

## IR Receiver Modules for Data Transmission



### DESCRIPTION

This IR receiver series is optimized for short burst remote control systems in different environments. The customer can choose between different IC settings (AGC variants), to find the optimum solution for his application. The higher the AGC, the better noise is suppressed, but the lower the code compatibility.

The devices contain a PIN diode and a preamplifier assembled on a lead frame. The epoxy package contains an IR filter. The demodulated output signal can be directly connected to a microprocessor for decoding. These components have not been qualified to automotive specifications.

### FEATURES

- Very low supply current
- Continuous data rates up to 7777 bps
- Photo detector and preamplifier in one package
- Internal filter tuned to 38.4 kHz for 4800 bps or 57.6 kHz for 9600 bps
- Shielding against EMI
- Supply voltage: 2.0 V to 5.5 V
- 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)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

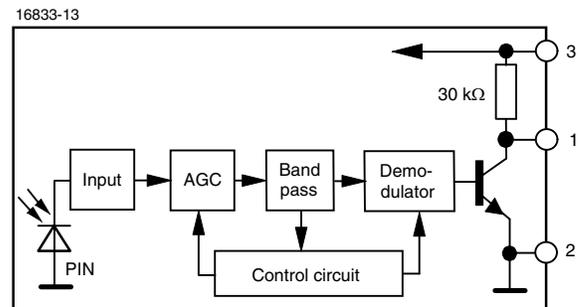
### LINKS TO ADDITIONAL RESOURCES


[Product Page](#)
[Marking](#)
[Packages](#)
[Holders](#)
[Bends and Cuts](#)

### DESIGN SUPPORT TOOLS

- [3D models](#)
- [Window size calculator](#)

### BLOCK DIAGRAM

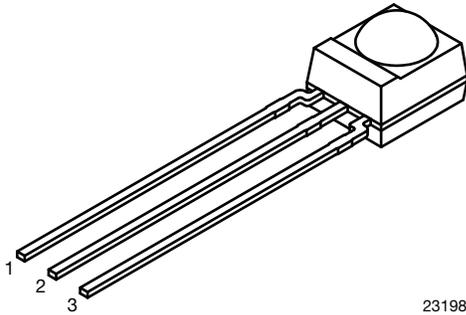




### MECHANICAL DATA

Pinning for TSDP341.., TSDP343..:

1 = OUT, 2 = GND, 3 = V<sub>S</sub>

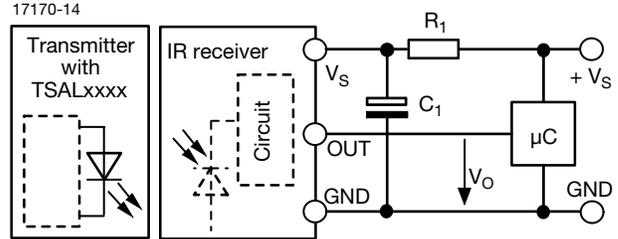


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### ORDERING CODE

TSDP34... - 2160 pieces in tubes

### APPLICATION CIRCUIT



R<sub>1</sub> and C<sub>1</sub> recommended in case there are strong ripple or spikes on the supply line.

PARTS TABLE				
AGC		LOW NOISE ENVIRONMENTS (AGC1)	NOISY ENVIRONMENTS (AGC3)	
Carrier frequency	38.4 kHz	TSDP34138	TSDP34338	
	57.6 kHz	TSDP34156	TSDP34356	
Package		Mold		
Pinning		1 = OUT, 2 = GND, 3 = V <sub>S</sub>	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		Data transmission		
Special options		<ul style="list-style-type: none"> <li>Narrow optical filter: <a href="http://www.vishay.com/doc?81590">www.vishay.com/doc?81590</a></li> <li>Wide optical filter: <a href="http://www.vishay.com/doc?82726">www.vishay.com/doc?82726</a></li> </ul>		

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.

