

## IR Receiver Modules for Remote Control Systems



21589

### MECHANICAL DATA

#### Pinning:

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

### FEATURES

- Very low supply current
- Photo detector and preamplifier in one package
- Compatible also with short burst dataformats
- Supply voltage: 2.5 V to 5.5 V
- Improved immunity against ambient light
- Capable of side or top view
- Low profile 2.35 mm
- Insensitive to supply voltage ripple and noise
- Narrow optical filter to reduce interference from plasma TV emissions
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
 COMPLIANT  
**GREEN**  
 [5-2008]\*\*

### DESCRIPTION

The TSOP753..W series is a miniaturized receiver module for infrared remote control systems. Two PIN diodes and a preamplifier are assembled on a leadframe, the epoxy package is designed as an IR filter.

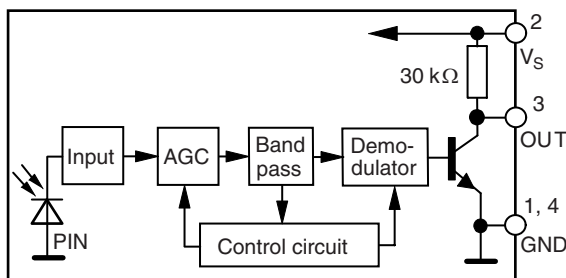
The demodulated output signal can be directly decoded by a microprocessor. The TSOP753..W is compatible with all common IR remote control data formats. It is optimized to suppress almost all spurious pulses from energy saving fluorescent lamps including dimmed LCD backlightings.

This component has not been qualified according to automotive specifications.

### PARTS TABLE

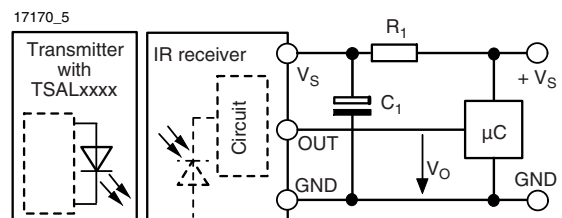
CARRIER FREQUENCY	NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)
30 kHz	TSOP75330W
33 kHz	TSOP75333W
36 kHz	TSOP75336W
38 kHz	TSOP75338W
40 kHz	TSOP75340W
56 kHz	TSOP75356W

### BLOCK DIAGRAM



20445-1

### APPLICATION CIRCUIT



$R_1$  and  $C_1$  are recommended for protection against EOS. Components should be in the range of  $33 \Omega < R_1 < 1 \text{ k}\Omega$ ,  $C_1 > 0.1 \mu\text{F}$ .

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		$V_S$	- 0.3 to + 6.0	V
Supply current		$I_S$	3	mA
Output voltage		$V_O$	- 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

**Note**

(1) 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 (1)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		$V_S$	2.5		5.5	V
Supply current	$E_v = 0, V_S = 3.3$ V	$I_{SD}$	0.27	0.35	0.45	mA
	$E_v = 40$ klx, sunlight	$I_{SH}$		0.45		mA
Transmission distance	$E_v = 0$ , test signal see fig. 1, IR diode TSAL6200, $I_F = 250$ mA	$d$		30		m
Output voltage low	$I_{OSL} = 0.5$ mA, $E_e = 0.7$ mW/m <sup>2</sup> , 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.		0.3	0.7	mW/m <sup>2</sup>
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 <sup>2</sup>
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 75$		deg

