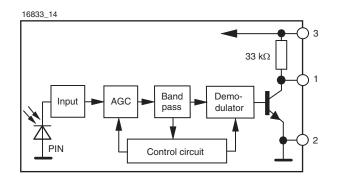
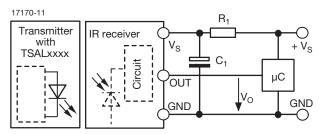
TSOP22.., TSOP24.., TSOP48.., TSOP44..

Vishay Semiconductors

BLOCK DIAGRAM

APPLICATION CIRCUIT





 $R_{\rm 1}$ and $C_{\rm 1}$ recommended to reduce supply ripple for $V_{\rm S} < 2.8~V$

ABSOLUTE MAXIMUM RATINGS							
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT			
Supply voltage		V _S	-0.3 to +6	V			
Supply current		I _S	5	mA			
Output voltage		Vo	-0.3 to 5.5	V			
Voltage at output to supply		V _S - V _O	-0.3 to (V _S + 0.3)	V			
Output current		Io	5	mA			
Junction temperature		Tj	100	°C			
Storage temperature range		T _{stg}	-25 to +85	°C			
Operating temperature range		T _{amb}	-25 to +85	°C			
Power consumption	T _{amb} ≤ 85 °C	P _{tot}	10	mW			
Soldering temperature	t ≤ 10 s, 1 mm from case	T _{sd}	260	°C			

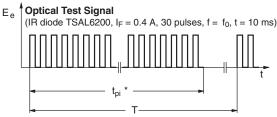
Note

• 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 _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Supply current	$E_{V} = 0, V_{S} = 5 V$	I _{SD}	0.55	0.7	0.9	mA	
	$E_v = 40$ klx, sunlight	I _{SH}	-	0.8	-	mA	
Supply voltage		Vs	2.5	-	5.5	V	
Transmission distance	$E_v = 0$, test signal see Fig. 1, IR diode TSAL6200, $I_F = 50 \text{ mA}$	d	-	24	-	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	Pulse width tolerance: t_{pi} - $5/f_o < t_{po} < t_{pi} + 6/f_o$, test signal see Fig. 1	E _{e min.}	-	0.12	0.25	mW/m²	
Maximum irradiance	t_{pi} - 5/f _o < t_{po} < t_{pi} + 6/f _o , test signal see Fig. 1	E _{e max.}	50	-	-	W/m ²	
Directivity	Angle of half transmission distance	Ψ1/2	-	± 45	-	deg	



TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)



