

TSOP182.., TSOP184.., TSOP186..

Vishay Semiconductors

IR Receiver Modules for Remote Control Systems

1926

LINKS TO ADDITIONAL RESOURCES









Holders

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

- 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

COMPLIANT HALOGEN FREE <u>GREEN</u> (5-2008)

е

RoHS

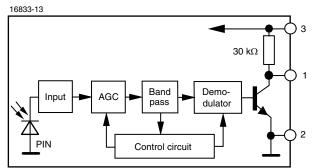
APPLICATIONS

• Infrared remote control systems

DESIGN SUPPORT TOOLS

- <u>3D models</u>
- Window size calculator

BLOCK DIAGRAM



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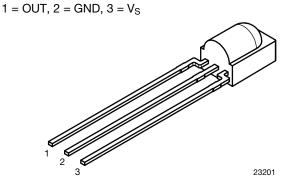


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MECHANICAL DATA

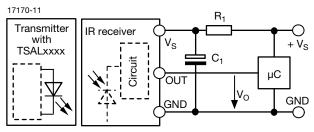
Pinning for TSOP18...:



ORDERING CODE

TSOP18... - 1500 pieces in bags

APPLICATION CIRCUIT



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

PARTS TABLE						
AGC		BASIC NOISE SUPPRESSION (AGC2)	ENHANCED NOISE SUPPRESSION (AGC4)	MAXIMIZED NOISE SUPPRESSION (AGC6)		
	30 kHz	TSOP18230	TSOP18430	TSOP18630		
	33 kHz	TSOP18233	TSOP18433	TSOP18633		
	36 kHz	TSOP18236	TSOP18436 ⁽⁴⁾⁽⁶⁾	TSOP18636 ⁽⁵⁾		
Carrier frequency	38 kHz	TSOP18238	TSOP18438 (2)(3)(9)(10)	TSOP18638		
	40 kHz	TSOP18240 ⁽¹¹⁾	TSOP18440	TSOP18640		
	56 kHz	TSOP18256 ⁽¹⁾	TSOP18456 ⁽⁸⁾	TSOP18656 ⁽⁷⁾		
Package		Minicast				
Pinning		1 = OUT, 2 = GND, 3 = V _S				
Dimensions (mm)		5.0 W x 6.95 H x 4.8 D				
Mounting		Leaded				
Application		Remote control				
Best choice for		 ⁽¹⁾ Cisco ⁽²⁾ Mitsubishi ⁽³⁾ NEC ⁽⁴⁾ Panasonic ⁽⁵⁾ RC-5 ⁽⁶⁾ RC-6 ⁽⁷⁾ RCA ⁽⁸⁾ r-step ⁽⁹⁾ Sejin 4PPM ⁽¹⁰⁾ Sharp ⁽¹¹⁾ Sony 				

Note

• 30 kHz and 33 kHz only available on written request

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.

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ELECTRICAL AND OPTICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Cupply ourrent	$E_v = 0, V_S = 3.3 V$	I _{SD}	0.25	0.35	0.45	mA
Supply current	E _v = 40 klx, sunlight	I _{SH}	-	0.45	-	mA
Supply voltage		VS	2.0	-	5.5	V
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	Test signal: RC5 code	E _{e min.}	-	0.08	0.20	mW/m ²
winimum madiance	Test signal: NEC code	E _{e min.}	-	0.12	0.25	mW/m ²
Maximum irradiance	$\begin{array}{l} \mbox{Pulse width tolerance:} \\ t_{pi} - 5/f_0 < t_{po} < t_{pi} + 5/f_0, \\ \mbox{test signal see Fig. 1} \end{array}$	E _{e max.}	30	-	-	W/m ²
Directivity	Angle of half transmission distance	φ1/2	-	± 45	-	o

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

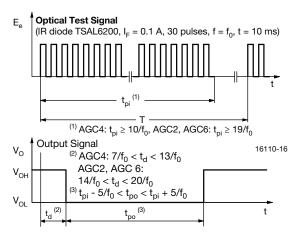


Fig. 1 - Output Delay and Pulse-Width

Input burst length

Output pulse width

 $\lambda = 950 \text{ nm},$

optical test signal, Fig.

10

Ee - Irradiance (mW/m²)

Fig. 2 - Pulse-Width vs. Irradiance in Dark Ambient

1000

100 000

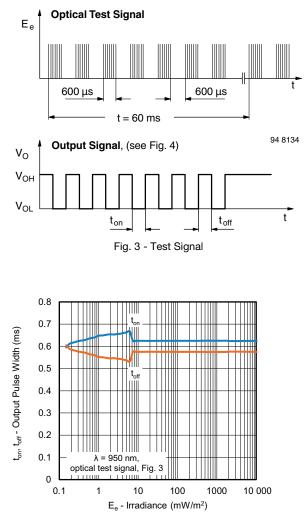


Fig. 4 - Pulse-Width vs. Irradiance in Dark Ambient

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1.00

0.90

0.80

0.70

0.60

0.50

0.40

0.30

0.20

0.10

0

0.1

t_{po} - Output Pulse Width (ms)