<b>ELECTRICAL AND OPTICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current	$E_v = 0, V_S = 3.3\text{ V}$	$I_{SD}$	0.25	0.35	0.45	mA
	$E_v = 40\text{ klx, sunlight}$	$I_{SH}$	-	0.45	-	mA
Supply voltage		$V_S$	2.0	-	5.5	V
Transmission distance	$E_v = 0$ , test signal see Fig. 1, IR diode TSAL6200, $I_F = 50\text{ mA}$	$d$	-	30	-	m
Output voltage low	$I_{OSL} = 0.5\text{ mA}$ , $E_e = 0.7\text{ mW/m}^2$ , test signal see Fig. 1	$V_{OSL}$	-	-	100	mV
Minimum irradiance	Test signal: RC5 code	$E_e\text{ min.}$	-	0.08	0.15	$\text{mW/m}^2$
	Test signal: XMP code	$E_e\text{ min.}$	-	0.12	0.25	$\text{mW/m}^2$
Maximum irradiance	$t_{pi} - 1/f_0 < t_{po} < t_{pi} + 3/f_0$ , test signal see Fig. 1	$E_e\text{ max.}$	30	-	-	$\text{W/m}^2$
Maximum pulse width	$E_e\text{ min.} > 10\text{ mW/m}^2$ , $t_{pi} = 8/f_0$	$t_{po}\text{ max.}$	-	-	$11/f_0$	s
Directivity	Angle of half transmission distance	$\phi_{1/2}$	-	$\pm 45$	-	deg

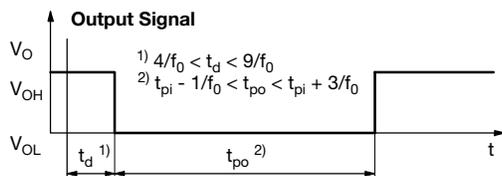
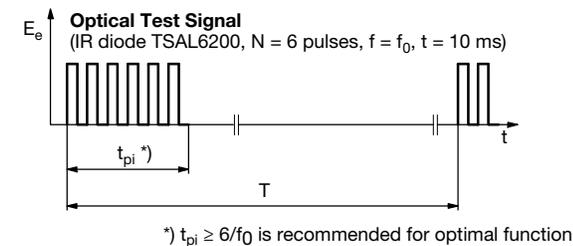
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Output Active Low

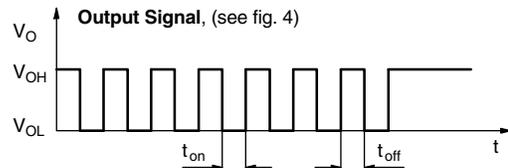
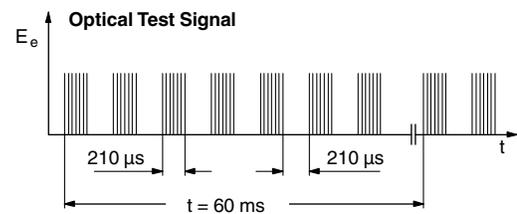


