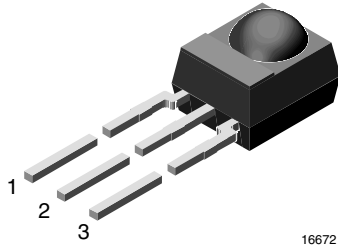


## IR Receiver Modules for Remote Control Systems



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 TSOP348..., TSOP344.. 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.

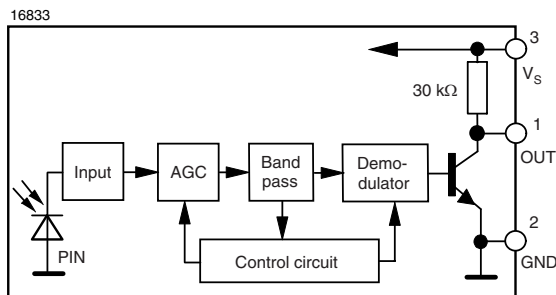
The demodulated output signal can be directly decoded by a microprocessor. The TSOP348.. is compatible with all common IR remote control data formats. The TSOP344.. is optimized to suppress almost all spurious pulses from energy saving fluorescent lamps but will also suppress some data signals.

This component has not been qualified according to automotive specifications.

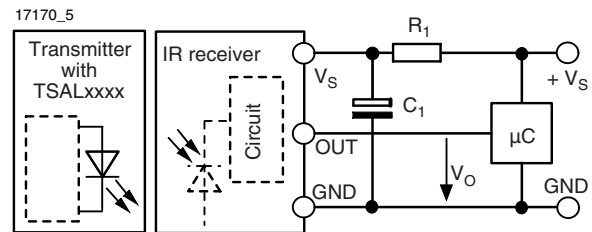
### PARTS TABLE

CARRIER FREQUENCY	STANDARD APPLICATIONS (AGC2/AGC8)	VERY NOISY ENVIRONMENTS (AGC4)
30 kHz	TSOP34830	TSOP34430
33 kHz	TSOP34833	TSOP34433
36 kHz	TSOP34836	TSOP34436
38 kHz	TSOP34838	TSOP34438
40 kHz	TSOP34840	TSOP34440
56 kHz	TSOP34856	TSOP34456

### BLOCK DIAGRAM



### APPLICATION CIRCUIT



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

# New TSOP348.., TSOP344..

## IR Receiver Modules for Remote Control Systems

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	$T_{amb} \leq 85 \text{ °C}$	$P_{tot}$	10	mW
Soldering temperature	$t \leq 10 \text{ s}$ , 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)	$E_v = 0$ , $V_S = 3.3 \text{ V}$	$I_{SD}$	0.27	0.35	0.45	mA
	$E_v = 40 \text{ klx}$ , 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, $I_F = 250 \text{ mA}$	$d$		45		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	$E_e \text{ min.}$		0.1	0.25	$\text{mW/m}^2$
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1	$E_e \text{ max.}$	30			$\text{W/m}^2$
Directivity	Angle of half transmission distance	$\phi_{1/2}$		$\pm 45$		deg

