AGC variants), to find the optimum solution for his application. The higher the AGC, the better noise is suppressed, but the lower the code compatibility.

The devices contain a PIN diode and a preamplifier assembled on a lead frame. The epoxy package contains an IR filter. The demodulated output signal can be directly connected to a microprocessor for decoding. These components have not been qualified to automotive specifications.

#### **FEATURES**





- · 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



HALOGEN FREE GREEN (5-2008)

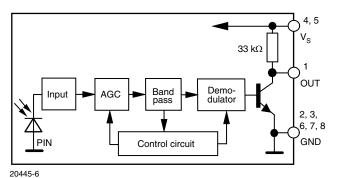
#### **APPLICATIONS**

• Infrared remote control systems

### **DESIGN SUPPORT TOOLS**

- 3D models
- Window size calculator

#### **BLOCK DIAGRAM**



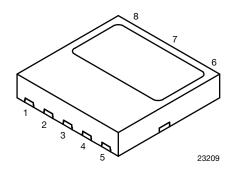


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### **MECHANICAL DATA**

#### Pinning:

 $1 = OUT, 2, 3, 6, 7, 8 = GND, 4, 5 = V_S$ 

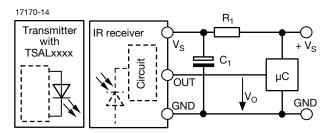


#### **ORDERING CODE**

#### Taping:

TSOP57...HTT1 - top view taped, 1500 pcs/reel

#### **APPLICATION CIRCUIT**



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

PARTS TA	BLE			
AGC		LEGACY, FOR LONG BURST REMOTE CONTROLS (AGC2)	RECOMMENDED FOR LONG BURST CODES (AGC4)	
	36 kHz	TSOP57236H	TSOP57436H (1)(2)(3)	
Carrier	38 kHz	TSOP57238H	TSOP57438H (4)(5)(9)(10)	
frequency	40 kHz	TSOP57240H (11)	TSOP57440H	
1	56 kHz	TSOP57256H <sup>(8)</sup>	TSOP57456H (6)(7)	
Package		Belobog shield		
Pinning		1 = OUT, 2, 3, 6, 7,	8 = GND, 4, 5 = V <sub>S</sub>	
Dimensions (mm)		3.95 W x 3.95 H x 0.8 D		
Mounting		SN	ИD	
Application		Remote	control	
Best choice f	est choice for (1) RC-5 (2) RC-6 (3) F (8) Cisc		(3) Panasonic (4) NEC (5) Sharp (6) r-step (7) Thomson RCA Disco (9) Mitsubishi (10) Sejin 4PPM (11) Sony	
Special option	ns	Extended temperature range: <u>www.vishay.com/c</u>	loc?82738	

ABSOLUTE MAXIMUM RA	KIMUM RATINGS			
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V <sub>S</sub>	-0.3 to +6	V
Supply current		I <sub>S</sub>	5	mA
Output voltage		V <sub>O</sub>	-0.3 to (V <sub>S</sub> + 0.3)	V
Output current		Io	5	mA
Junction temperature		T <sub>j</sub>	100	°C
Storage temperature range		T <sub>stg</sub>	-25 to +85	°C
Operating temperature range		T <sub>amb</sub>	-25 to +85	°C
Power consumption	T <sub>amb</sub> ≤ 85 °C	P <sub>tot</sub>	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



