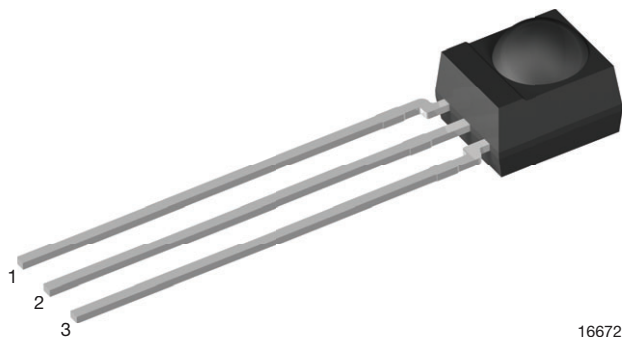


## IR Receiver Modules for Remote Control Systems



### LINKS TO ADDITIONAL RESOURCES



### 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 TSOP32G36 and the TSOP34G36 are optimized for the usage with RCMM code with low pulse jitter.

It can suppress almost all spurious pulses from energy saving fluorescent lamps, LCD backlighting, and plasma TVs.

This component has not been qualified according to automotive specifications.

### FEATURES

- Low output pulse jitter, optimized for RCMM code
- 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### MECHANICAL DATA

#### Pinning for TSOP32G36:

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

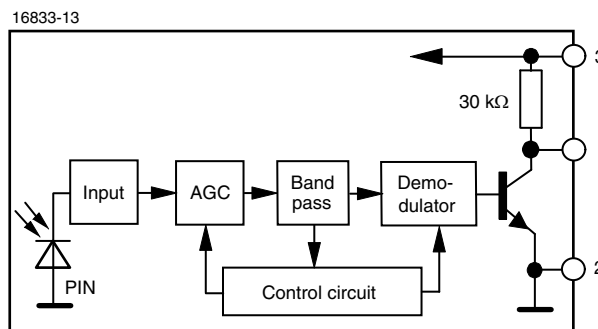
#### Pinning for TSOP34G36:

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

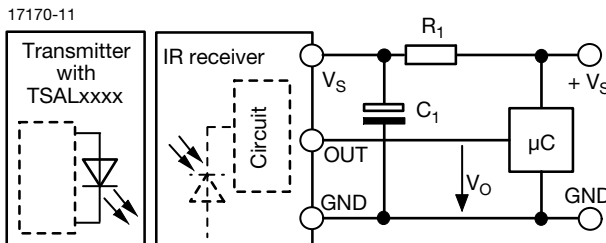
### ORDERING CODE

TSOP3.... - 2160 pieces in tubes

### BLOCK DIAGRAM



### APPLICATION CIRCUIT



$R_1$  and  $C_1$  recommended to reduce supply ripple for  $V_S < 2.8$  V

**PARTS TABLE**

AGC		AGC3 FOR NOISY ENVIRONMENTS	
Carrier frequency	36 kHz	TSOP32G36 <sup>(1)</sup>	TSOP34G36 <sup>(1)</sup>
Package	Mold		
Pinning	1 = OUT, 2 = V <sub>S</sub> , 3 = GND		1 = OUT, 2 = GND, 3 = V <sub>S</sub>
Dimensions (mm)	6.0 W x 6.95 H x 5.6 D		
Mounting	Leaded		
Application	Remote control		
Best choice for	<sup>(1)</sup> RCMM		

