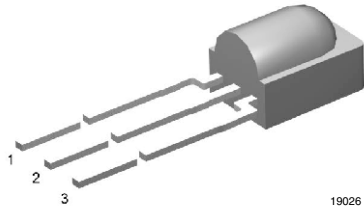


IR Receiver Modules for Remote Control Systems



FEATURES

- Low supply current
- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against EMI
- Supply voltage: 2.7 V to 5.5 V
- Improved immunity against ambient light
- Insensitive to supply voltage ripple and noise
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS
COMPLIANT

MECHANICAL DATA

Pinning for TSOP582.., TSOP584..:

1 = OUT, 2 = GND, 3 = V_S

Pinning for TSOP592.., TSOP594..:

1 = OUT, 2 = V_S , 3 = GND

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 acts as an IR filter.

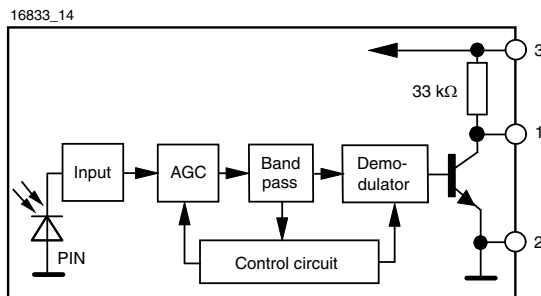
The demodulated output signal can be directly decoded by a microprocessor. The TSOP582.., TSOP592.. series are compatible with all common IR remote control data formats. The TSOP584.., TSOP594.. series are optimized to suppress almost all spurious pulses from energy saving fluorescent lamps but will also suppress some data signals.

This component has not been qualified according to automotive specifications.

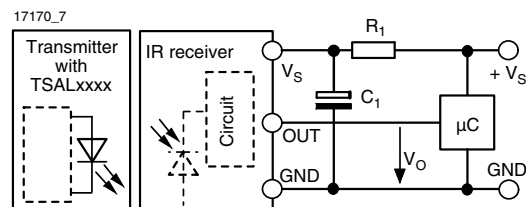
PARTS TABLE

CARRIER FREQUENCY	STANDARD APPLICATIONS (AGC2)		VERY NOISY ENVIRONMENTS (AGC4)	
	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
30 kHz	TSOP58230	TSOP59230	TSOP58430	TSOP59430
33 kHz	TSOP58233	TSOP59233	TSOP58433	TSOP59433
36 kHz	TSOP58236	TSOP59236	TSOP58436	TSOP59436
36.7 kHz	TSOP58237	TSOP59237	TSOP58437	TSOP59437
38 kHz	TSOP58238	TSOP59238	TSOP58438	TSOP59438
40 kHz	TSOP58240	TSOP59240	TSOP58440	TSOP59440
56 kHz	TSOP58256	TSOP59256	TSOP58456	TSOP59456

BLOCK DIAGRAM



APPLICATION CIRCUIT



The external components R_1 and C_1 are optional to improve the robustness against electrical overstress (typical values are $R_1 = 100 \Omega$, $C_1 = 0.1 \mu F$). The output voltage V_O should not be pulled down to a level below 1 V by the external circuit. The capacitive load at the output should be less than 2 nF.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V_S	- 0.3 to + 6	V
Supply current		I_S	5	mA
Output voltage		V_O	- 0.3 to 5.5	V
Voltage at output to supply		$V_S - V_O$	- 0.3 to ($V_S + 0.3$)	V
Output current		I_O	5	mA
Junction temperature		T_j	100	°C
Storage temperature range		T_{stg}	- 25 to + 85	°C
Operating temperature range		T_{amb}	- 25 to + 85	°C
Power consumption	$T_{amb} \leq 85$ °C	P_{tot}	10	mW
Soldering temperature	$t \leq 10$ 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	$E_v = 0, V_S = 5$ V	I_{SD}	0.65	0.85	1.05	mA
	$E_v = 40$ klx, sunlight	I_{SH}		0.95		mA
Supply voltage		V_S	2.7		5.5	V
Transmission distance	$E_v = 0$, test signal see fig. 1, IR diode TSAL6200, $I_F = 400$ mA	d		40		m
Output voltage low	$I_{OSL} = 0.5$ mA, $E_e = 0.7$ mW/m ² , test signal see fig. 1	V_{OSL}			100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see fig. 1	$E_e \text{ min.}$		0.3	0.45	mW/m ²
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see fig. 1	$E_e \text{ max.}$	30			W/m ²
Directivity	Angle of half transmission distance	$\phi_{1/2}$		± 45		deg

