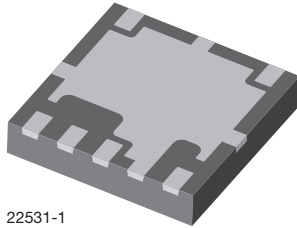
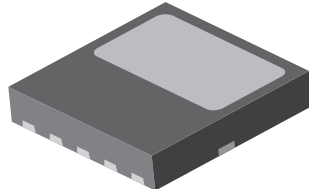




## IR Receiver Modules for Remote Control Systems



22531-1



### 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
- Insensitive to supply voltage ripple and noise
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### ORDERING CODE

#### Taping:

TSOP37...TT1 - top view taped

TSOP37...TT2 - top view taped

### DESCRIPTION

The TSOP37... series are miniaturized SMD IR receiver modules for infrared remote control systems. A PIN diode 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 TSOP372.., TSOP374.. are optimized to suppress almost all spurious pulses from energy saving lamps like CFLs. The AGC4 used in the TSOP374.. may suppress some data signals. The TSOP372.. is a legacy product for all common IR remote control data formats. Between these two receiver types, the TSOP374.. is preferred. Customers should initially try the TSOP374.. in their design.

These components have not been qualified according to automotive specifications.

PARTS TABLE			
AGC		LEGACY, FOR LONG BURST REMOTE CONTROLS (AGC2)	RECOMMENDED FOR LONG BURST CODES (AGC4) (1)
Carrier frequency	36 kHz	TSOP37236	TSOP37436 (2)(3)(4)
	38 kHz	TSOP37238	TSOP37438 (5)(6)
	40 kHz	TSOP37240	TSOP37440
	56 kHz	TSOP37256	TSOP37456 (7)(8)
Package		Belobog	
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		SMD	
Application		Remote control	
Best remote control code		(2) RC-5 (3) RC-6 (4) Panasonic (5) NEC (6) Sharp (7) r-step (8) Thomson RCA	

#### Note

(1) We advise try AGC4 first if the burst length is unknown.

**BLOCK DIAGRAM**


20445-5

**APPLICATION CIRCUIT**


17170\_5

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

**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		$T_{\text{stg}}$	-25 to +85	°C
Operating temperature range		$T_{\text{amb}}$	-25 to +85	°C
Power consumption	$T_{\text{amb}} \leq 85 \text{ }^\circ\text{C}$	$P_{\text{tot}}$	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** ( $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		$V_S$	2.5		5.5	V
Supply current	$V_S = 3.3 \text{ V}$ , $E_v = 0$	$I_{\text{SD}}$	0.27	0.35	0.45	mA
	$E_v = 40 \text{ klx}$ , sunlight	$I_{\text{SH}}$		0.45		mA
Transmission distance	$E_v = 0$ , IR diode TSAL6200, $I_F = 200 \text{ mA}$ , test signal see fig. 1	$d$		45		m
Output voltage low	$I_{\text{OSL}} = 0.5 \text{ mA}$ , $E_e = 0.7 \text{ mW/m}^2$ , test signal see fig. 1	$V_{\text{OSL}}$			100	mV
Minimum irradiance	Pulse width tolerance: $t_{\text{pi}} - 5/f_o < t_{\text{po}} < t_{\text{pi}} + 6/f_o$ , test signal see fig. 1	$E_e \text{ min.}$		0.12	0.25	$\text{mW/m}^2$
Maximum irradiance	$t_{\text{pi}} - 5/f_o < t_{\text{po}} < t_{\text{pi}} + 6/f_o$ , test signal see fig. 1	$E_e \text{ max.}$	30			$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 75$		deg



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



Fig. 1 - Output Function



Fig. 4 - Output Pulse Diagram



Fig. 2 - Output Pulse Width vs. Irradiance

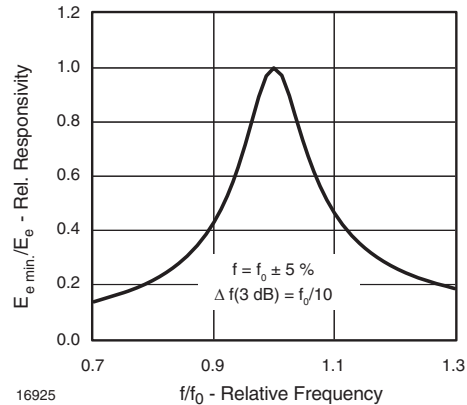


Fig. 5 - Frequency Dependence of Responsivity



Fig. 3 - Output Function

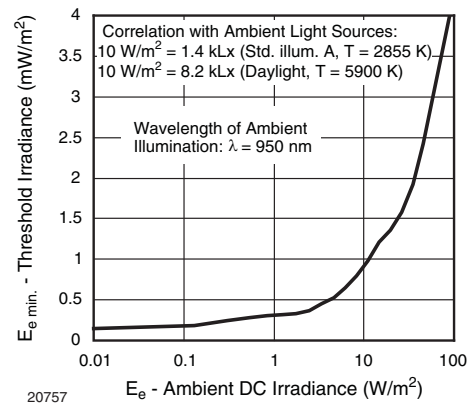


Fig. 6 - Sensitivity in Bright Ambient



Fig. 7 - Sensitivity vs. Supply Voltage Disturbances



Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

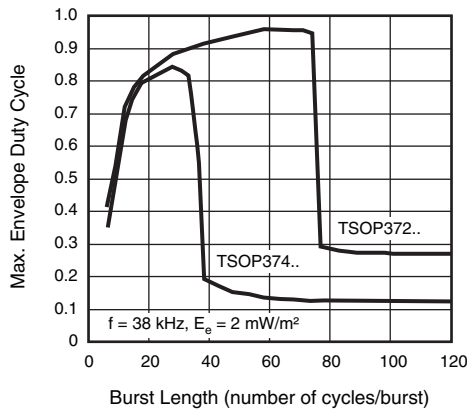


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length



Fig. 11 - Directivity



Fig. 9 - Sensitivity vs. Ambient Temperature



Fig. 12 - Sensitivity vs. Supply Voltage

**SUITABLE DATA FORMAT**

The TSOP372.., TSOP374.. 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 TSOP372.., TSOP374.. 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 figure 13 or figure 14)

