

## IR Receiver Modules for Remote Control Systems



19026

### MECHANICAL DATA

#### Pinning:

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

### 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
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



### DESCRIPTION

The TSOP582.., TSOP584.. series 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.. is compatible with all common IR remote control data formats. The TSOP584.. is optimized to suppress almost all spurious pulses from energy saving fluorescent lamps but will also suppress some data signals.

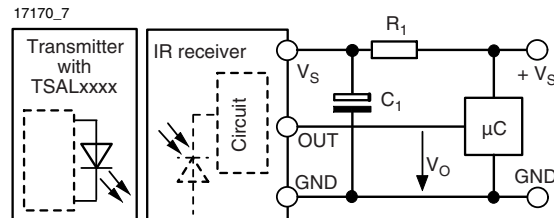
This component has not been qualified according to automotive specifications.

PARTS TABLE		
CARRIER FREQUENCY	STANDARD APPLICATIONS (AGC2/AGC8)	VERY NOISY ENVIROMENTS (AGC4)
30 kHz	TSOP58230	
33 kHz	TSOP58233	
36 kHz	TSOP58236	
36.7 kHz	TSOP58237	
38 kHz	TSOP58238	TSOP58438
40 kHz	TSOP58240	
56 kHz	TSOP58256	

### 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 <sup>(1)</sup>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage (pin 3)		$V_S$	- 0.3 to + 6.0	V
Supply current (pin 3)		$I_S$	5	mA
Output voltage (pin 1)		$V_O$	- 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 (pin 1)		$I_O$	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	$T_{amb} \leq 85\text{ °C}$	$P_{tot}$	10	mW
Soldering temperature	$t \leq 10\text{ s}$ , 1 mm from case	$T_{sd}$	260	°C

**Note**

<sup>(1)</sup> 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 <sup>(1)</sup>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current (pin 3)	$E_v = 0, V_S = 5\text{ V}$	$I_{SD}$	0.65	0.85	1.05	mA
	$E_v = 40\text{ klx}$ , 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, $I_F = 400\text{ mA}$	$d$		40		m
Output voltage low (pin 1)	$I_{OSL} = 0.5\text{ mA}$ , $E_e = 0.7\text{ mW/m}^2$ , test signal see fig. 1	$V_{OSL}$			100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e\text{ min.}$		0.3	0.45	mW/m <sup>2</sup>
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 <sup>2</sup>
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 45$		deg

