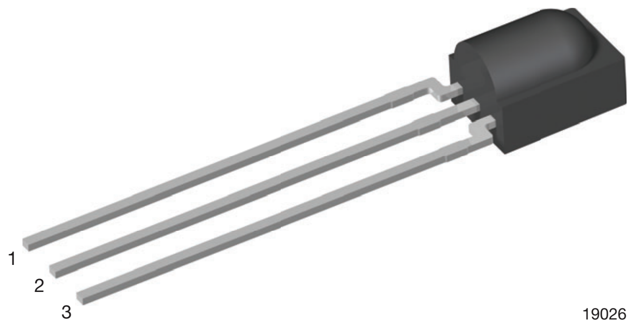
IR Receiver Modules for Remote Control Systems



LINKS TO ADDITIONAL RESOURCES

Product Page | 3D Models | Calculators | Marking | Packages | Holders | Bends and Cuts

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 contains an IR filter. The demodulated output signal can be directly connected to a microprocessor for decoding.

The TSOP583.. series devices are optimized to suppress almost all spurious pulses from Wi-Fi and CFL sources. They may suppress some data signals if continuously transmitted.

The TSOP581.. series devices are provided primarily for compatibility with old AGC1 designs. New designs should prefer the TSOP583.. series containing the newer AGC3. The TSOP585.. series are useful to suppress even extreme levels of optical noise, but may also suppress some data signals. Please check compatibility with your codes.

These components have not been qualified according to automotive specifications.

FEATURES

- Improved immunity against HF and RF noise
- 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
- Suitable for short bursts: burst length ≥ 6 carrier cycles
- 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

Pb-free
e3
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

MECHANICAL DATA

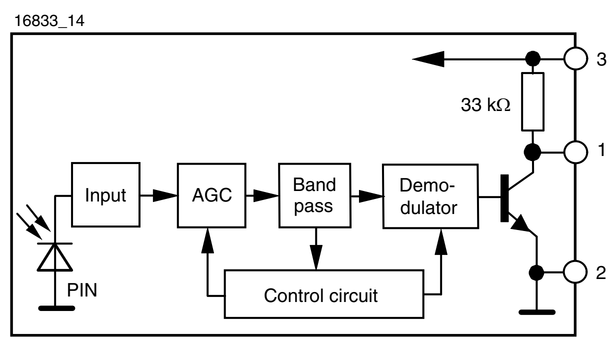
Pinning for TSOP581.., TSOP583.., TSOP585:

1 = OUT, 2 = GND, 3 = V_S

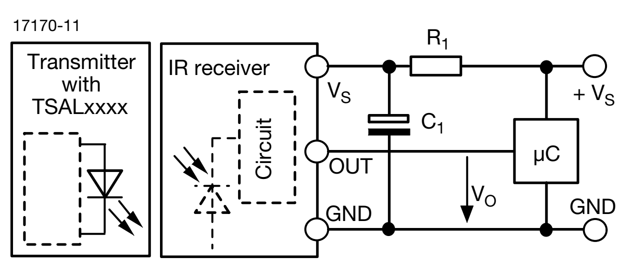
ORDERING CODE

TSOP58... - 1500 pieces in bags

BLOCK DIAGRAM



APPLICATION CIRCUIT



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

PARTS TABLE				
AGC		**LEGACY PRODUCT FOR SHORT BURST REMOTE CONTROLS (AGC1)**	**NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)**	**VERY NOISY ENVIRONMENTS AND SHORT BURSTS (AGC5)**
Carrier frequency	30 kHz	TSOP58130	TSOP58330	TSOP58530
	33 kHz	TSOP58133	TSOP58333	TSOP58533
	36 kHz	TSOP58136	TSOP58336 (1)	TSOP58536
	38 kHz	TSOP58138	TSOP58338 (2)(3)(4)(5)	TSOP58538
	40 kHz	TSOP58140	TSOP58340	TSOP58540
	56 kHz	TSOP58156	TSOP58356	TSOP58556
Package		Minicast		
Pinning		1 = OUT, 2 = GND, 3 = V_S		
Dimensions (mm)		5.0 W x 6.95 H x 4.8 D		
Mounting		Leaded		
Application		Remote control		
Best choice for		(1) MCIR (2) Mitsubishi (3) RECS-80 Code (4) r-map (5) XMP-1, XMP-2		

