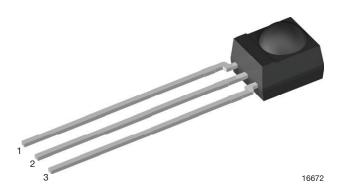


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IR Receiver Modules for Remote Control Systems



LINKS TO ADDITIONAL RESOURCES















DESCRIPTION

These products are miniaturized receivers for infrared remote control systems. A PIN diode and a preamplifier are 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.

The TSOP323.., TSOP343..series devices are optimized to suppress almost all spurious pulses from energy saving lamps like CFLs. AGC3 may also suppress some data signals if continuously transmitted.

The TSOP321.., TSOP341.. series are provided primarily for compatibility with old AGC1 designs. New designs should prefer the TSOP323.., TSOP343.. series containing the newer AGC3. The TSOP325.., TSOP345.. series contain a very robust AGC5. This series should only be used for critically noisy environments.

These components have not been qualified according to automotive specifications.

FEATURES

- Very low supply current
- · Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- · Improved shielding against EMI
- 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





ROHS
COMPLIANT
HALOGEN
FREE
GREEN

(5-2008)

MECHANICAL DATA

Pinning for TSOP341.., TSOP343.., TSOP345..:

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

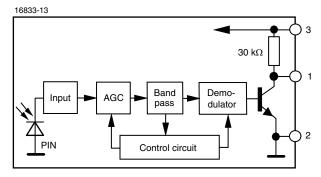
Pinning for TSOP321..., TSOP323..., TSOP325...:

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

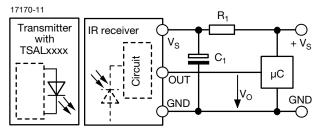
ORDERING CODE

TSOP3.... - 2160 pieces in tubes

BLOCK DIAGRAM



APPLICATION CIRCUIT



 R_{1} and C_{1} recommended to reduce supply ripple for $V_{\text{S}} < 2.8 \; \text{V}$



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PARTS TABLE								
AGC		LEGACY, FOR SHORT BURST REMOTE CONTROLS (AGC1)		NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)		VERY NOISY ENVIRONMENTS AND SHORT BURSTS (AGC5)		
Carrier frequency	30 kHz	TSOP34130	TSOP32130	TSOP34330	TSOP32330	TSOP34530	TSOP32530	
	33 kHz	TSOP34133	TSOP32133	TSOP34333	TSOP32333	TSOP34533	TSOP32533	
	36 kHz	TSOP34136	TSOP32136	TSOP34336 (1)(6)	TSOP32336 (1)	TSOP34536	TSOP32536	
	38 kHz	TSOP34138	TSOP32138	TSOP34338 (2)(3)(4)(5)	TSOP32338 (2)(3)(4)(5)	TSOP34538	TSOP32538	
	40 kHz	TSOP34140	TSOP32140	TSOP34340	TSOP32340	TSOP34540	TSOP32540	
	56 kHz	TSOP34156	TSOP32156	TSOP34356	TSOP32356	TSOP34556	TSOP32556	
Package		Mold						
Pinning		1 = OUT, 2 = GND, 3 = V _S	1 = OUT, 2 = V _S , 3 = GND	1 = OUT, 2 = GND, 3 = V _S	1 = OUT, 2 = V _S , 3 = GND	1 = OUT, 2 = GND, 3 = V _S	1 = OUT, 2 = V _S , 3 = GND	
Dimensions	(mm)			6.0 W x 6.9	6.95 H x 5.6 D			
Mounting		Leaded						
Application		Remote control						
Best choice for		(1) MCIR (2) Mitsubishi (3) RECS-80 Code (4) r-map (5) XMP-1, XMP-2 (6) RCMM						
Special options		Narrow optical filter: www.vishay.com/doc?81590 Wide optical filter: www.vishay.com/doc?82726 Low voltage option: www.vishay.com/doc?82382						

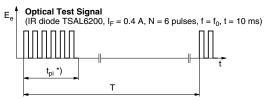
ABSOLUTE MAXIMUM RATINGS						
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT		
Supply voltage		V _S	-0.3 to +6	V		
Supply current		I _S	3	mA		
Output voltage		V _O	-0.3 to (V _S + 0.3)	V		
Output current		Io	5	mA		
Junction temperature		Tj	100	°C		
Storage temperature range		T _{stg}	-25 to +85	°C		
Operating temperature range		T _{amb}	-25 to +85	°C		
Power consumption	T _{amb} ≤ 85 °C	P _{tot}	10	mW		
Soldering temperature	t ≤ 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 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
Supply voltage		Vs	2.5	-	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	Pulse width tolerance: t_{pi} - $5/f_o < t_{po} < t_{pi} + 6/f_o$, test signal see Fig. 1	E _{e min.}	-	0.08	0.15	mW/m²
Maximum irradiance	t_{pi} - 5/f _o < t_{po} < t_{pi} + 6/f _o , test signal see Fig. 1	E _{e max.}	30	-	-	W/m ²
Directivity	Angle of half transmission distance	Ψ1/2	-	± 45	-	0