### Note

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

## TYPICAL CHARACTERISTICS

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

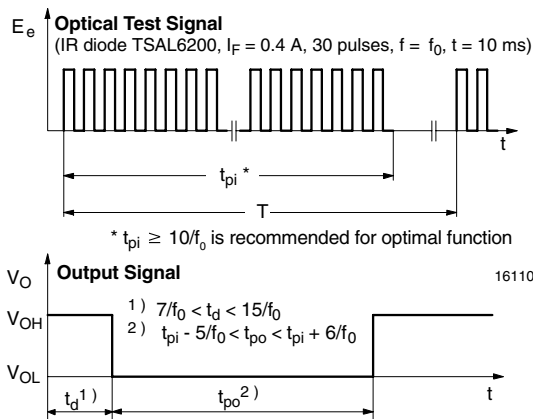


Fig. 1 - Output Active Low

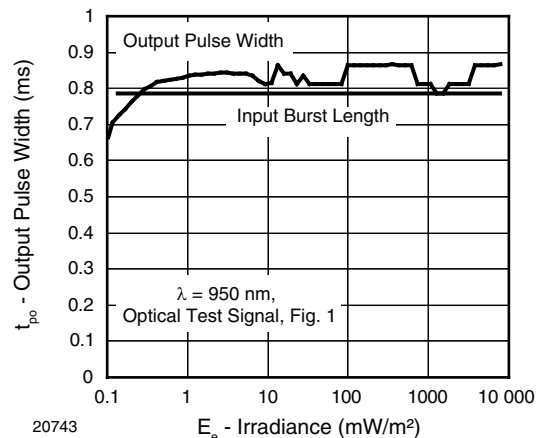


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

IR Receiver Modules for Remote Control Systems

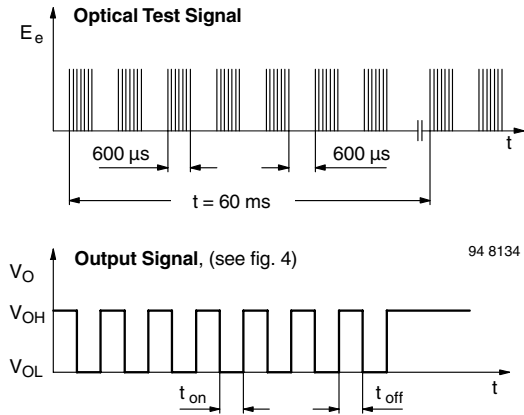


Fig. 3 - Output Function

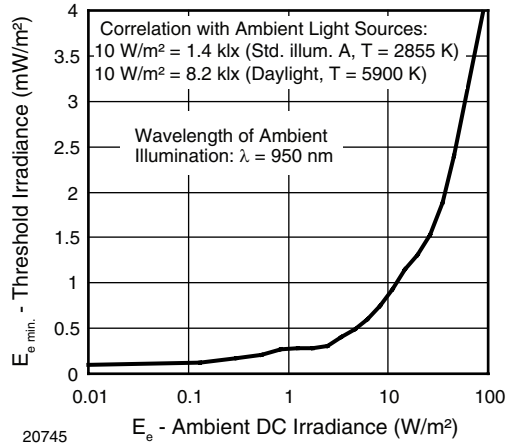


Fig. 6 - Sensitivity in Bright Ambient