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V <sub>S</sub>	-0.3 to +6	V
Supply current		I <sub>S</sub>	3	mA
Output voltage		V <sub>O</sub>	-0.3 to (V <sub>S</sub> + 0.3)	V
Output current		I <sub>O</sub>	5	mA
Junction temperature		T <sub>j</sub>	100	°C
Storage temperature range		T <sub>stg</sub>	-25 to +85	°C
Operating temperature range		T <sub>amb</sub>	-25 to +85	°C
Power consumption	T <sub>amb</sub> ≤ 85 °C	P <sub>tot</sub>	10	mW
Soldering temperature	t ≤ 10 s, 1 mm from case	T <sub>sd</sub>	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<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current	E <sub>v</sub> = 0, V <sub>S</sub> = 3.3 V	I <sub>SD</sub>	0.27	0.35	0.45	mA
	E <sub>v</sub> = 40 klx, sunlight	I <sub>SH</sub>	-	0.45	-	mA
Supply voltage		V <sub>S</sub>	2.5	-	5.5	V
Transmission distance	E <sub>v</sub> = 0, test signal see Fig. 1, IR diode TSAL6200, I <sub>F</sub> = 50 mA	d	-	30	-	m
Output voltage low	I <sub>OSL</sub> = 0.5 mA, E <sub>e</sub> = 0.7 mW/m <sup>2</sup> , test signal see Fig. 1	V <sub>OSL</sub>	-	-	100	mV
Minimum irradiance	Pulse width tolerance: t <sub>pi</sub> - 1/f <sub>0</sub> < t <sub>po</sub> < t <sub>pi</sub> + 4/f <sub>0</sub> , test signal see Fig. 1	E <sub>e min.</sub>	-	0.15	0.25	mW/m <sup>2</sup>
Maximum irradiance	t <sub>pi</sub> - 1/f <sub>0</sub> < t <sub>po</sub> < t <sub>pi</sub> + 4/f <sub>0</sub> , test signal see Fig. 1	E <sub>e max.</sub>	30	-	-	W/m <sup>2</sup>
Directivity	Angle of half transmission distance	φ <sub>1/2</sub>	-	± 45	-	°

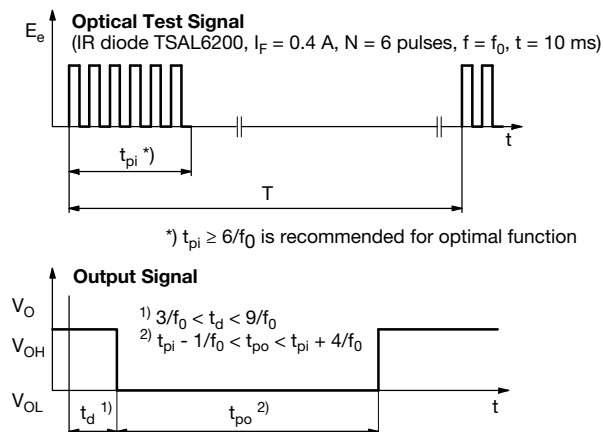
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Output Active Low

