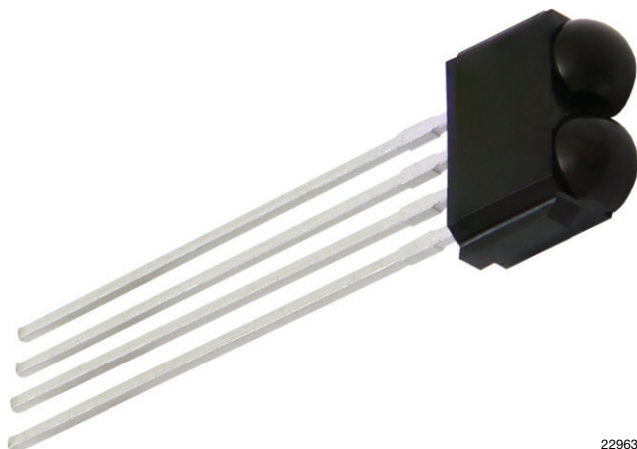




IR Receiver Modules for Remote Control Systems



22963

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

- Individual IC settings to reach maximum performance
- Immunity against noise (lamps, LCD TV, Wi-Fi)
- Low supply current
- Photo detector and preamplifier in one package
- Supply voltage: 2.0 V to 5.5 V
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



Product Page



Marking



Packages



3D Models

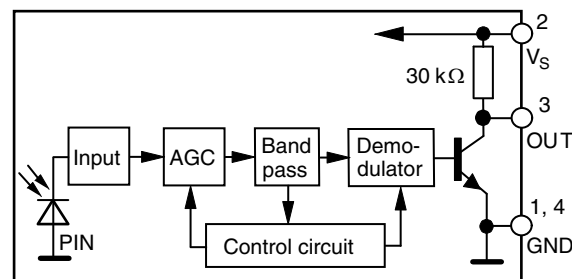
APPLICATIONS

- Infrared remote control systems

DESIGN SUPPORT TOOLS

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

BLOCK DIAGRAM



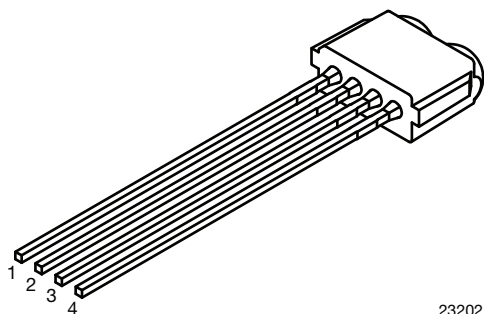
20445-1



MECHANICAL DATA

Pinning:

1, 4 = GND, 2 = V_S, 3 = OUT



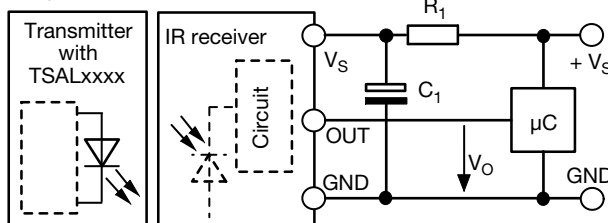
23202

ORDERING CODE

TSOP593.., TSOP595.. - 2400 pcs in 6 bags

APPLICATION CIRCUIT

17170-14



R₁ and C₁ recommended in case there are strong ripple or spikes on the supply line.

PARTS TABLE

AGC		NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)	VERY NOISY ENVIRONMENTS AND SHORT BURSTS (AGC5)
Carrier frequency	30 kHz	TSOP59330	TSOP59530
	33 kHz	TSOP59333	TSOP59533
	36 kHz	TSOP59336 ⁽¹⁾⁽²⁾	TSOP59536
	38 kHz	TSOP59338 ⁽²⁾⁽³⁾⁽⁴⁾	TSOP59538
	40 kHz	TSOP59340	TSOP59540
	56 kHz	TSOP59356 ⁽⁵⁾	TSOP59556
Package		TVCast	
Pinning		1, 4 = GND, 2 = V _S , 3 = OUT	
Dimensions (mm)		6.8 W x 2.6 H x 5.3 D	
Mounting		Leaded	
Application		Remote control	
Best choice for		⁽¹⁾ MCIR ⁽²⁾ RCMM ⁽³⁾ RECS-80 code ⁽⁴⁾ XMP ⁽⁵⁾ r-map	
Special options		- Narrow optical filter: www.vishay.com/doc?81590 - Wide optical filter: www.vishay.com/doc?82726	