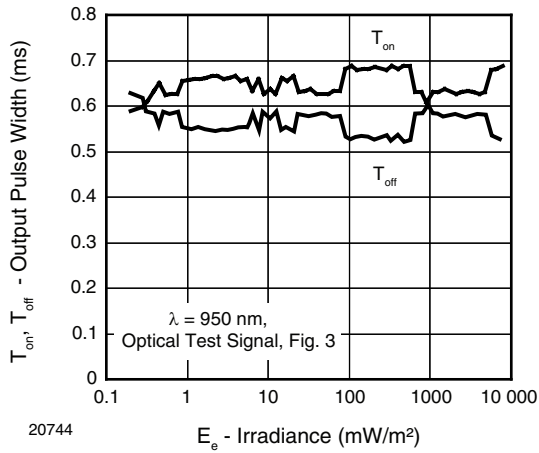


Fig. 4 - Output Pulse Diagram

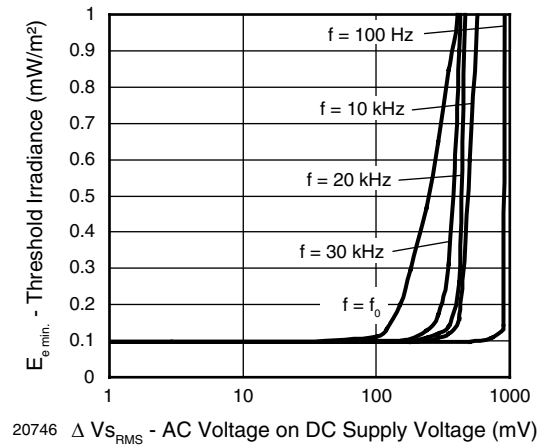


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

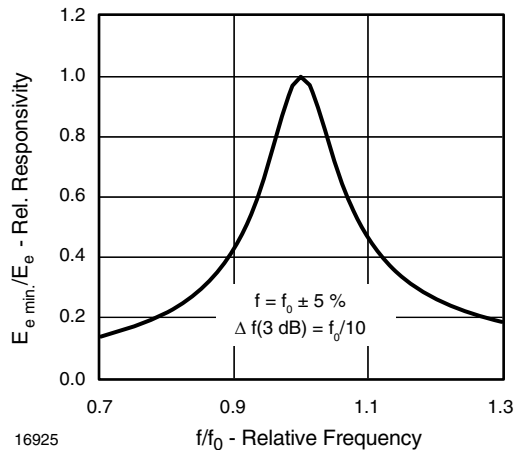


Fig. 5 - Frequency Dependence of Responsivity

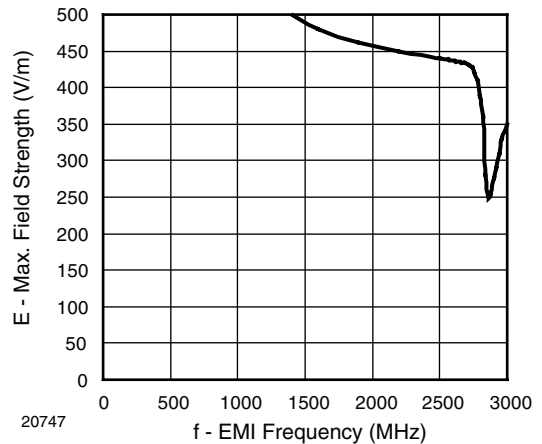


Fig. 8 - Sensitivity vs. Electric Field Disturbances

# New TSOP348., TSOP344..

## IR Receiver Modules for Remote Control Systems

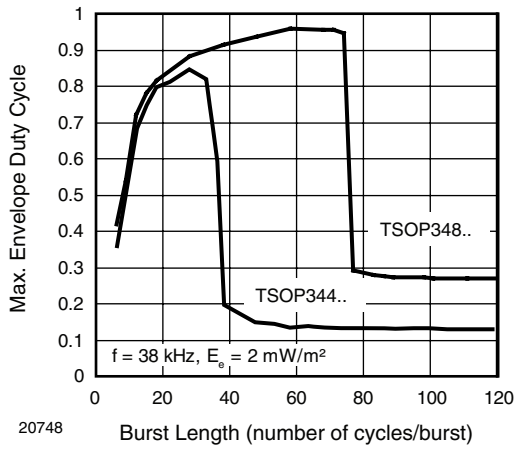


Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