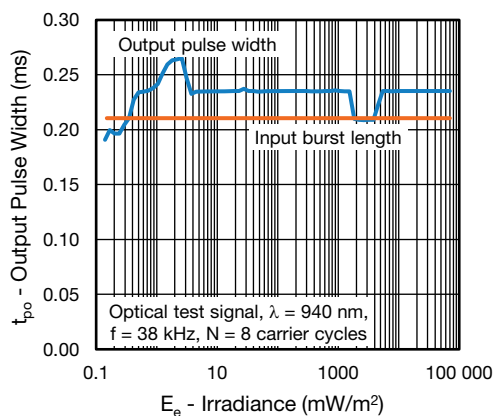


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

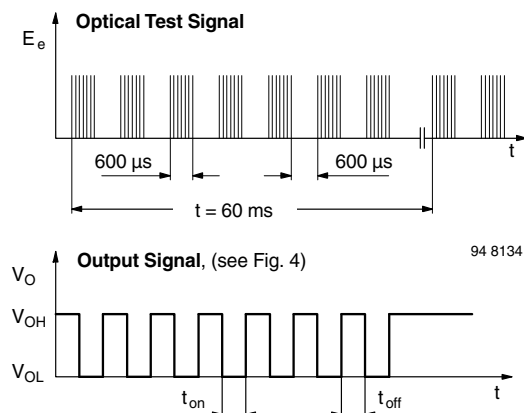


Fig. 3 - Output Function

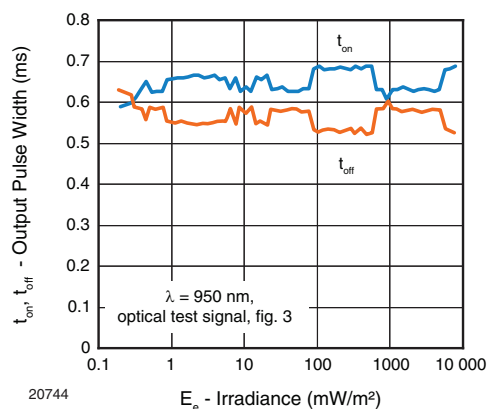


Fig. 4 - Output Pulse Diagram

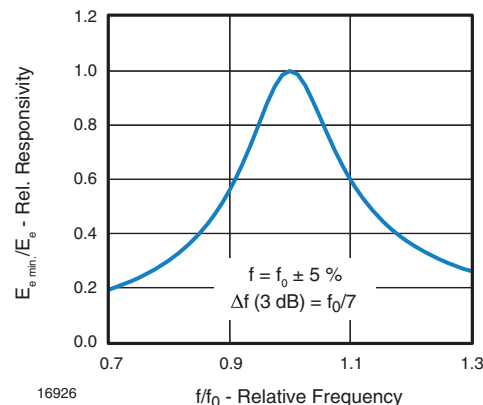


Fig. 5 - Frequency Dependence of Responsivity

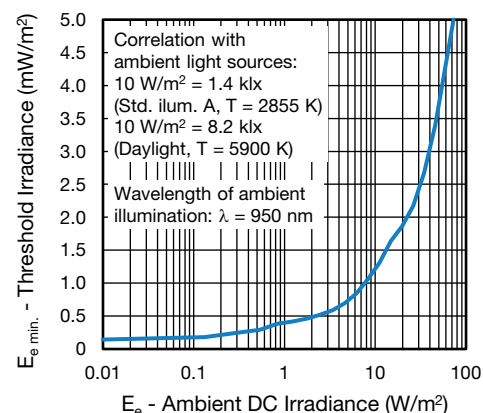


Fig. 6 - Sensitivity in Bright Ambient

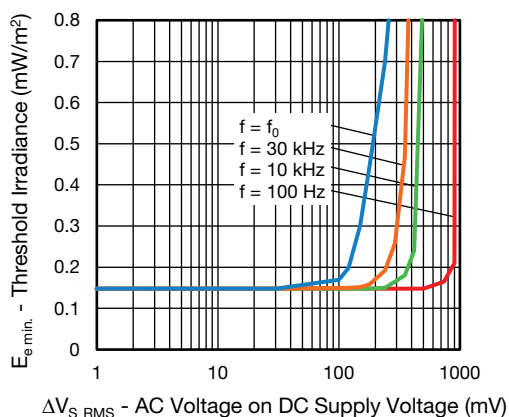


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

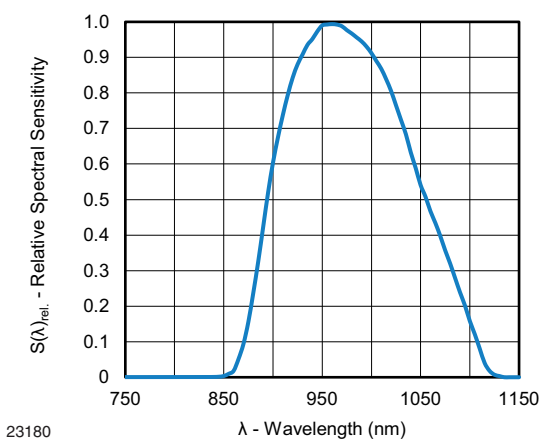


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

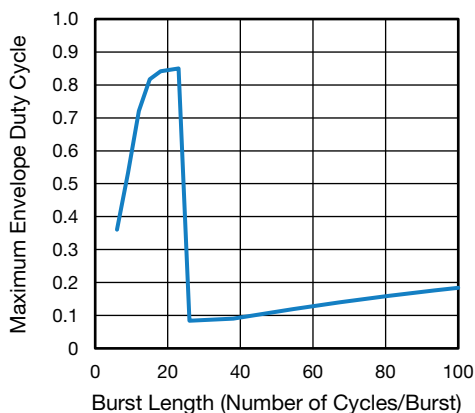


Fig. 8 - Maximum Envelope Duty Cycle vs. Burst Length

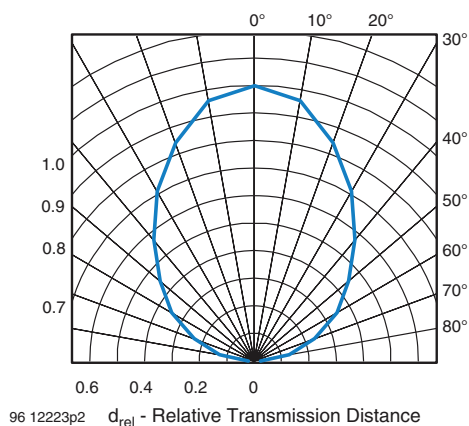


Fig. 11 - Horizontal Directivity

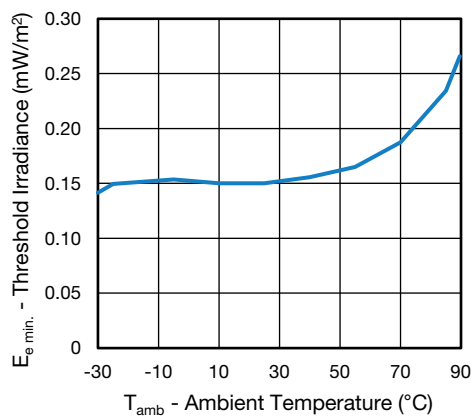


Fig. 9 - Sensitivity vs. Ambient Temperature