Fig. 3 - Output Function

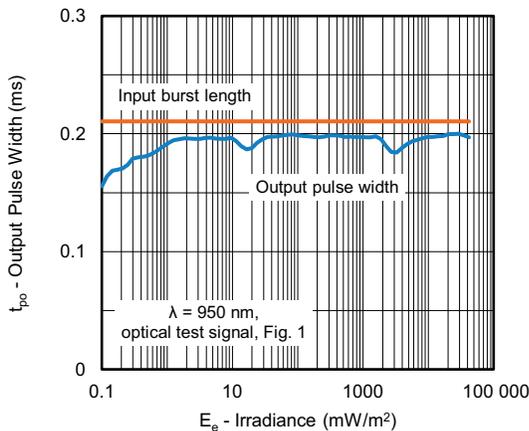


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

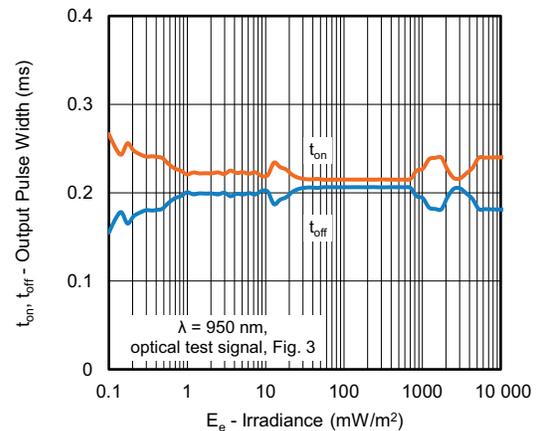


Fig. 4 - Output Pulse Diagram

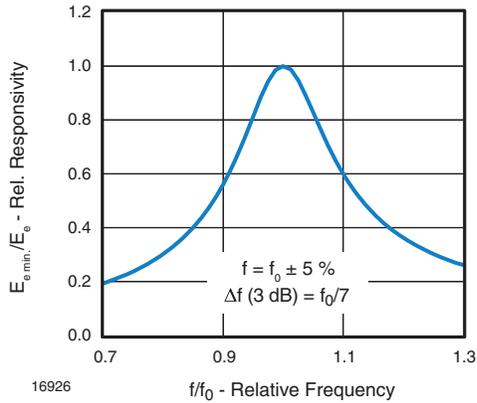


Fig. 5 - Frequency Dependence of Responsivity

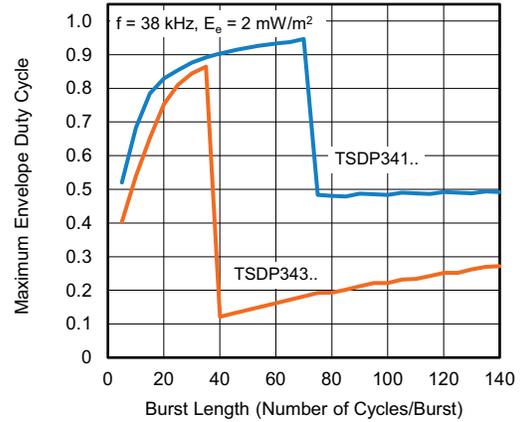


Fig. 8 - Maximum Envelope Duty Cycle vs. Burst Length

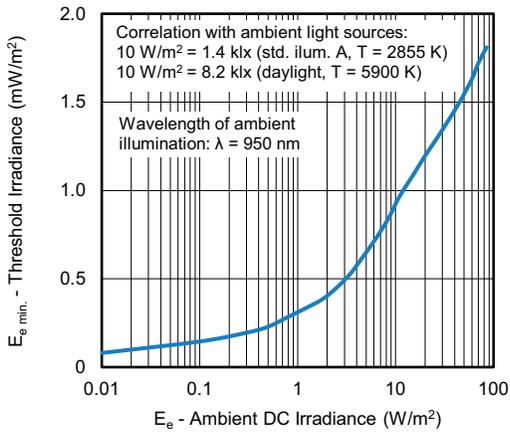


Fig. 6 - Sensitivity in Bright Ambient

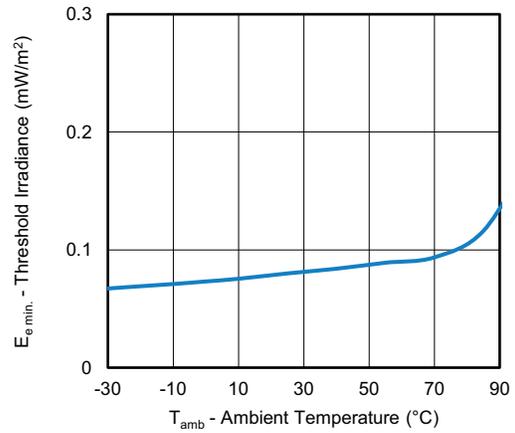


Fig. 9 - Sensitivity vs. Ambient Temperature

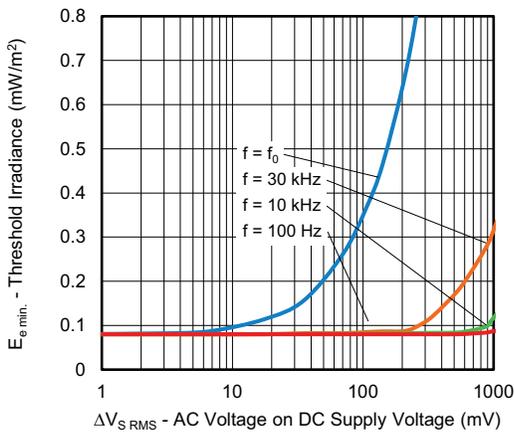


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

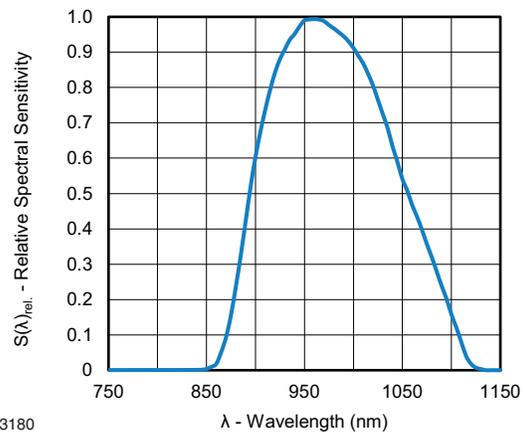


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