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

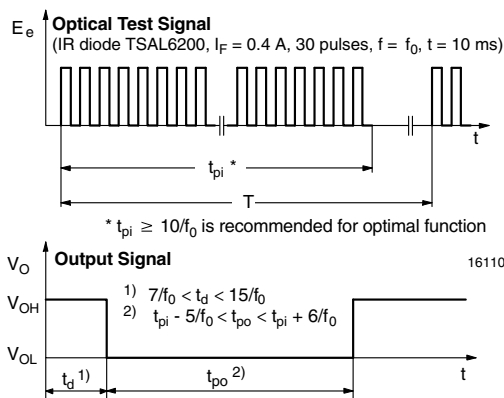


Fig. 1 - Output Active Low

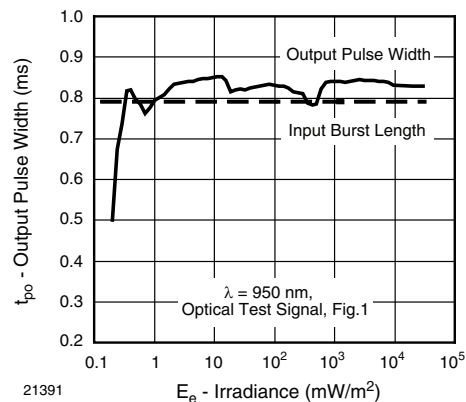


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

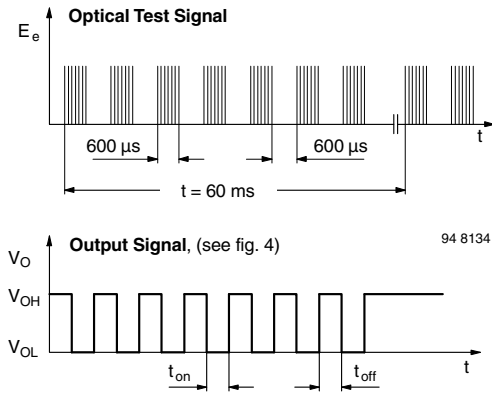


Fig. 3 - Output Function

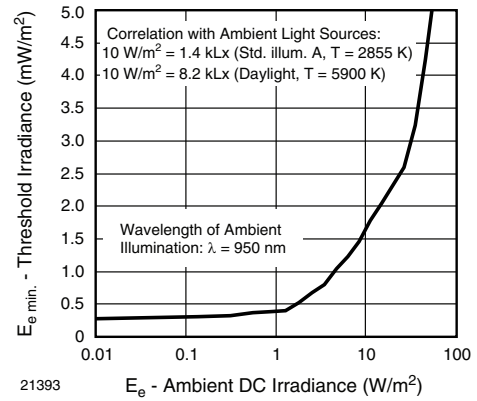


Fig. 6 - Sensitivity in Bright Ambient

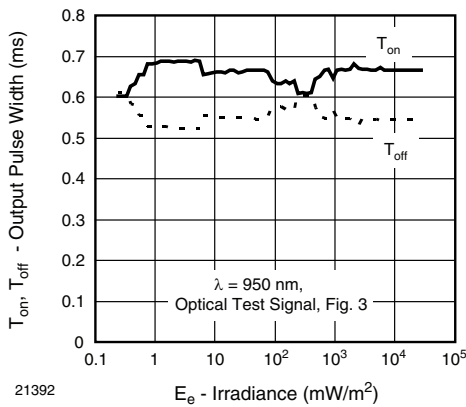


Fig. 4 - Output Pulse Diagram

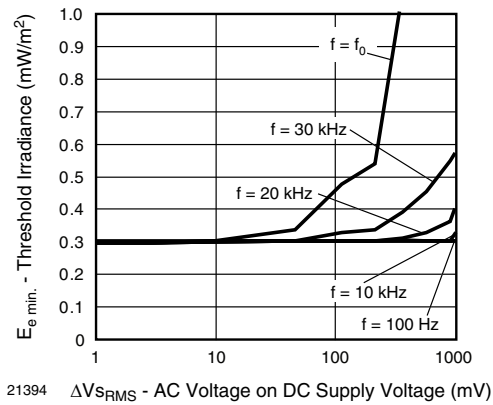


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

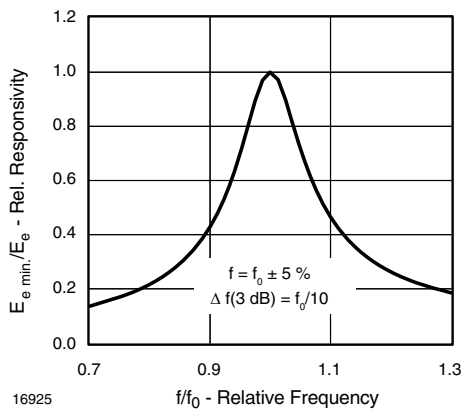


Fig. 5 - Frequency Dependence of Responsivity

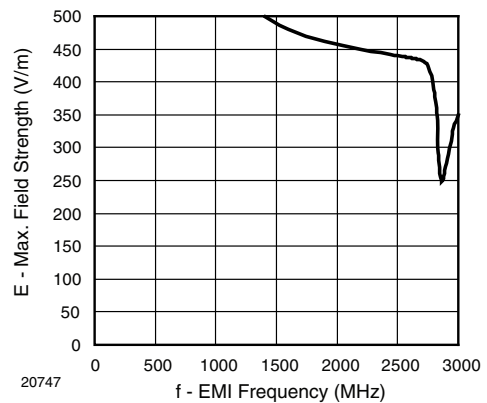


Fig. 8 - Sensitivity vs. Electric Field Disturbances

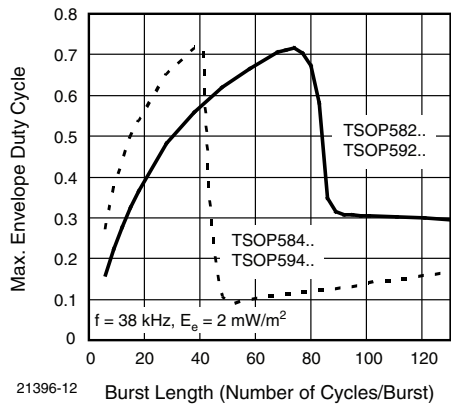


Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

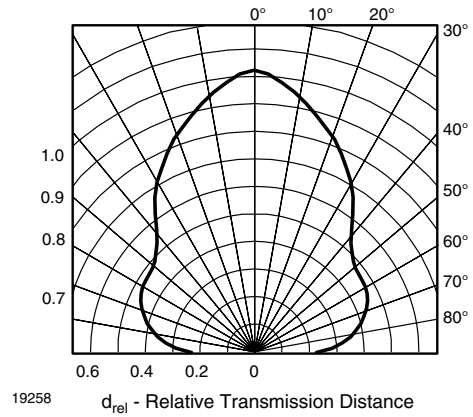


Fig. 12 - Horizontal Directivity

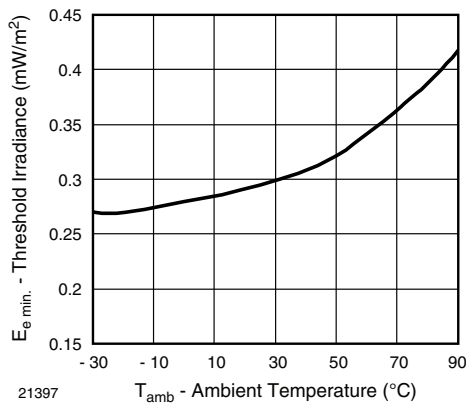