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	$T_{amb} \leq 85$ °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 voltage		V_S	2.5	-	5.5	V
Supply current	V_S = 5 V, E_v = 0	I_{SD}	0.55	0.7	0.9	mA
	E_v = 40 klx, sunlight	I_{SH}	-	0.8	-	mA
Transmission distance	E_v = 0, IR diode TSAL6200, I_F = 50 mA, test signal see Fig. 1	d	-	18	-	m
Output voltage low	I_{OSL} = 0.5 mA, E_e = 0.7 mW/m², 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	$E_{e\ min.}$	-	0.2	0.4	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/m²
Directivity	Angle of half transmission distance	$\varphi_{1/2}$	-	± 45	-	deg

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

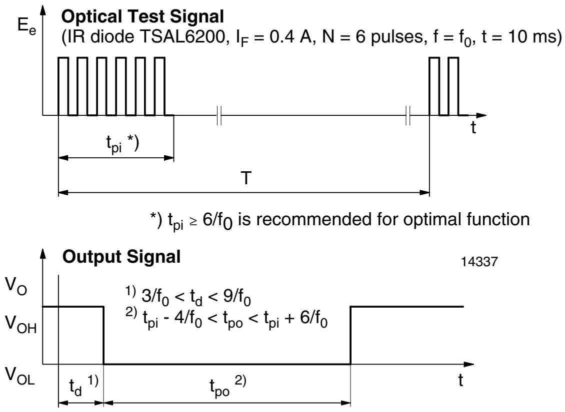