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## TSOP572..H, TSOP574..H

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<b>ELECTRICAL AND OPTICAL CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		Vs	2.0	-	5.5	V
Supply current	$V_{S} = 5 V, E_{V} = 0$	I <sub>SD</sub>	0.25	0.35	0.45	mA
Зарріу сапені	E <sub>v</sub> = 40 klx, sunlight	I <sub>SH</sub>	-	0.45	-	mA
Transmission distance	$E_V = 0$ , IR diode TSAL6200, $I_F = 50$ mA, test signal see Fig. 1	d	-	15	-	m
Output voltage low	$I_{OSL} = 0.5 \text{ mA}, E_e = 0.7 \text{ mW/m}^2,$ test signal see Fig. 1	V <sub>OSL</sub>	-	-	100	mV
Minimum irradiance	Test signal: RC5 code	E <sub>e min.</sub>	-	0.25	0.5	mW/m <sup>2</sup>
Willimum irradiance	Test signal: NEC code	E <sub>e min.</sub>	-	0.3	0.6	mW/m <sup>2</sup>
Maximum irradiance	Pulse width tolerance: $t_{pi}$ - $4/f_o$ < $t_{po}$ < $t_{pi}$ + $4/f_o$ , test signal see Fig. 1	E <sub>e max.</sub>	30	-	-	W/m <sup>2</sup>
Directivity	Angle of half transmission distance	Ψ1/2	-	± 75	-	0

### TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

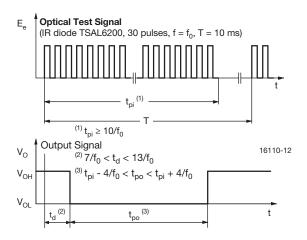


Fig. 1 - Output Active Low

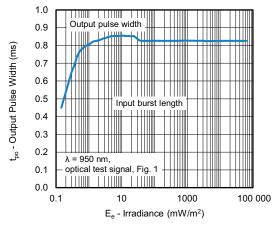
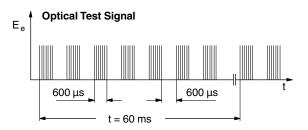


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



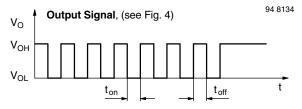


Fig. 3 - Output Function

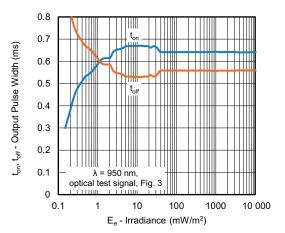
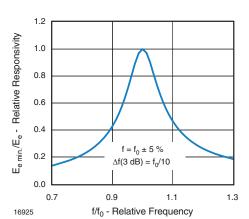


Fig. 4 - Output Pulse Diagram



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Fig. 5 - Frequency Dependance of Responsivity

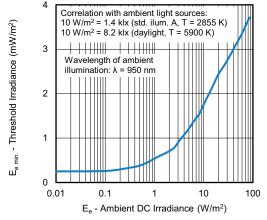


Fig. 6 - Sensitivity in Bright Ambient

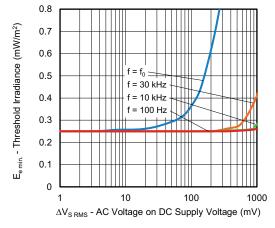


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

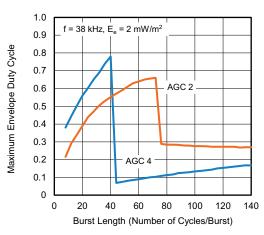


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

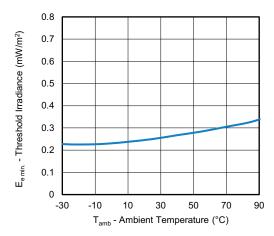


Fig. 9 - Sensitivity vs. Ambient Temperature

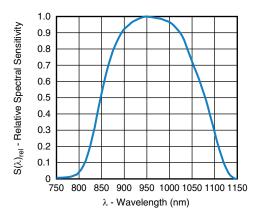


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength



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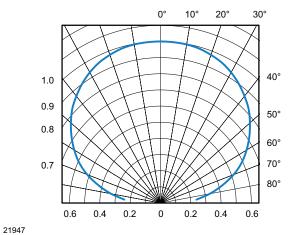