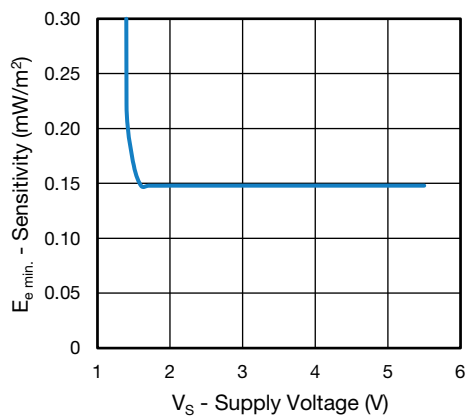


Fig. 12 - Sensitivity vs. Supply Voltage



## SUITABLE DATA FORMAT

This series is designed to suppress spurious output pulses due to noise or disturbance signals. The devices can distinguish data signals from noise due to differences in frequency, burst length, and envelope duty cycle. The data signal should be close to the device's band-pass center frequency (36 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the product in the presence of a disturbance, the sensitivity of the receiver is automatically reduced by the AGC to insure that no spurious pulses are present at the receiver's output. Some examples which are suppressed are:

- DC light (e.g. from tungsten bulbs sunlight)
- Continuous signals at any frequency
- Strongly or weakly modulated patterns from fluorescent lamps with electronic ballasts (see Fig. 13 or Fig. 14).