Fig. 10 - Sensitivity vs. Ambient Temperature

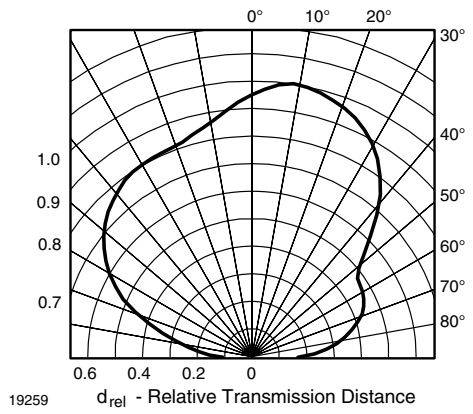


Fig. 13 - Vertical Directivity

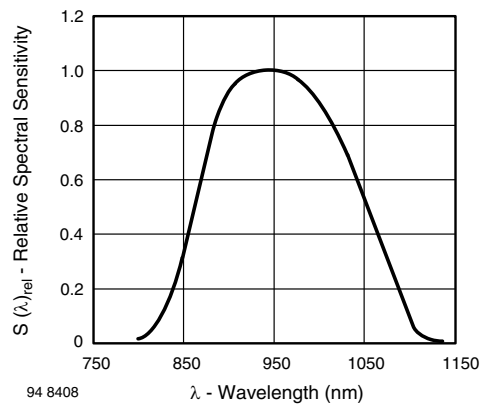


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

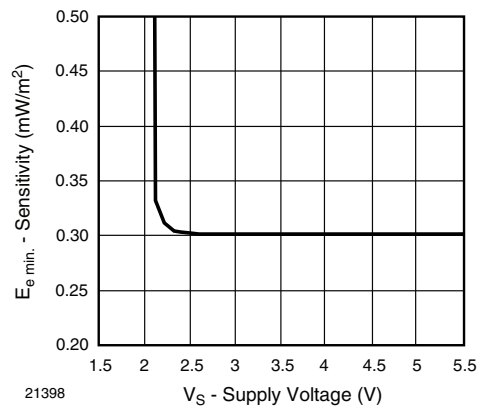


Fig. 14 - Sensitivity vs. Supply Voltage

SUITABLE DATA FORMAT

These products are designed to suppress spurious output pulses due to noise or disturbance signals. Data and disturbance signals can be distinguished by the devices according to carrier frequency, burst length and envelope duty cycle. The data signal should be close to the band-pass center frequency (e.g. 38 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the IR receiver in the presence of a disturbance signal, the sensitivity of the receiver is reduced to insure that no spurious pulses are present at the output. Some examples of disturbance signals which are suppressed are:

- DC light (e.g. from tungsten bulb or sunlight)