Fig. 11 - Horizontal Directivity

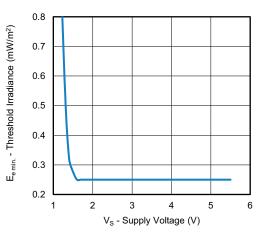


Fig. 12 - Sensitivity vs. Supply Voltage



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#### **SUITABLE DATA FORMAT**

The TSOP572.., TSOP574.. series is designed to suppress spurious output pulses due to noise or disturbance signals. The devices can distinguish data signals from noise due to differences in frequency, burst length, and envelope duty cycle. The data signal should be close to the device's band-pass center frequency (e.g. 38 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the TSOP572.., TSOP574.. in the presence of a disturbance, the sensitivity of the receiver is automatically reduced by the AGC to insure that no spurious pulses are present at the receiver's output. Some examples which are suppressed are:

- DC light (e.g. from tungsten bulbs sunlight)
- · Continuous signals at any frequency
- Strongly or weakly modulated patterns from fluorescent lamps with electronic ballasts (see Fig. 13 or Fig. 14)
- 2.4 GHz and 5 GHz Wi-Fi

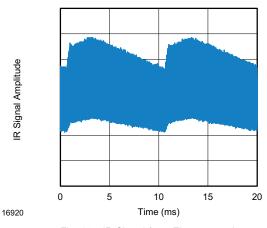


Fig. 13 - IR Signal from Fluorescent Lamp With Low Modulation

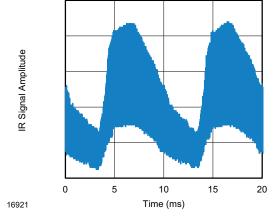


Fig. 14 - IR Signal from Fluorescent Lamp With High Modulation

AGC CHARACTERISTICS		
	TSOP572	TSOP574
Minimum burst length	10 cycles/burst	10 cycles/burst
After each burst of length a minimum gap time is required of	10 to 72 cycles ≥ 10 cycles	10 to 40 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	72 cycles > 3 x burst length	40 cycles > 10 x burst length
Maximum number of continuous short bursts/second	950	1500
NEC code	Yes	Preferred
RC5 / RC6 code	Yes	Preferred
RCA 56 kHz code	Yes	Preferred
r-step code	Yes	Preferred
Sony code	Preferred	No
Suppression of interference from fluorescent lamps	Mild disturbance patterns are suppressed (example: signal pattern of Fig. 13)	Complex and critical disturbance patterns are suppressed (example: signal pattern of Fig. 14 or highly dimmed LCDs)

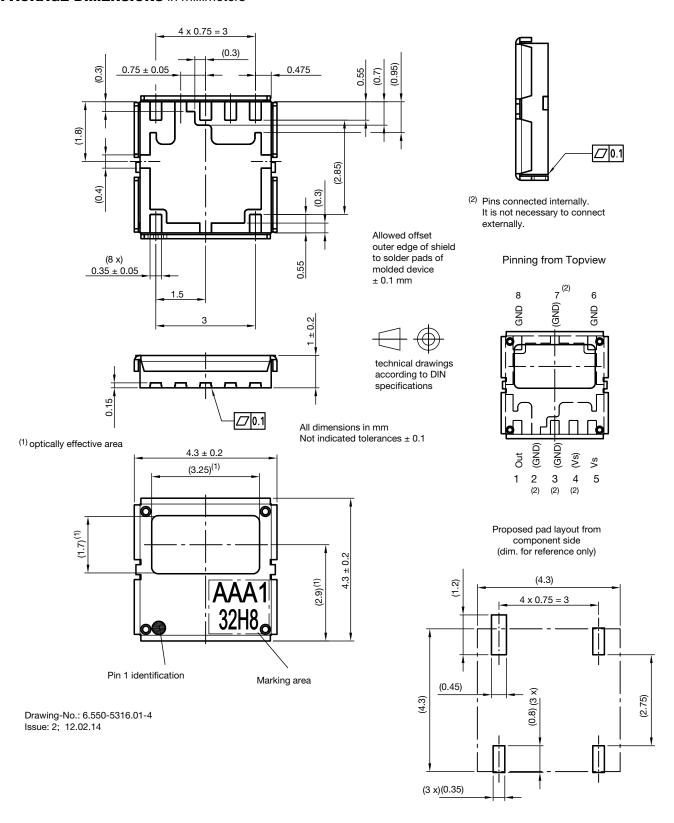
#### Note

• For data formats with short bursts please see the datasheet for TSOP573..