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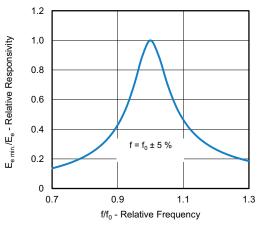
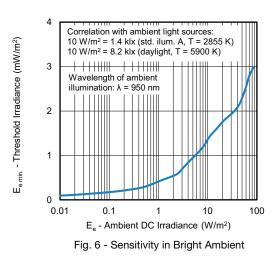


Fig. 5 - Frequency Dependence of Responsivity



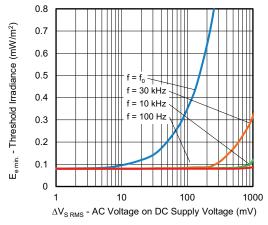


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

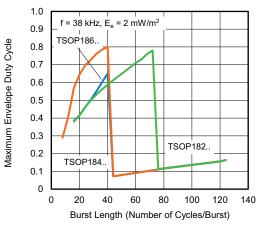
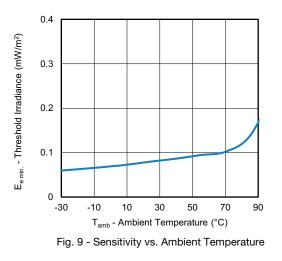


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length



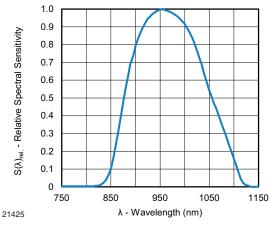


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

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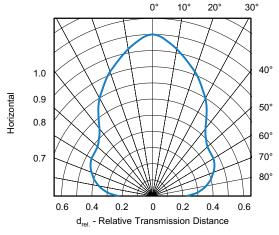
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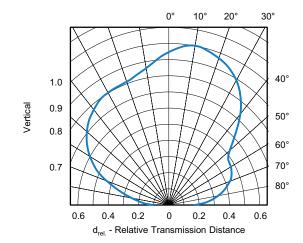


Fig. 11 - Horizontal and Vertical Directivity

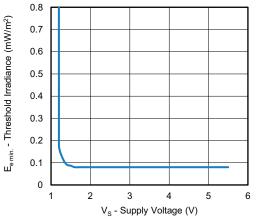


Fig. 12 - Sensitivity vs. Supply Voltage

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Datasheet Values Refer to PCN-OPT-1288-2023



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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 patterns from fluorescent lamps with electronic ballasts (see Fig. 13 or Fig. 14)
- 2.4 GHz and 5 GHz Wi-Fi

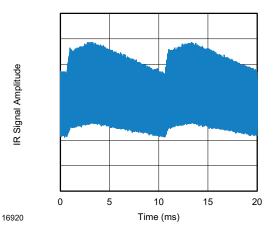


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

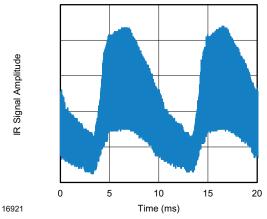


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP182	TSOP184	TSOP186
Minimum burst length	19 cycles/burst	10 cycles/burst	19 cycles/burst
After each burst of length a minimum gap time is required of	19 to 72 cycles ≥ 20 cycles	10 to 40 cycles ≥ 11 cycles	19 to 40 cycles ≥ 20 cycles
For bursts greater than a minimum gap time in the data stream is needed of	72 cycles > 6 x burst length	40 cycles > 10 x burst length	40 cycles > 10 x burst length
Maximum number of continuous short bursts/second	750	1300	750
RC-5 code	Yes	Yes	Preferred
RC-6 code	No	Preferred	No
NEC code	Yes	Preferred	Yes
r-step code	No	Preferred	No
Sony code	Preferred	No	No
RCA 56 kHz code	Yes	Yes	Preferred
Suppression of interference from fluorescent lamps	Fig. 13	Fig. 13 and Fig. 14	Fig. 13 and Fig. 14

Note

For data formats with short bursts please see the datasheet for TSOP181.., TSOP183.., TSOP185...



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R 2

4.8

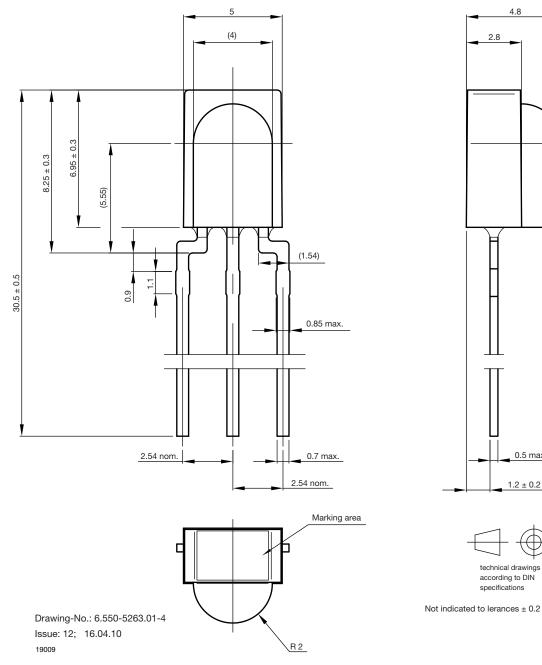
0.5 max.

 1.2 ± 0.2

technical drawings according to DIN specifications

2.8

PACKAGE DIMENSIONS in millimeters





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