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



*) $t_{\text{pi}} \ge 6/f_0$ is recommended for optimal function

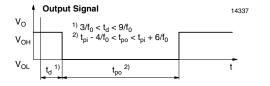


Fig. 1 - Output Active Low

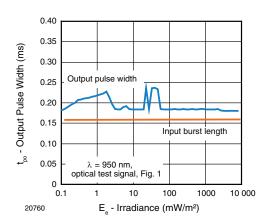


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

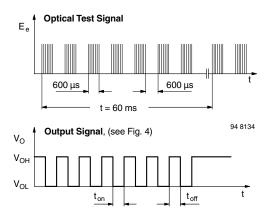


Fig. 3 - Output Function

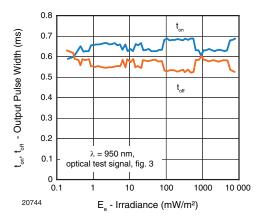


Fig. 4 - Output Pulse Diagram

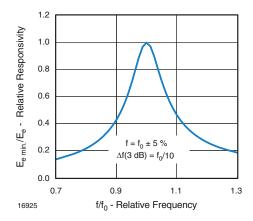


Fig. 5 - Frequency Dependence of Responsivity

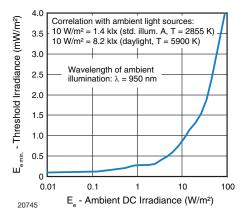


Fig. 6 - Sensitivity in Bright Ambient

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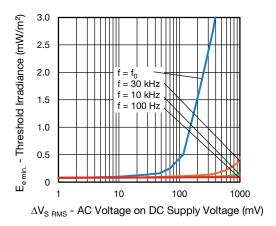


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

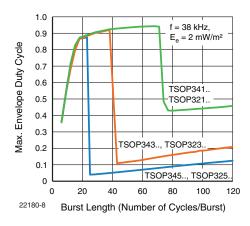


Fig. 8 - Maximum Envelope Duty Cycle vs. Burst Length

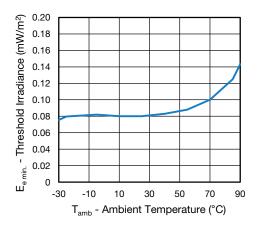


Fig. 9 - Sensitivity vs. Ambient Temperature

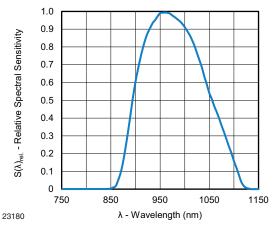


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

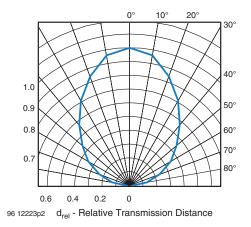


Fig. 11 - Horizontal Directivity

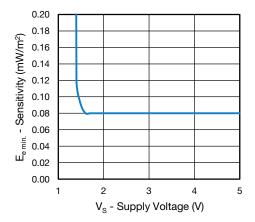


Fig. 12 - Sensitivity vs. Supply Voltage

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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).

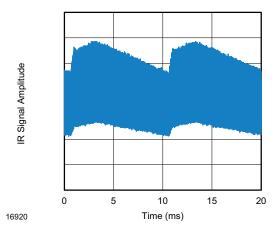


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

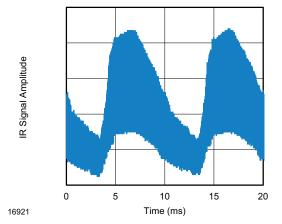


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP341, TSOP321	TSOP343, TSOP323	TSOP345, TSOP325	
Minimum burst length	6 cycles/burst	6 cycles/burst	6 cycles/burst	
After each burst of length A gap time is required of	6 to 70 cycles ≥ 10 cycles	6 to 35 cycles ≥ 10 cycles	6 to 24 cycles ≥ 10 cycles	
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 1.2 x burst length	35 cycles > 6 x burst length	24 cycles > 25 ms	
Maximum number of continuous short bursts/second	2000	2000	2000	
MCIR code	Yes	Preferred	Yes	
XMP-1, XMP-2 code	Yes	Preferred	Yes	
Suppression of interference from fluorescent lamps	Mild disturbance patterns are suppressed (example: signal pattern of Fig. 13)	Complex disturbance patterns are suppressed (example: signal pattern of Fig. 14)	Critical disturbance patterns are suppressed, e.g. highly dimmed LCDs	

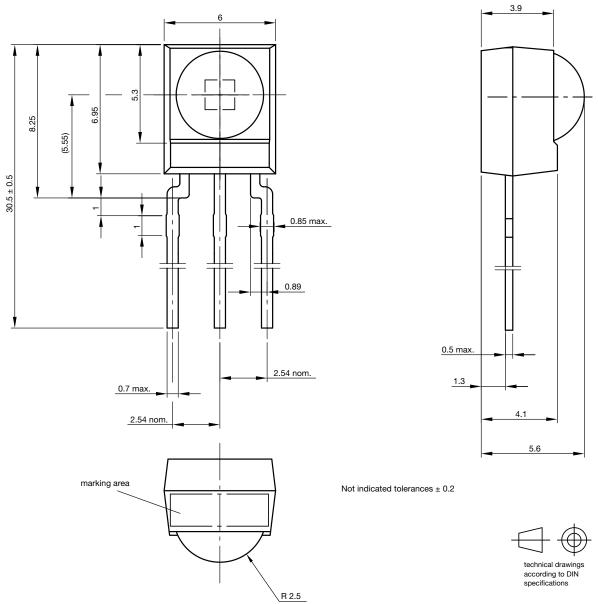
Notes

• For data formats with long bursts (more than 10 carrier cycles) please see the datasheet for TSOP348.., TSOP344.., TSOP322.., TSOP324...

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PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.01-4

Issue: 9; 03.11.10

13655



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