

## IR Receiver Modules for Remote Control Systems



16672

### MECHANICAL DATA

#### Pinning:

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

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



### DESCRIPTION

The TSOP341.., TSOP343.. 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 TSOP341.. is compatible with all common IR remote control data formats. The TSOP343.. is optimized to better suppress spurious pulses from energy saving fluorescent lamps but will also suppress some data signals.

This component has not been qualified according to automotive specifications.

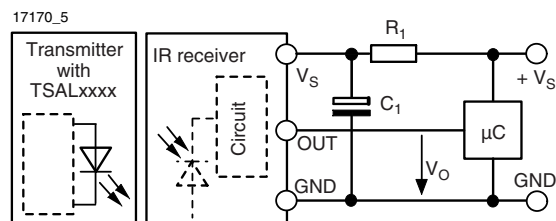
### PARTS TABLE

CARRIER FREQUENCY	SHORT BURSTS AND HIGH DATA RATES (AGC1)	NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)
30 kHz	TSOP34130	TSOP34330
33 kHz	TSOP34133	TSOP34333
36 kHz	TSOP34136	TSOP34336
38 kHz	TSOP34138	TSOP34338
40 kHz	TSOP34140	TSOP34340
56 kHz	TSOP34156	TSOP34356

### BLOCK DIAGRAM



### APPLICATION CIRCUIT



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

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

**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 current (pin 3)	$E_v = 0, V_S = 3.3$ V	$I_{SD}$	0.27	0.35	0.45	mA
	$E_v = 40$ klx, sunlight	$I_{SH}$		0.45		mA
Supply voltage		$V_S$	2.5		5.5	V
Transmission distance	$E_v = 0$ , test signal see fig. 1, IR diode TSAL6200, $I_F = 250$ mA	d		45		m
Output voltage low (pin 1)	$I_{OSL} = 0.5$ mA, $E_e = 0.7$ mW/m <sup>2</sup> , test signal see fig. 1	$V_{OSL}$			100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e$ min.		0.1	0.25	mW/m <sup>2</sup>
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e$ max.	30			W/m <sup>2</sup>
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 45$		deg