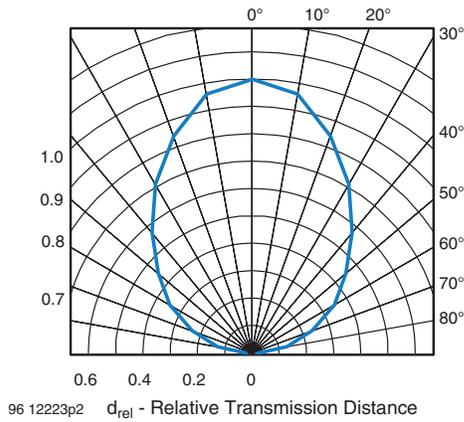


Fig. 11 - Horizontal Directivity

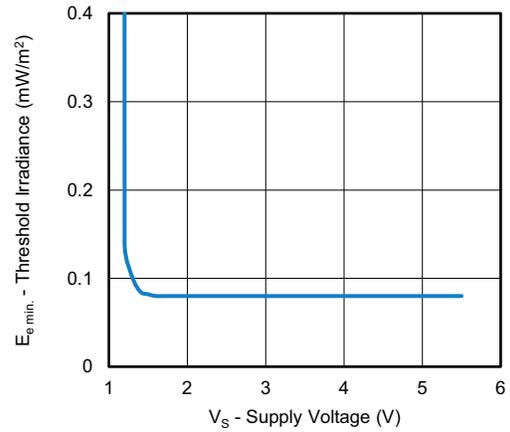


Fig. 12 - Sensitivity vs. Supply Voltage

**SUITABLE DATA FORMAT**

These receivers are designed to suppress spurious output pulses due to noise or optical disturbances. The devices can distinguish data signals from noise due to differences in frequency, burst length, and envelope duty cycle. For optimum sensitivity, the data's modulation frequency should be close to the device's band-pass center frequency (e.g. 38.4 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the receiver in the presence of noise, 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 of noise which is suppressed:

- 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).