- Continuous signals at any frequency
- Strongly or weakly modulated noise from fluorescent lamps with electronic ballasts (see figure 15 or figure 16)

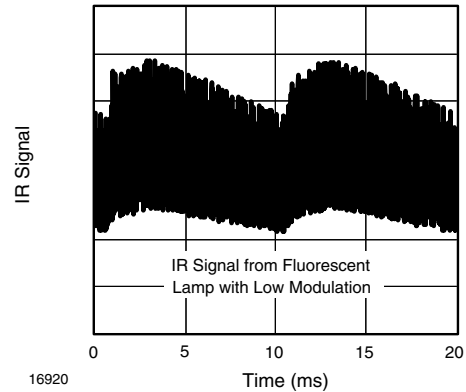


Fig. 15 - IR Signal from Fluorescent Lamp with Low Modulation

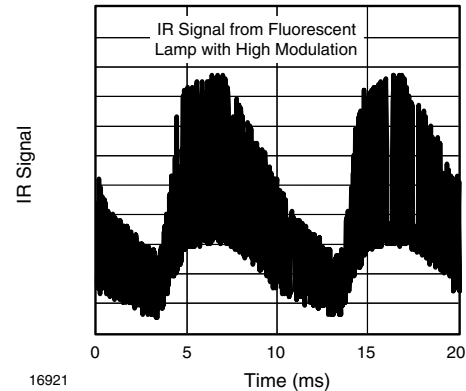


Fig. 16 - IR Signal from Fluorescent Lamp with High Modulation

	TSOP582.., TSOP592..	TSOP584.., TSOP594..
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 ≥ 12 cycles	10 to 35 cycles ≥ 12 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	800	1300
Recommended for NEC code	yes	yes
Recommended for RC5/RC6 code	yes	yes
Recommended for Sony code	yes	no
Recommended for Thomson 56 kHz code	yes	yes
Recommended for Mitsubishi code (38 kHz, preburst 8 ms, 16 bit)	yes	yes
Recommended for Sharp code	yes	yes
Suppression of interference from fluorescent lamps	Most common disturbance signals are suppressed	Even extreme disturbance signals are suppressed