**Note**

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

**TYPICAL CHARACTERISTICS**

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

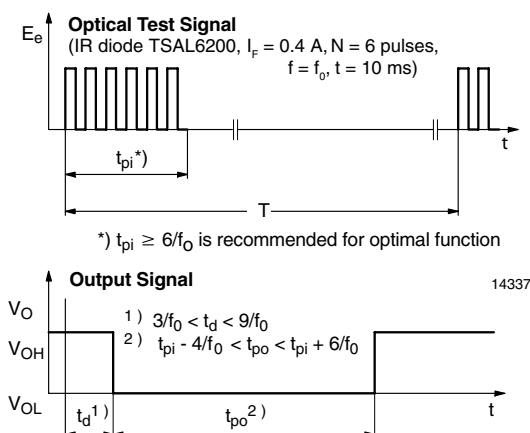


Fig. 1 - Output Active Low

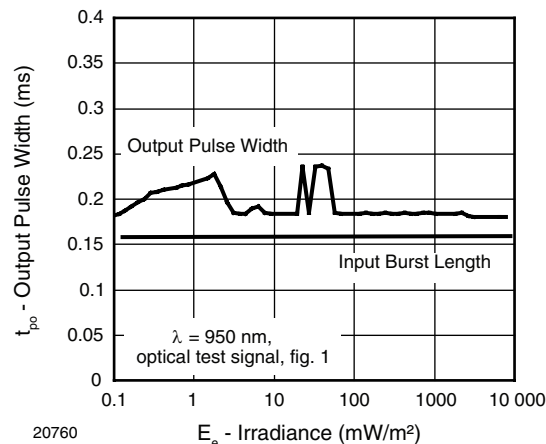


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



Fig. 3 - Output Function

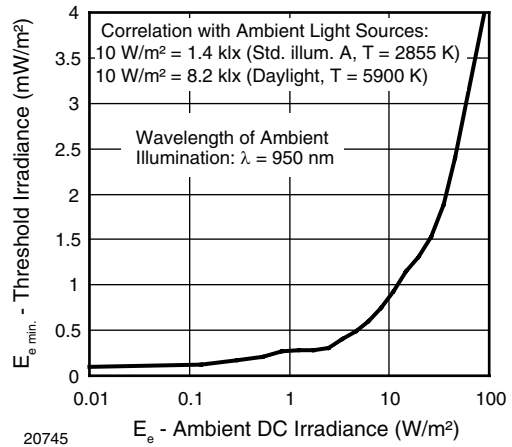


Fig. 6 - Sensitivity in Bright Ambient

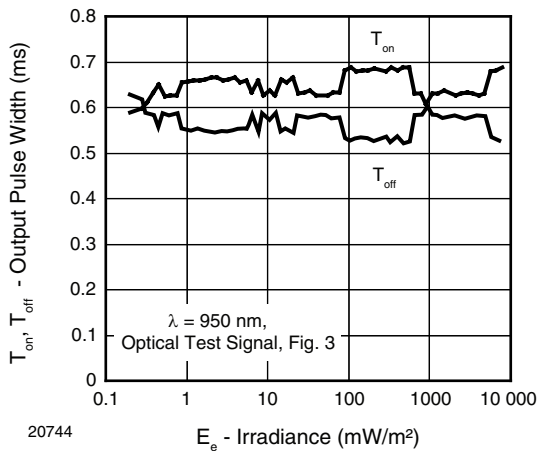


Fig. 4 - Output Pulse Diagram

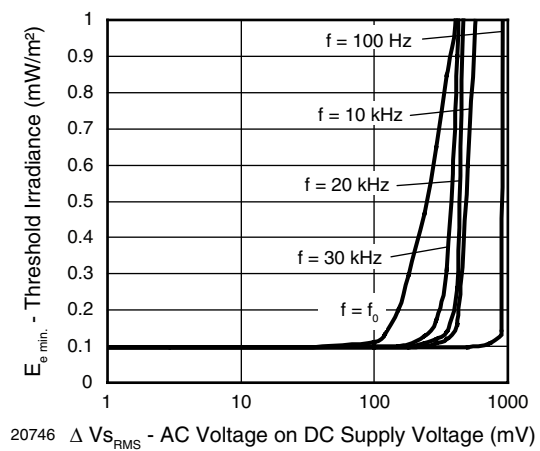


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

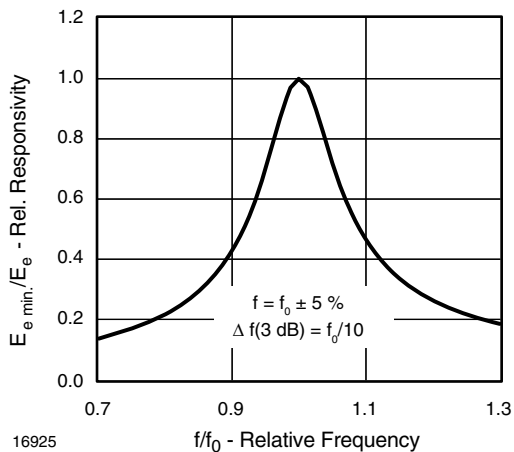


Fig. 5 - Frequency Dependence of Responsivity



Fig. 8 - Sensitivity vs. Electric Field Disturbances



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



Fig. 12 - Horizontal Directivity



Fig. 10 - Sensitivity vs. Ambient Temperature



Fig. 13 - Sensitivity vs. Supply Voltage



Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

### SUITABLE DATA FORMAT

The TSOP341.., TSOP343.. 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 TSOP341.., TSOP343.. 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
- 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

	TSOP341..	TSOP343..
Minimum burst length	6 cycles/burst	6 cycles/burst
After each burst of length a minimum gap time is required of	6 to 70 cycles ≥ 10 cycles	6 to 35 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
Maximum number of continuous short bursts/second	2000	2000
Compatible to NEC code	yes	yes
Compatible to RC5/RC6 code	yes	yes
Compatible to Sony code	yes	no
Compatible to RCMM code	yes	yes
Compatible to r-step code	yes	yes
Compatible to XMP code	yes	yes
Suppression of interference from fluorescent lamps	Common disturbance signals are suppressed (example: signal pattern of fig. 14)	Even critical disturbance signals are suppressed (examples: signal pattern of fig. 14 and fig. 15)

#### Note

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

# TSOP341.., TSOP343..

Vishay Semiconductors

IR Receiver Modules for  
Remote Control Systems



## PACKAGE DIMENSIONS in millimeters



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16003

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