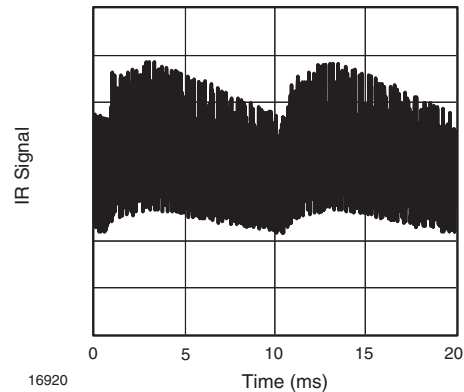


Fig. 13 - IR Signal from Fluorescent Lamp with Low Modulation



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

	<b>TSOP372..</b>	<b>TSOP374..</b>
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
NEC code	yes	preferred
RC5/RC6 code	yes	preferred
Thomson 56 kHz code	yes	preferred
Sharp code	yes	preferred
Suppression of interference from fluorescent lamps	Most common disturbance patterns are suppressed	Even extreme disturbance patterns are suppressed

**Notes**

- For data formats with short bursts (less than 10 carrier cycles) please see the datasheet for TSOP373.., TSOP375..
- Best choice of AGC for some popular IR-codes:  
 TSOP37436: RC-5, RC-6, Panasonic;  
 TSOP37438: NEC, Sharp, r-step;  
 TSOP37456: r-step, Thomson RCA
- For Sony 12, 15, and 20 bit IR-codes please see the datasheet of TSOP37S40



### PACKAGE DIMENSIONS in millimeters



(1) optically effective area



marking area

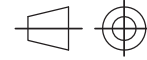
Drawing refers to following types: TSOP37... / TSOP57...

Drawing-No.: 6.550-5315.01-4

Issue: 2; 12.02.14

All dimensions in mm

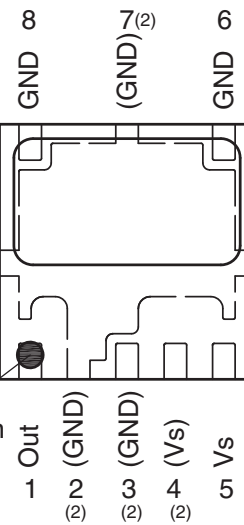
Not indicated tolerances  $\pm 0.1$



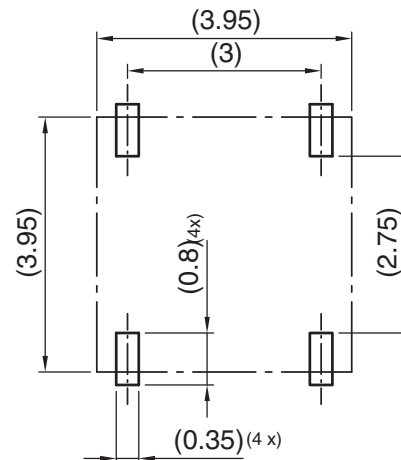
technical drawings according to DIN specifications

(2) Pins connected internally. It is not necessary to connect externally.

### Pinning from Topview



Proposed pad layout from component side (dim. for reference only)





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



ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME <sup>(1)</sup>	REMARKS
TSOP37..TT1	Tape and reel	MOQ: 1800 pcs	3.95 mm x 3.95 mm x 0.75 mm
TSOP37..TT2		MOQ: 7000 pcs	

Note

<sup>(1)</sup> MOQ: minimum order quantity

## TAPING VERSION TSOP37... DIMENSIONS in millimeters



Drawing-No.: 9.700-5347.01-4  
 Issue: 1; 14.11.11

Not indicated tolerances  $\pm 0.1$



**LABEL**
**Standard bar code labels for finished goods**

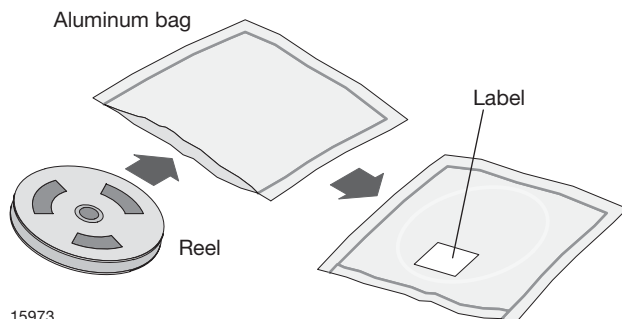
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled

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.

<b>VISHAY SEMICONDUCTOR GmbH STANDARD BAR CODE PRODUCT LABEL (finished goods)</b>		
<b>PLAIN WRITING</b>	<b>ABBREVIATION</b>	<b>LENGTH</b>
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
<b>LONG BAR CODE TOP</b>	<b>TYPE</b>	<b>LENGTH</b>
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
<b>SHORT BAR CODE BOTTOM</b>	<b>TYPE</b>	<b>LENGTH</b>
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. A secondary cardboard box is used for shipping purposes.



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® 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

Caution label with 'LEVEL 3' and 'MOISTURE-SENSITIVE DEVICES' text, including instructions for storage and handling.

22650

EIA JEDEC standard J-STD-020 level 3 label is included on all dry bags



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

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 in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

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

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)