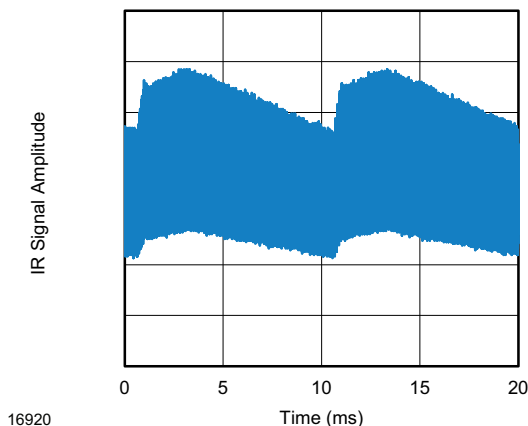


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

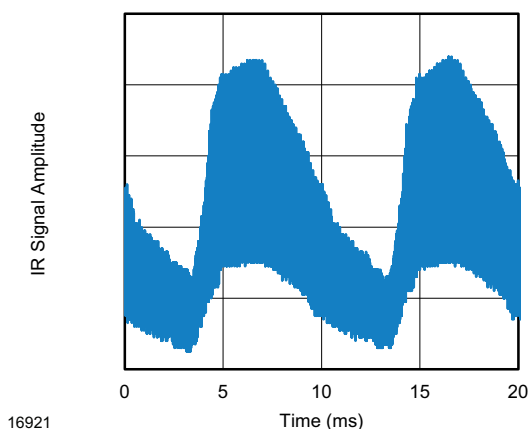
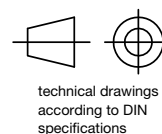
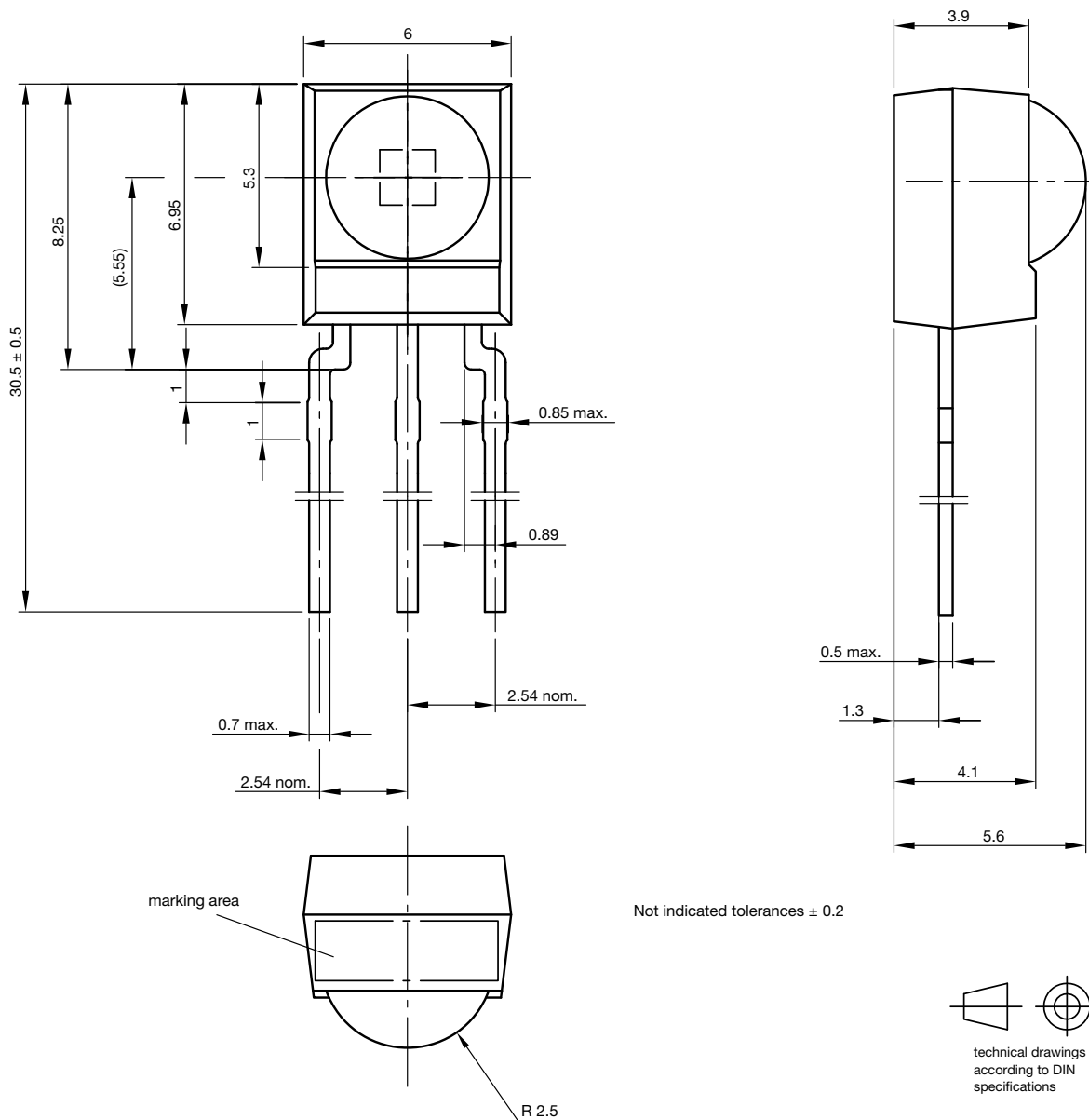


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation



## PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.01-4

Issue: 9; 03.11.10

13655



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