30 k 🛙

Demo-

dulator

3

OUT

1.4

GND

TSOP392.., TSOP394..

Vishay Semiconductors

(5-2008)

еЗ

RoHS

COMPLIANT

HALOGEN

- · Photo detector and preamplifier in one package Internal filter for PCM frequency
- Supply voltage: 2.5 V to 5.5 V

Very low supply current

FEATURES

- Improved immunity against ambient light
- Two lenses for high sensitivity
- Insensitive to supply voltage ripple and noise
- Ultra small top-view PCB footprint
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

MECHANICAL DATA

Pinning:

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

ORDERING CODE

TSOP.9.... - 2400 pieces in 6 bags

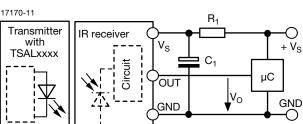
BLOCK DIAGRAM

Input

PIN

20445-1



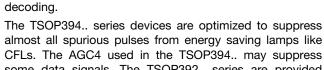


Band

pass

Control circuit

 R_1 and C_1 recommended to reduce supply ripple for $V_S < 2.8 V$



30

DESCRIPTION

CFLs. The AGC4 used in the TSOP394.. may suppress some data signals. The TSOP392.. series are provided primarily for compatibility with old AGC2 designs. New designs should prefer the TSOP394.. series containing the newer AGC4.

The TSOP39... series are miniaturized receiver modules for infrared remote control systems. Two PIN diodes and a preamplifier are assembled on a leadframe, the epoxy package contains an IR filter. The demodulated output

signal can be directly connected to digital circuitry for

These components have not been qualified according to automotive specifications.

Rev. 1.5, 03-Aug-2021

1





IR Receiver Modules for Remote Control Systems



Vishay Semiconductors

PARTS TABLE

PARISIABLE					
AGC		NOISY ENVIRONMENTS AND LONG BURSTS (AGC2)	VERY NOISY ENVIRONMENTS AND LONG BURSTS (AGC4)		
Carrier frequency	30 kHz	TSOP39230	TSOP39430		
	33 kHz	TSOP39233	TSOP39433		
	36 kHz	TSOP39236	TSOP39436 ⁽¹⁾⁽²⁾⁽³⁾		
	38 kHz	TSOP39238	TSOP39438 ⁽⁴⁾⁽⁵⁾		
	40 kHz	TSOP39240	TSOP39440		
	56 kHz	TSOP39256	TSOP39456 ⁽⁶⁾⁽⁷⁾		
Package		TVCast			
Pinning		1, 4 = GND, 2 = V _S , 3 = OUT			
Dimensions (mm)		6.8 W x 2.6 H x 5.3 D			
Mounting		Leaded			
Application		Remote control			
Best choice for		⁽¹⁾ RC-5 ⁽²⁾ RC-6 ⁽³⁾ Panasonic ⁽⁴⁾ NEC ⁽⁵⁾ Sharp ⁽⁶⁾ r-step ⁽⁷⁾ Thomson RCA			
Special options		Low voltage option: <u>www.vishay.com/doc?82382</u>			

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		Vo	-0.3 to (V _S + 0.3)	V		
Output current		Ι _Ο	5	mA		
Junction temperature		Тj	100	°C		
Storage temperature range		T _{stg}	-25 to +85	°C		
Operating temperature range		T _{amb}	-25 to +85	°C		
Power consumption	T _{amb} ≤ 85 °C	P _{tot}	10	mW		
Soldering temperature	$t \le 10$ s, 1 mm from case	T _{sd}	260	°C		

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

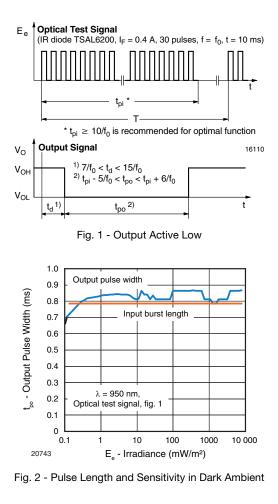
ELECTRICAL AND OPTICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		VS	2.5	-	5.5	V
Supply current	$E_v = 0, V_S = 3.3 V$	I _{SD}	0.27	0.35	0.45	mA
Supply current	$E_v = 40$ klx, sunlight	I _{SH}	-	0.45	-	mA
Transmission distance	$E_v = 0$, test signal see Fig. 1, IR diode TSAL6200, I _F = 50 mA	d	-	30	-	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	$\begin{array}{c} \mbox{Pulse width tolerance:} \\ t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o, \mbox{test signal} \\ \mbox{see Fig. 1} \end{array}$	E _{e min.}	-	0.08	0.12	mW/m ²
Maximum irradiance	$\begin{array}{c} t_{pi} \text{ - } 5/f_o {<} t_{po} {<} t_{pi} {+} 6/f_o, \text{test signal} \\ \text{see Fig. 1} \end{array}$	E _{e max.}	30	-	-	W/m ²
Directivity	Angle of half transmission distance	φ1/2	-	± 45	-	0

Rev. 1.5, 03-Aug-2021

TSOP392.., TSOP394..