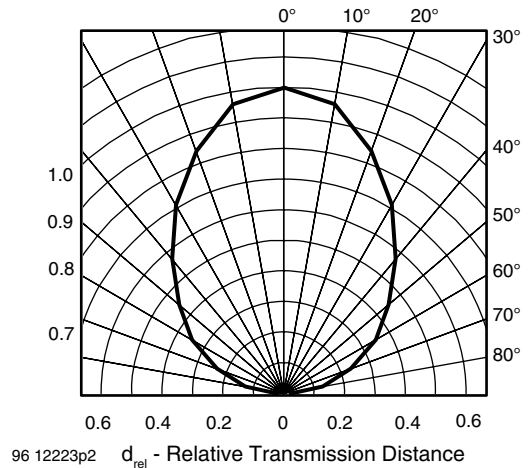


Fig. 12 - Horizontal Directivity

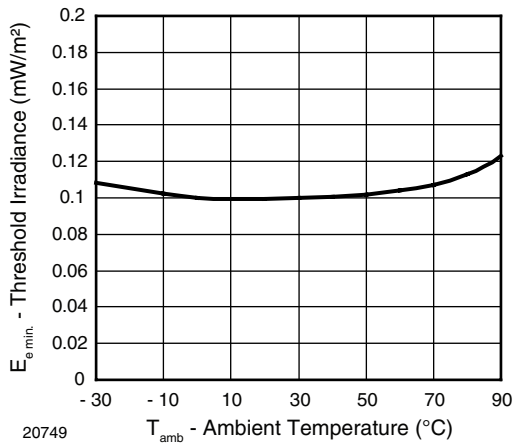


Fig. 10 - Sensitivity vs. Ambient Temperature

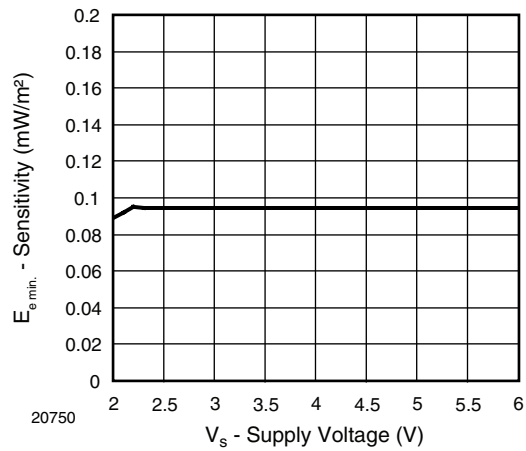


Fig. 13 - Sensitivity vs. Supply Voltage

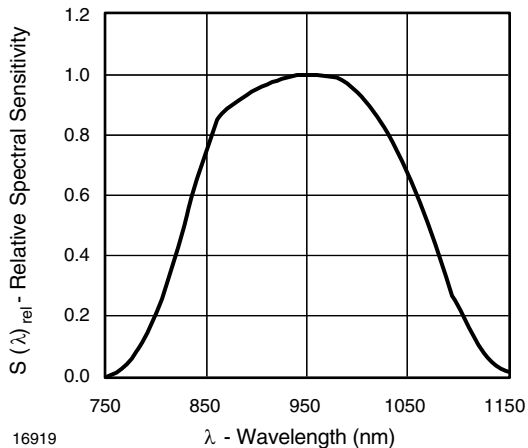


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

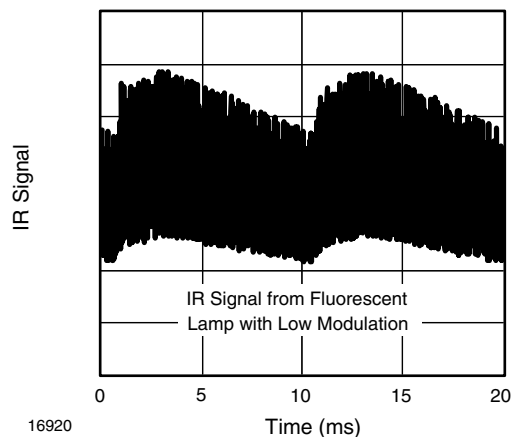
## IR Receiver Modules for Remote Control Systems

### SUITABLE DATA FORMAT

The TSOP348.., TSOP344.. 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.