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		V _O	-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		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} ≤ 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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	-	21	-	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: RC-5	$E_{e\text{ min.}}$	-	0.15	0.3	mW/m^2
	Test signal: XMP code	$E_{e\text{ min.}}$	-	0.23	0.4	mW/m^2
Maximum irradiance	$t_{pi} - 3/f_0 < t_{po} < t_{pi} + 3.5/f_0$, test signal see Fig. 1	$E_{e\text{ max.}}$	30	-	-	W/m^2
Directivity	Angle of half transmission distance	$\Phi_{1/2}$	-	± 45	-	$^{\circ}$

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

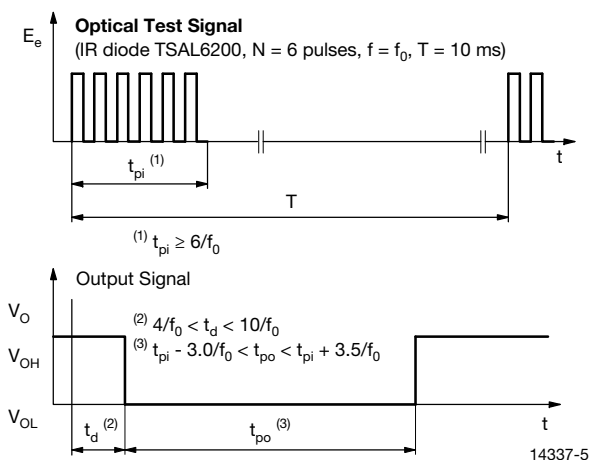


Fig. 1 - Output Active Low

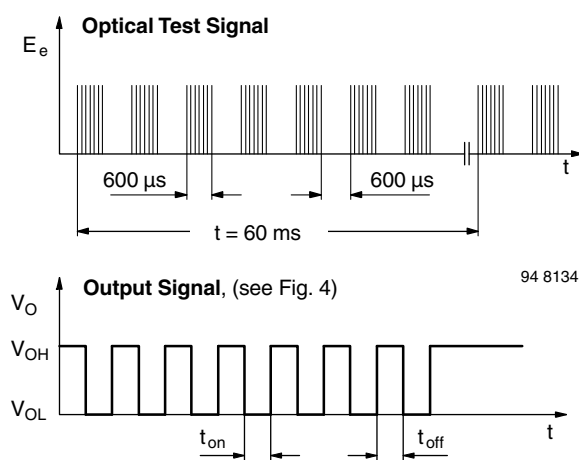


Fig. 3 - Output Function

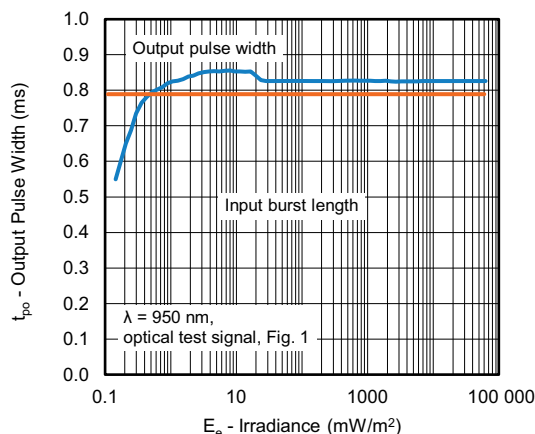


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

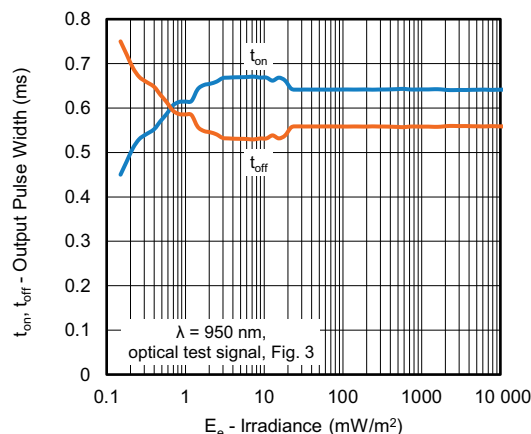


Fig. 4 - Output Pulse Diagram

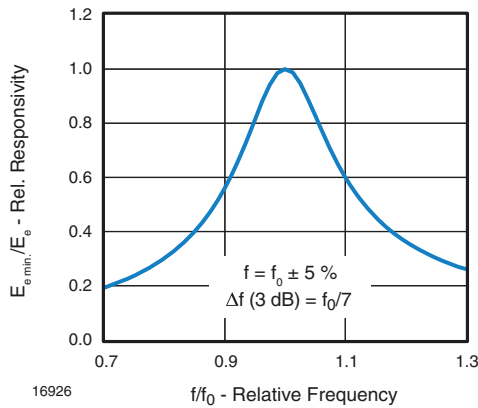


Fig. 5 - Frequency Dependence of Responsivity

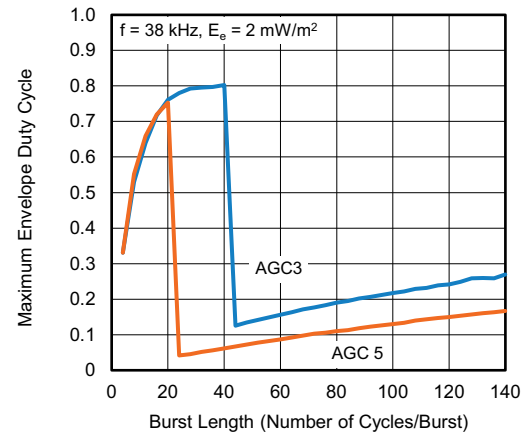


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

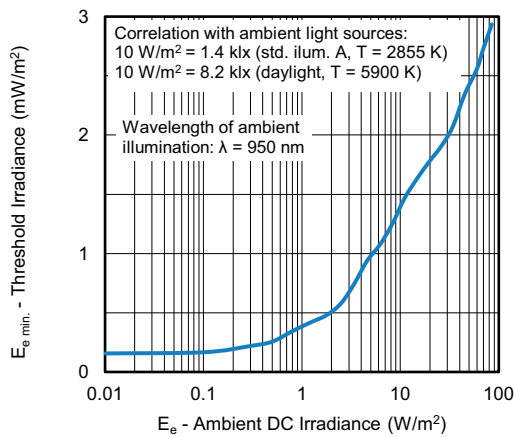


Fig. 6 - Sensitivity in Bright Ambient