**Note**

<sup>(1)</sup>  $T_{amb} = 25\text{ °C}$ , unless otherwise specified

**TYPICAL CHARACTERISTICS**

$T_{amb} = 25\text{ °C}$ , unless otherwise specified

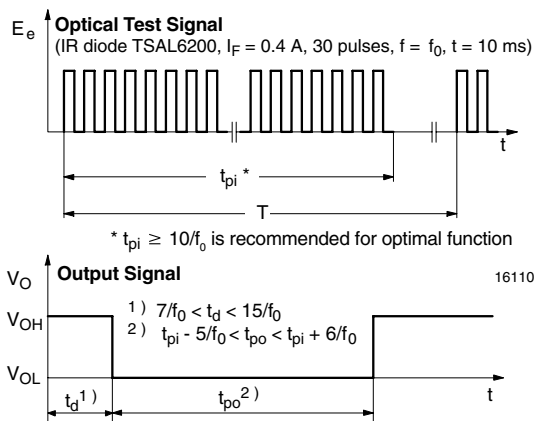


Fig. 1 - Output Active Low



Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



Fig. 3 - Output Function

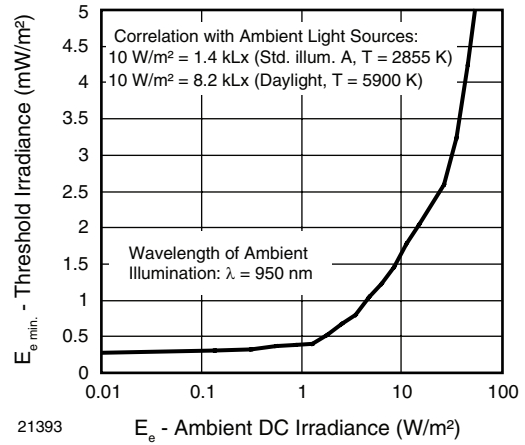


Fig. 6 - Sensitivity in Bright Ambient



Fig. 4 - Output Pulse Diagram



Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

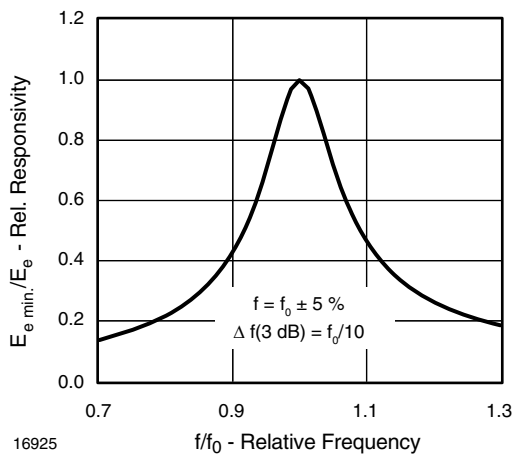


Fig. 5 - Frequency Dependence of Responsivity

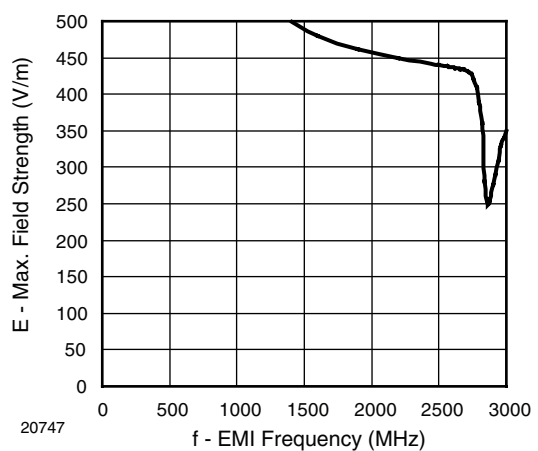
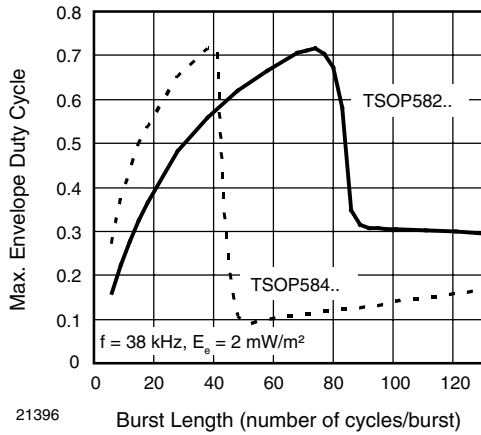


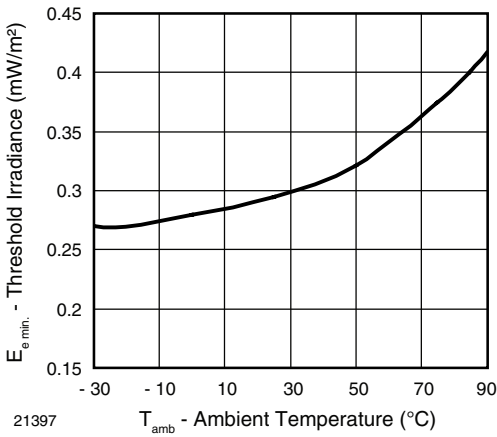
Fig. 8 - Sensitivity vs. Electric Field Disturbances