**Note**

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

### TYPICAL CHARACTERISTICS

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



Fig. 1 - Output Active Low

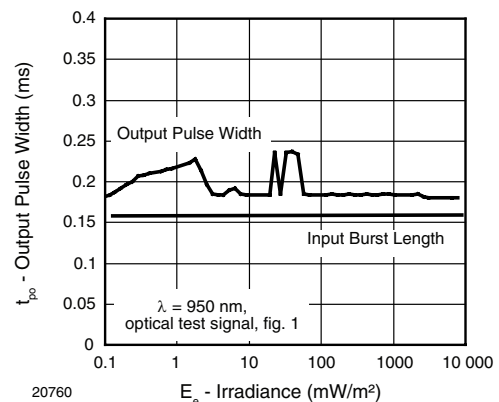


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



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

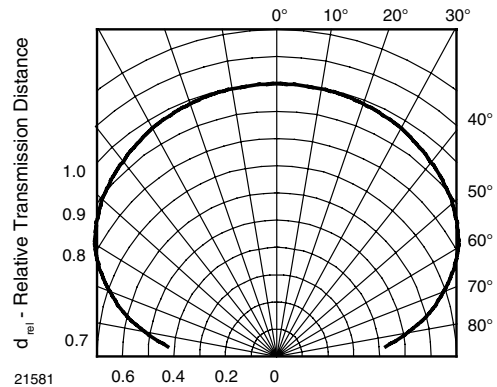


Fig. 12 - Horizontal Directivity

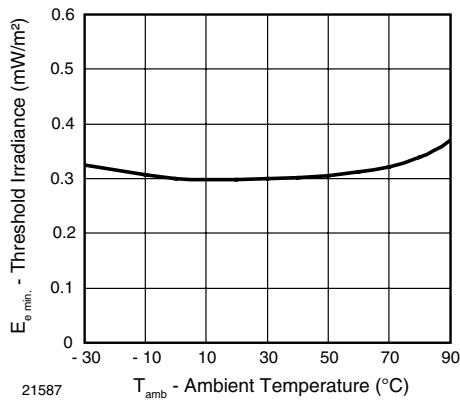


Fig. 10 - Sensitivity vs. Ambient Temperature

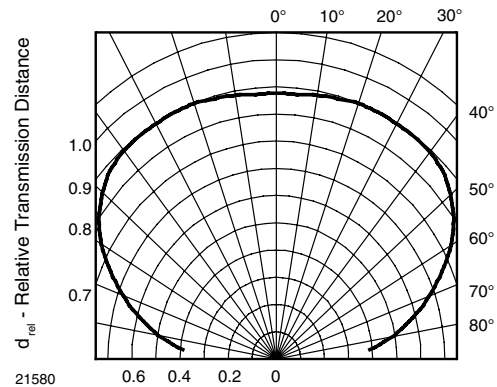


Fig. 13 - Vertical Directivity

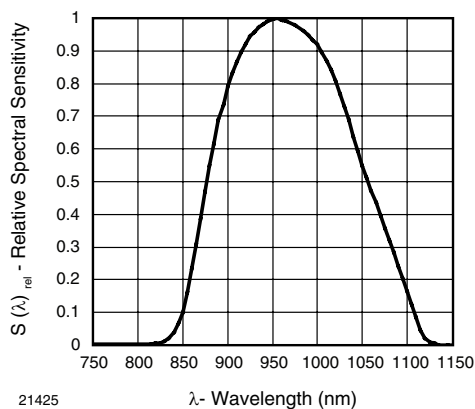


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

**SUITABLE DATA FORMAT**

The TSOP753..W series is 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 TSOP753..W 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 14 or figure 15)



Fig. 14 - IR Signal from Fluorescent Lamp with Low Modulation



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

	<b>TSOP753..W</b>
Minimum burst length	6 cycles/burst
After each burst of length a minimum gap time is required of	6 to 35 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	35 cycles > 4 x burst length
Maximum number of continuous short bursts/second	2000
Recommended for NEC code	yes
Recommended for RC5/RC6 code	yes
Recommended for Sony code	no
Recommended for XMP format	yes
Recommended for RCMM code	yes
Recommended for RECS-80 code	yes
Suppression of interference from fluorescent lamps	Most common disturbance signals are suppressed

**Note**

For data formats with long bursts please see the datasheet for TSOP752..W

## PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ± 0.25



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 21582









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