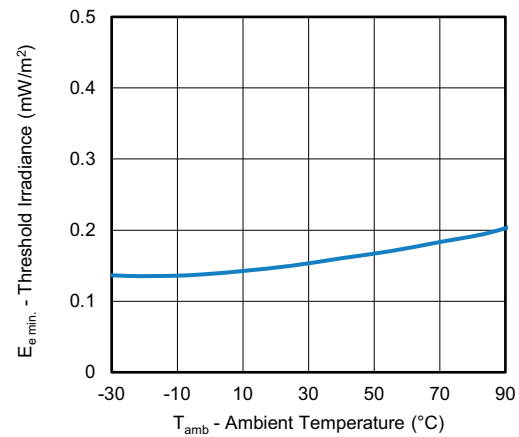


Fig. 9 - Sensitivity vs. Ambient Temperature

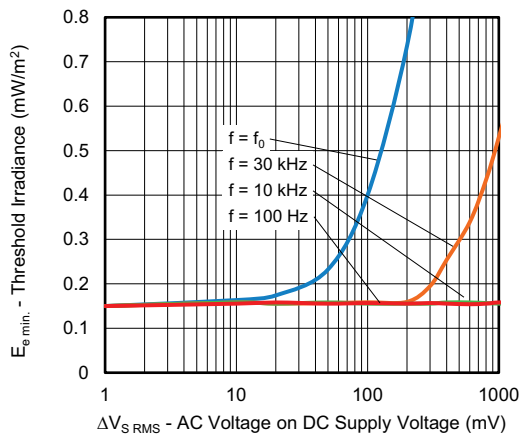


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

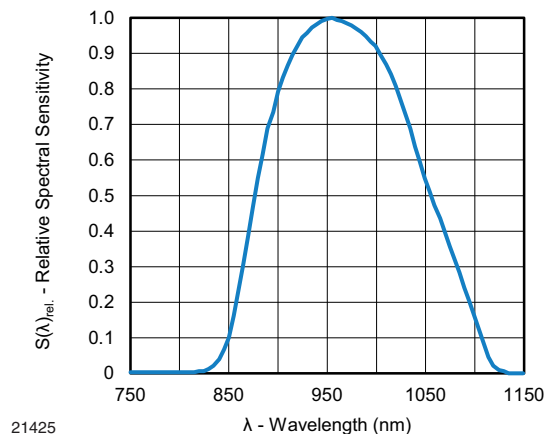


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

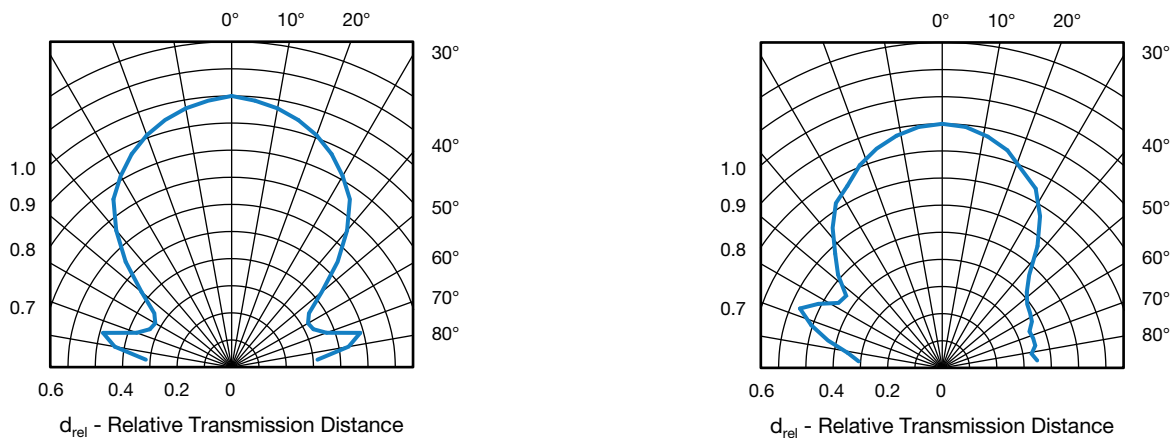


Fig. 11 - Horizontal and Vertical Directivity

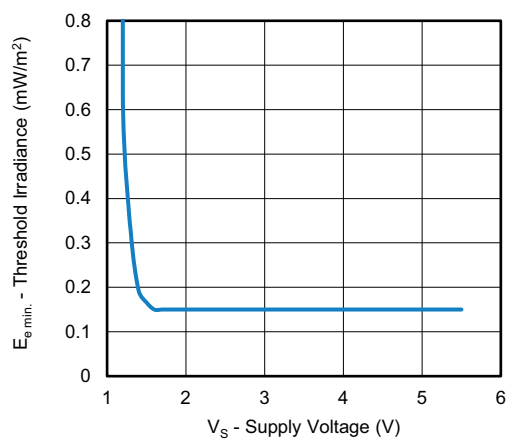


Fig. 12 - Sensitivity vs. Supply Voltage

**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 pattern 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

	TSOP593..	TSOP595..
Minimum burst length	6 cycles/burst	6 cycles/burst
After each burst of length a minimum gap time is required of	6 to 40 cycles ≥ 7 cycles	6 to 20 cycles ≥ 7 cycles
For bursts greater than a minimum gap time in the data stream is needed of	40 cycles > 6 x burst length	20 cycles > 10 x burst length
Maximum number of continuous short bursts/second	2500	2500
RCMM code	Preferred	Yes
XMP code	Preferred	Yes
r-map code	Preferred	Yes
RECS-80 code	Preferred	Yes
Suppression of interference from fluorescent lamps	Mild and complex disturbance patterns are suppressed (example: signal patterns of Fig. 13 and Fig. 14)	Critical disturbance patterns are suppressed, e.g. highly dimmed LCDs

Note