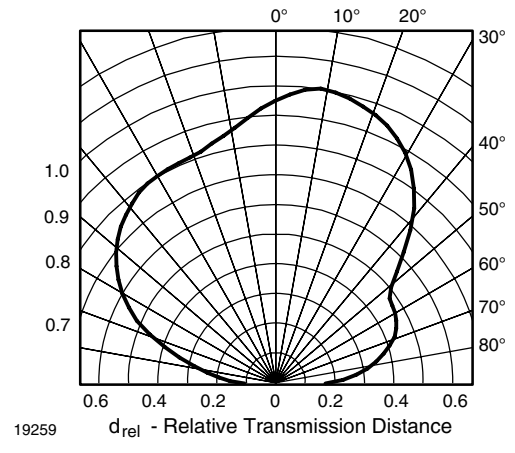
21396  
 Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length



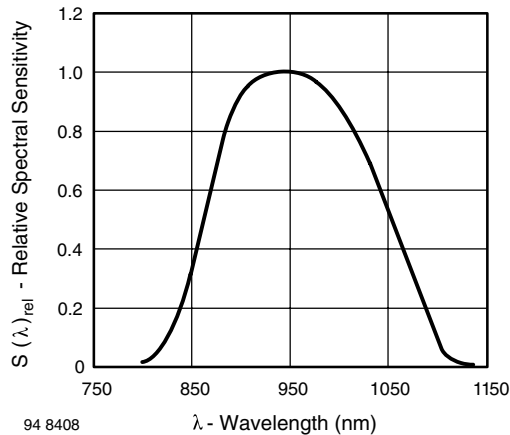
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 Fig. 12 - Horizontal Directivity



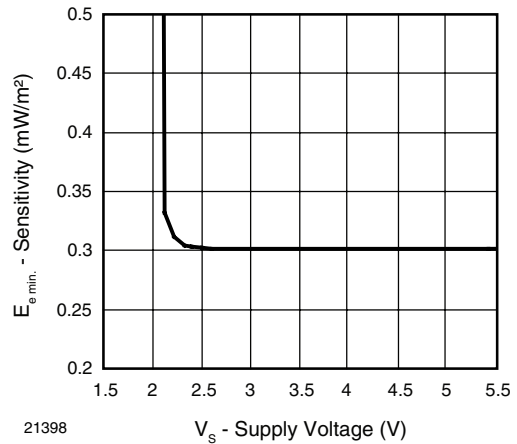
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 Fig. 10 - Sensitivity vs. Ambient Temperature



19259  
 Fig. 13 - Vertical Directivity



94 8408  
 Fig. 11 - Relative Spectral Sensitivity vs. Wavelength



21398  
 Fig. 14 - Sensitivity vs. Supply Voltage

## SUITABLE DATA FORMAT

The TSOP582.., TSOP584.. series 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 TSOP582.., TSOP584.. 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

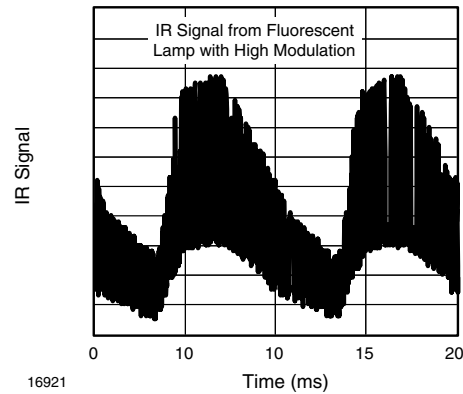


Fig. 16 - IR Signal from Fluorescent Lamp with High Modulation

	TSOP582..	TSOP584..
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
Compatible to NEC code	yes	yes
Compatible to RC5/RC6 code	yes	yes
Compatible to Sony code	yes	no
Compatible to Thomson 56 kHz code	yes	yes
Compatible to Mitsubishi code (38 kHz, preburst 8 ms, 16 bit)	yes	yes
Compatible to 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 data sheet of TSOP581..



**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.550-5263.01-4  
Issue: 10; 07.03.08  
19009



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