Note

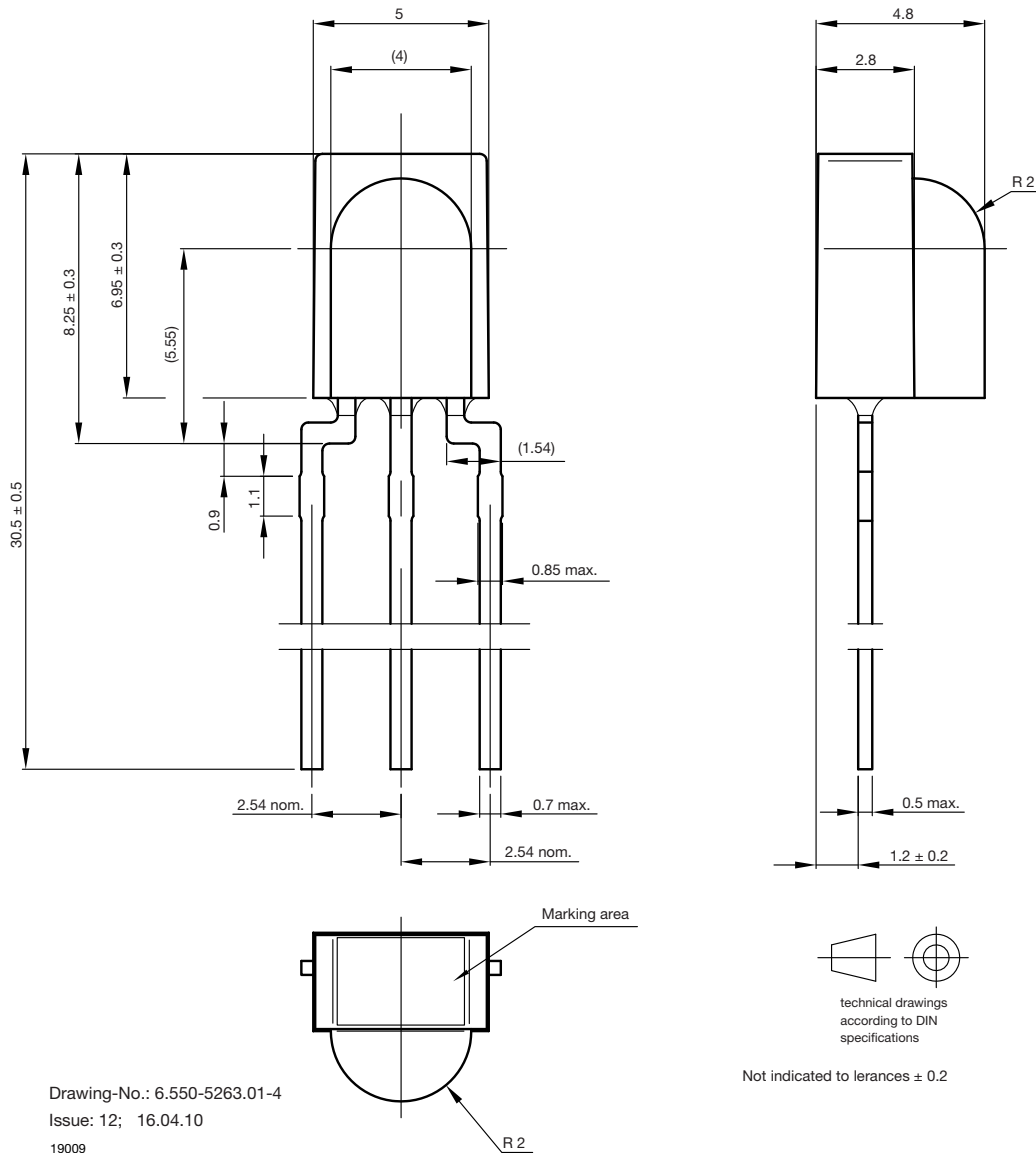
- For data formats with short bursts please see the datasheet of TSOP581.., TSOP591.., TSOP583.., TSOP593..

TSOP582.., TSOP584.., TSOP592.., TSOP594..

Vishay Semiconductors IR Receiver Modules for Remote Control Systems



PACKAGE DIMENSIONS in millimeters





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