- For data formats with long bursts please see the datasheet for TSOP592.., TSOP594..

Technical drawing of a component showing top, side, and bottom views with dimensions and labels.

Top View:

- Overall width: 6.8
- Overall height: $24 \pm 0.3 \text{ max.}$
- Radius: R1.5
- Internal width: 5.9
- Internal height: 5.3
- Marking area: Indicated by a dashed rectangle.
- Area not plane: Indicated by a dashed line.
- Pin spacing: 1.27 nom.
- Pin pitch: $3 \times 1.27 = 3.81$
- Pin labels: GND, V_S , Out, GND
- Pin diameter: $\varnothing 0.75$
- Pin length: 0.6 max.

Side View:

- Overall height: 2.6
- Radius: R1.5
- Internal width: 1.6
- Internal height: 0.9
- Pin diameter: $\varnothing 0.75$
- Pin length: 0.4 $\pm$ 0.1

Bottom View:

- Overall width: 3.05
- Radius: 0.5

Technical Drawing Specification:

- Technical drawings according to DIN specification.

Proposed hole layout from component side (for reference only)

- Pin pitch: 1.27
- Pin diameter: $\varnothing 0.75$
- Pin length: 1.4
- Pin diameter: $\varnothing 0.75$
- Pin length: 1.4
- Pin diameter: $\varnothing 0.75$
- Pin length: 1.4
- Pin diameter: $\varnothing 0.75$
- Pin length: 1.4

Not indicated tolerances ± 0.2

Drawing-No.: GO-100220.01-4_Rev03_1
issue H: 18.03.16

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