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



www.vishay.com

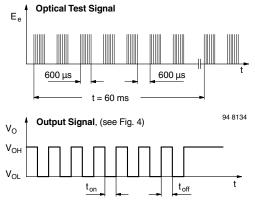


Fig. 3 - Output Function

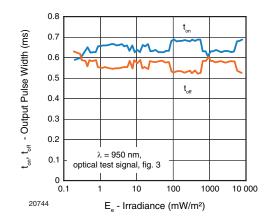


Fig. 4 - Output Pulse Diagram

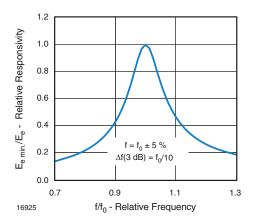


Fig. 5 - Frequency Dependence of Responsivity

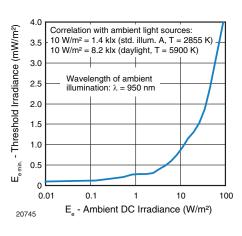


Fig. 6 - Sensitivity in Bright Ambient

Rev. 1.5, 03-Aug-2021



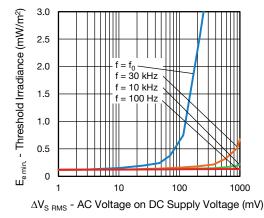


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

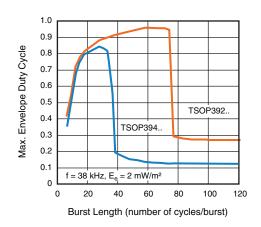


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

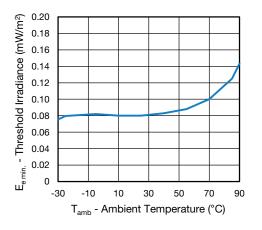
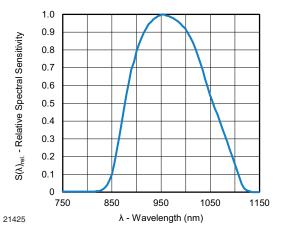


Fig. 9 - Sensitivity vs. Ambient Temperature



TSOP392.., TSOP394..

Vishay Semiconductors

Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

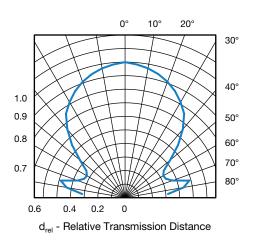


Fig. 11 - Horizontal Directivity

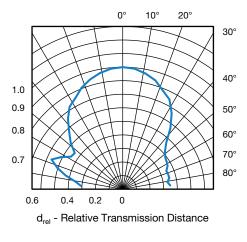


Fig. 12 - Vertical Directivity

Rev. 1.5, 03-Aug-2021



Vishay Semiconductors

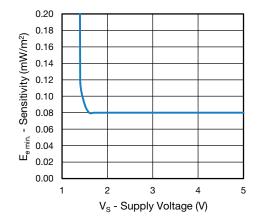


Fig. 13 - Sensitivity vs. Supply Voltage



TSOP392.., TSOP394..

Vishay Semiconductors

SUITABLE DATA FORMAT

This 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 product 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 pattern from fluorescent lamps with electronic ballasts (see Fig. 14 or Fig. 15)

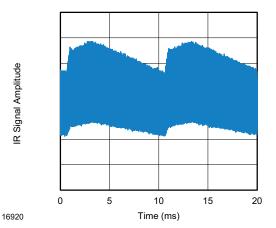


Fig. 14 - IR Disturbance from Fluorescent Lamp With Low Modulation

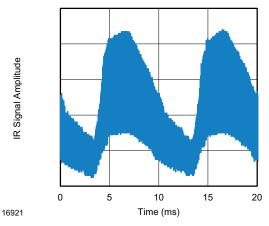


Fig. 15 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP392	TSOP394
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	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 TSOP393.., TSOP395..

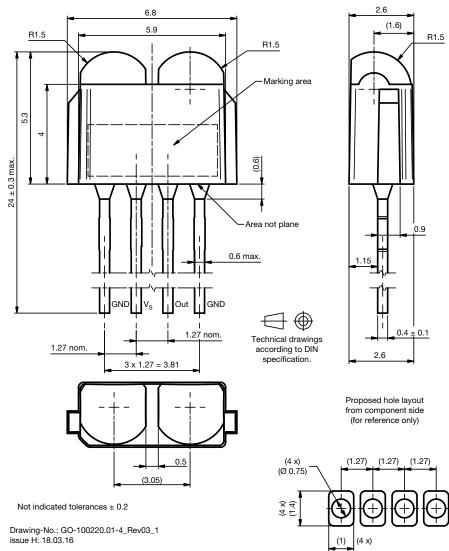
Rev. 1.5, 03-Aug-2021

6



PACKAGE DIMENSIONS in millimeters

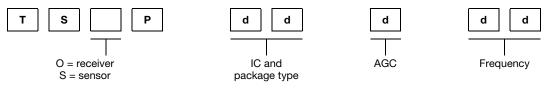
Vishay Semiconductors



BULK PACKAGING

Standard shipping for TVCast is in conductive plastic bags. The packing quantity is determined by weight and the number of components per carton may vary by a maximum of ± 0.3 %.

ORDERING INFORMATION



Note

• d = "digit", please consult the list of available devices create a valid part number

Example: TSOP39438

PACKAGING QUANTITY

- 400 pieces per bag (each bag is individually boxed)
- 6 bags per carton

Rev. 1.5, 03-Aug-2021

Document Number: 82778



Vishay

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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.