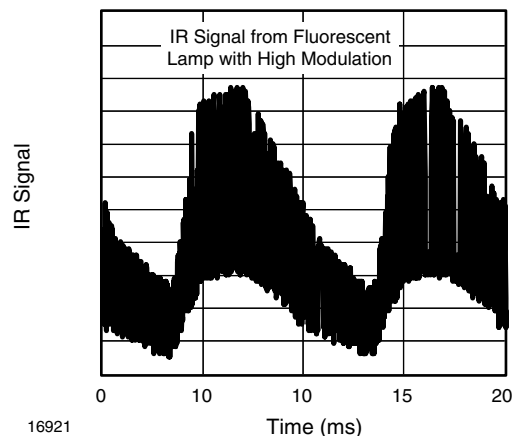
When a data signal is applied to the TSOP348.., TSOP344.. in the presence of a disturbance signal, the sensitivity of the receiver is reduced to insure that no spurious pulses are present at the output. Some examples of disturbance signals which are suppressed are:

- 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)



16920

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



16921

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

	TSOP348..	TSOP344..
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 ≥ 10 cycles	10 to 35 cycles ≥ 10 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	1800	1500
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	no
Compatible to Sharp code	yes	yes
Suppression of interference from fluorescent lamps	Most common disturbance signals are suppressed	Even extreme disturbance signals are suppressed

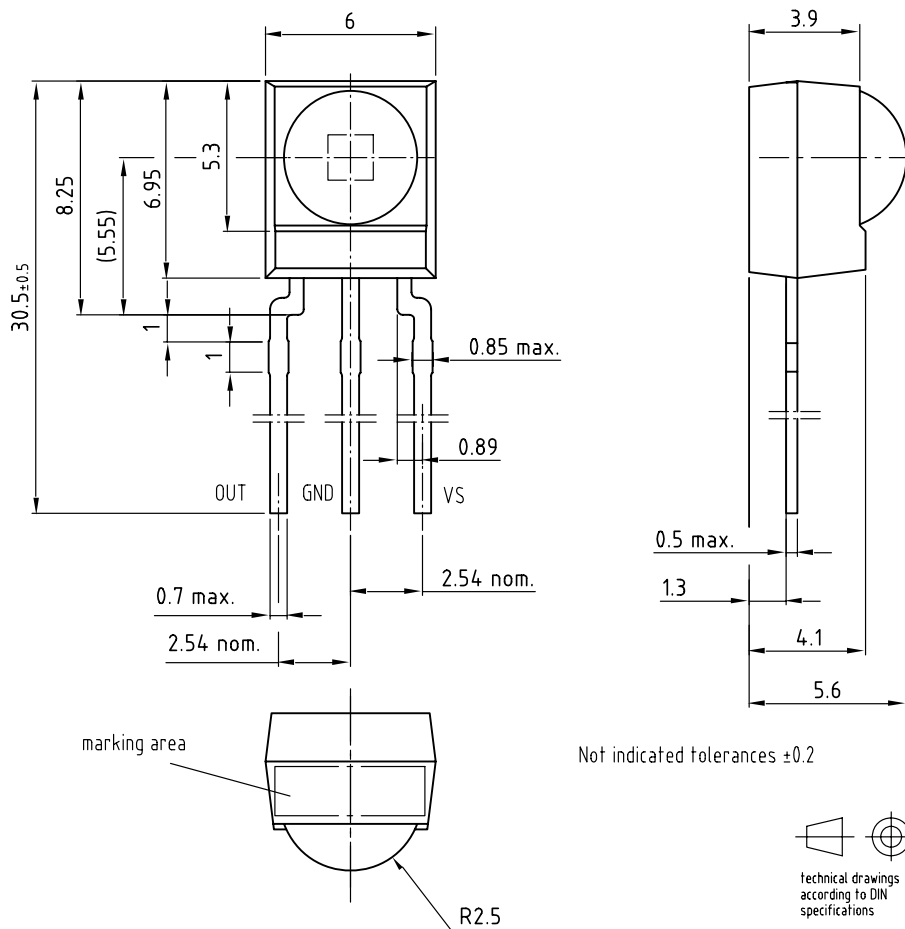
#### Note

For data formats with short bursts please see the datasheet for TSOP341.., TSOP343..

# New TSOP348.., TSOP344..

IR Receiver Modules for  
Remote Control Systems

## PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.11-4  
Issue: 10; 08.06.04

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