 * t_{pi} \geq 10/f₀ is recommended for optimal function

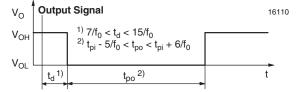


Fig. 1 - Output Active Low

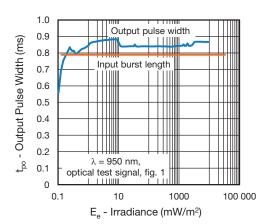


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

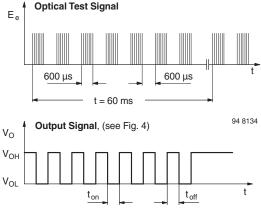


Fig. 3 - Output Function

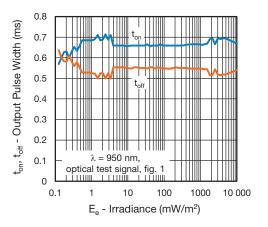


Fig. 4 - Output Pulse Diagram

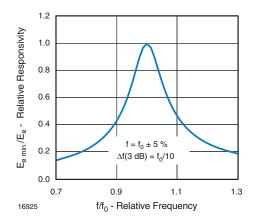


Fig. 5 - Frequency Dependence of Responsivity

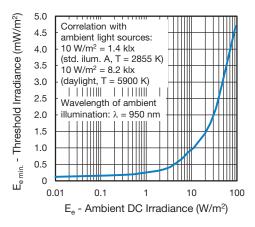


Fig. 6 - Sensitivity in Bright Ambient

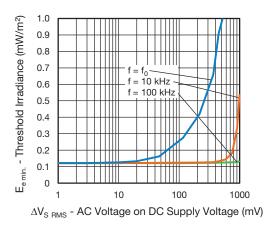


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

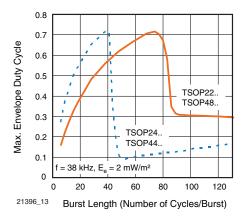


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

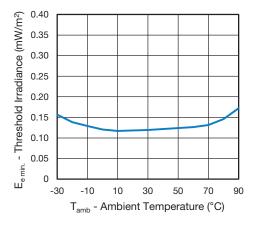


Fig. 9 - Sensitivity vs. Ambient Temperature

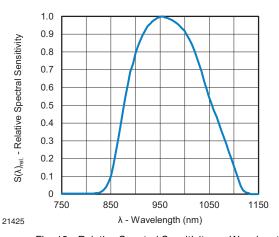


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

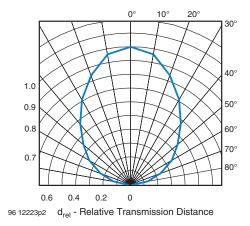


Fig. 11 - Horizontal Directivity

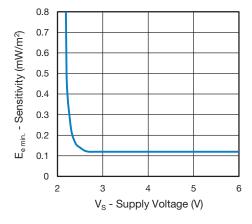


Fig. 12 - Sensitivity vs. Supply Voltage

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 (e.g. 38 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).
- 2.4 GHz and 5 GHz Wi-Fi

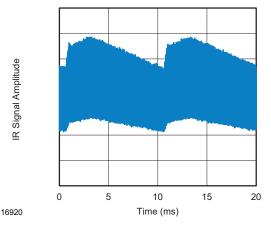


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

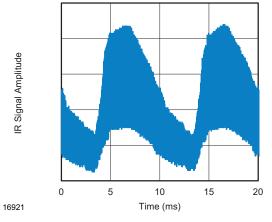


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

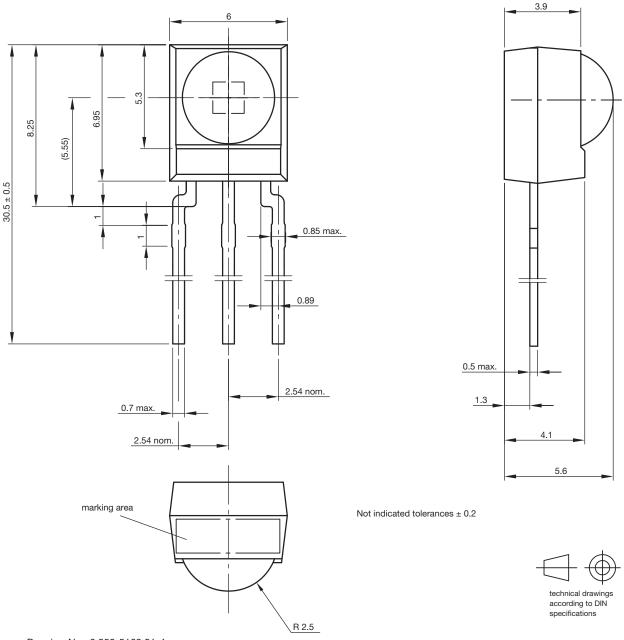
	TSOP22, TSOP48	TSOP24, TSOP44		
Minimum burst length	10 cycles/burst	10 cycles/burst		
After each burst of length a minimum gap time is required of	10 to 70 cycles ≥ 12 cycles	10 to 35 cycles ≥ 12 cycles		
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 4 x burst length	35 cycles > 10 x burst length		
Maximum number of continuous short bursts/second	800	1300		
NEC code	Yes	Preferred		
RC5/RC6 code	Yes	Preferred		
Thomson 56 kHz code	Yes	Preferred		
Sharp code	Yes	Preferred		
Suppression of interference from fluorescent lamps	Mild disturbance patterns are suppressed (example: signal pattern of Fig. 13)	Complex and critical disturbance patterns are suppressed (example: signal pattern of Fig. 14 or highly dimmed LCDs)		

Note

• For data formats with short bursts please see the datasheet of TSOP23.., TSOP43..



PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.01-4

Issue: 9; 03.11.10

13655



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