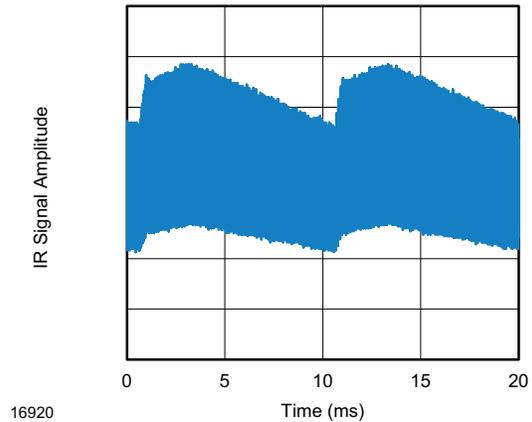


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

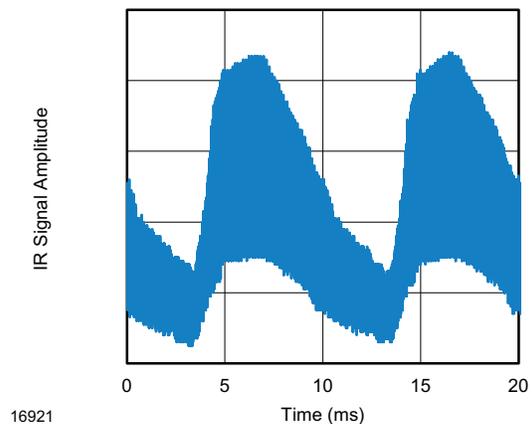
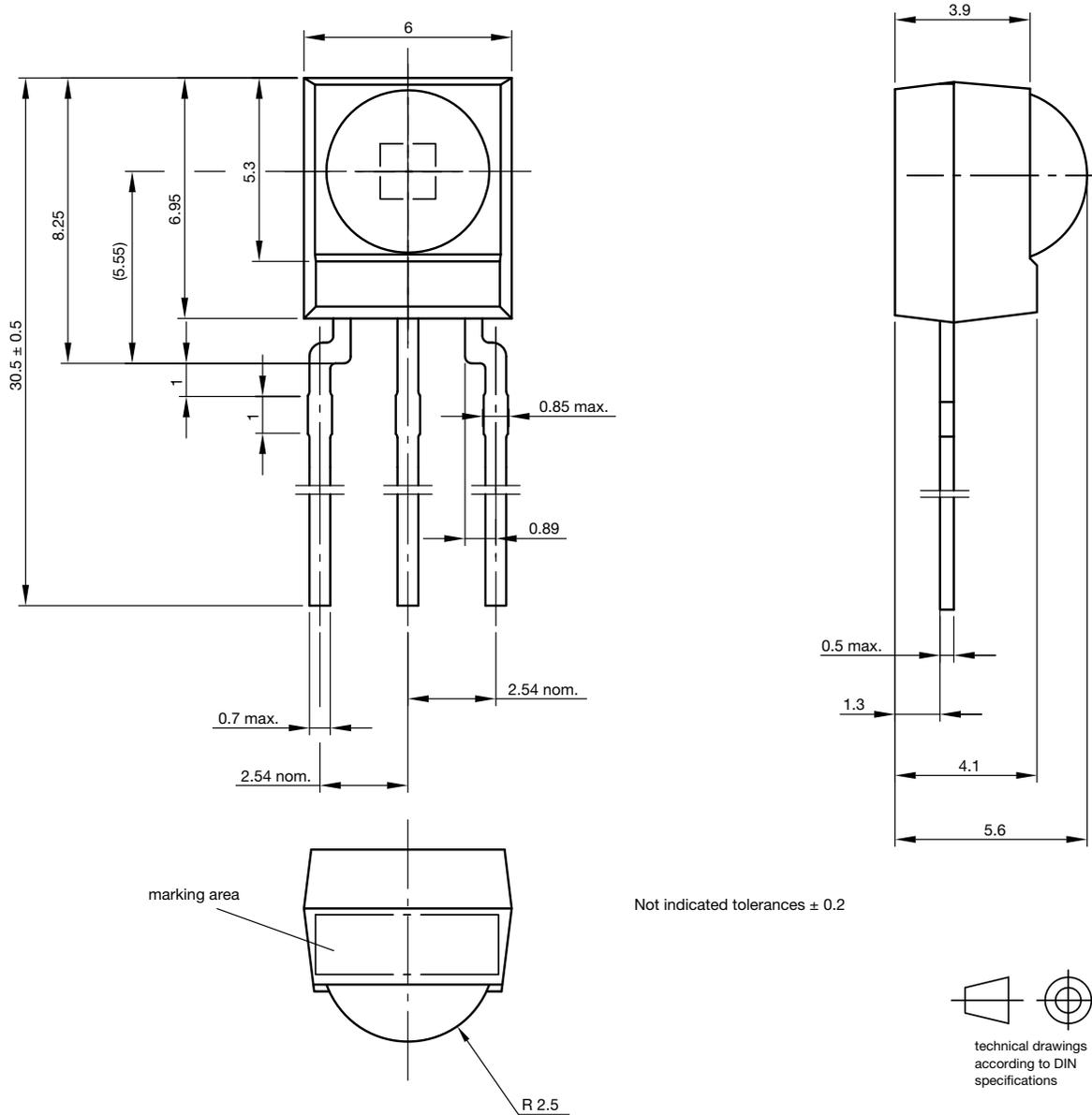


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

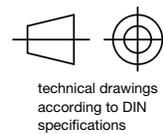
	<b>TSDP341..</b>	<b>TSDP343..</b>
Minimum burst length	6 cycles/burst	6 cycles/burst
After each burst of length A gap time is required of	6 to 70 cycles ≥ 6 cycles	6 to 35 cycles ≥ 6 cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 3 x burst length	35 cycles > 9 x burst length
Maximum number of continuous short bursts/second	3000	3000
Suppression of interference from fluorescent lamps	Fig. 13	Fig. 13 and Fig. 14



PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ± 0.2



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