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### **PACKAGE DIMENSIONS** in millimeters





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#### **ASSEMBLY INSTRUCTIONS**

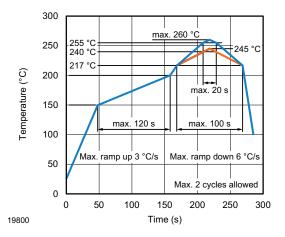
#### **Reflow Soldering**

- Reflow soldering must be done within 168 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**

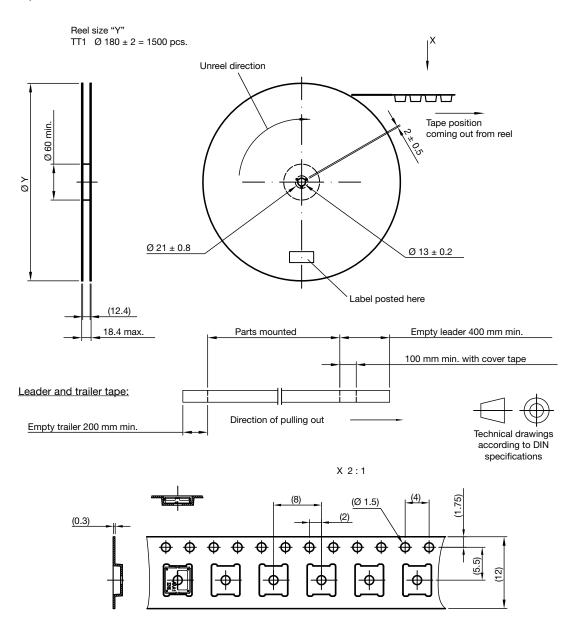




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### **TAPING VERSION TSOP57... DIMENSIONS** in millimeters

Tape and reel dimensions:



Drawing-No.: 9.700-5380.01-4

Issue: 3; 07.03.18

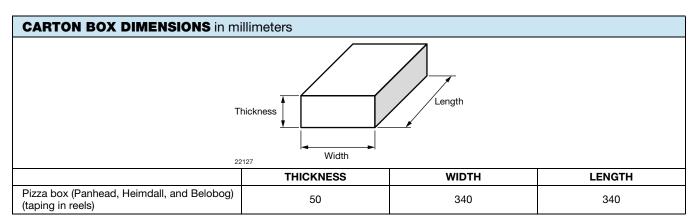
Not indicated tolerances ± 0.1



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#### **OUTER PACKAGING**

The sealed reel is packed into a pizza box.



#### **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.

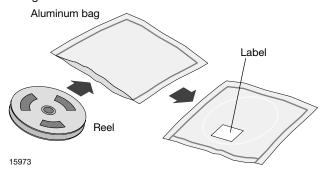
PLAIN WRITING	ABBREVIATION	LENGTH
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by	ACC	-
Packed by	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	xxxxxxx+	Company logo
LONG BAR CODE TOP	TYPE	LENGTH
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



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#### **DRY PACKING**

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



#### 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.

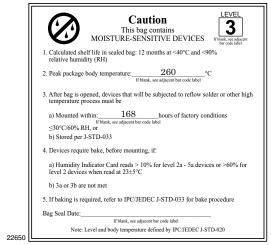
After more than 168 h under these conditions moisture content will be too high for reflow soldering.

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  $^{\circledR}$  standard J-STD-020 level 3 label is included on all dry bags.



EIA JEDEC standard J-STD-020 level 3 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.

### **BAR CODE PRODUCT LABEL** (example)



22178



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