Fig. 1 - Output Active Low

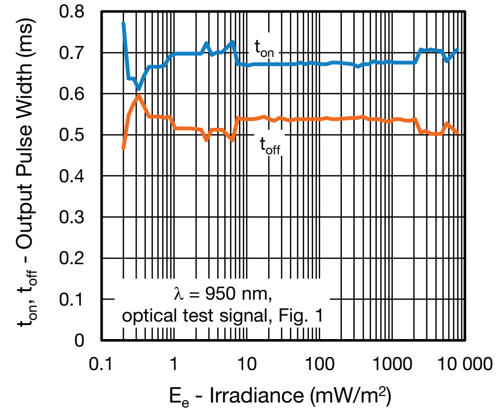


Fig. 4 - Output Pulse Diagram

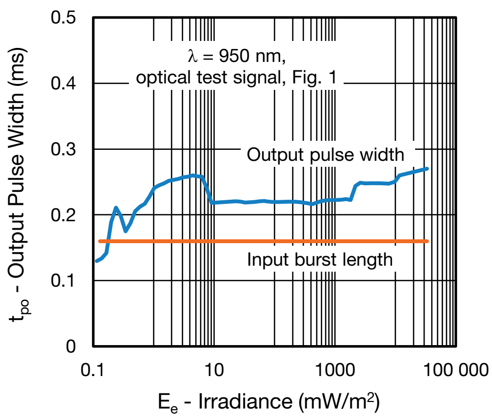


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

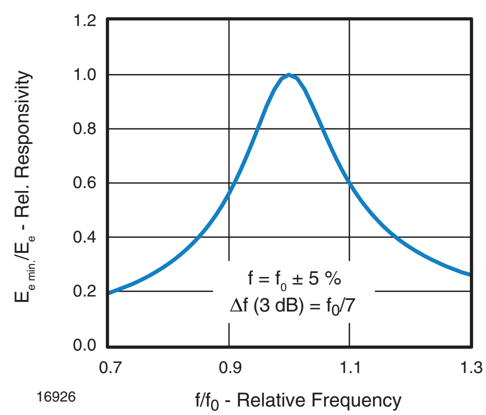


Fig. 5 - Frequency Dependence of Responsivity

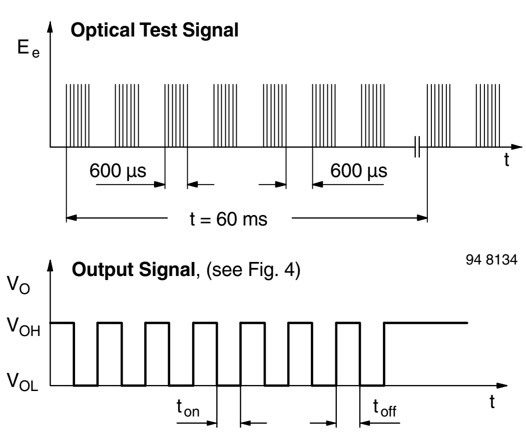


Fig. 3 - Output Function

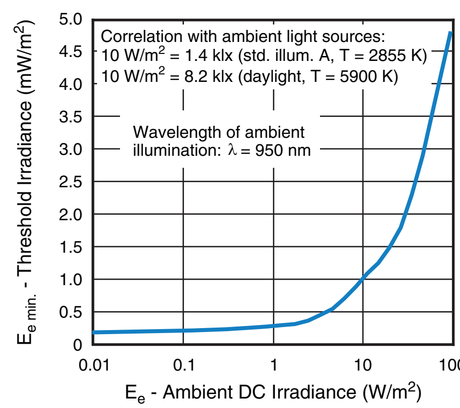


Fig. 6 - Sensitivity in Bright Ambient

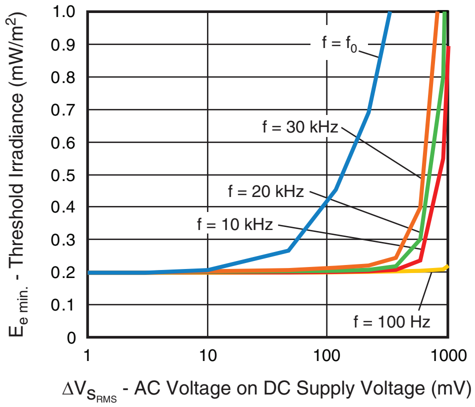


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

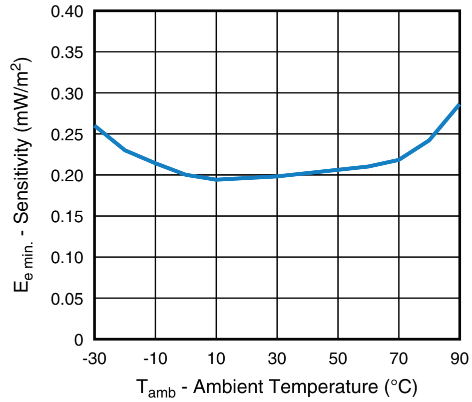


Fig. 10 - Sensitivity vs. Ambient Temperature

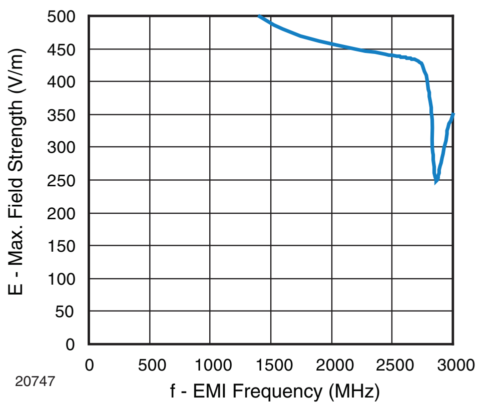


Fig. 8 - Sensitivity vs. Electric Field Disturbances

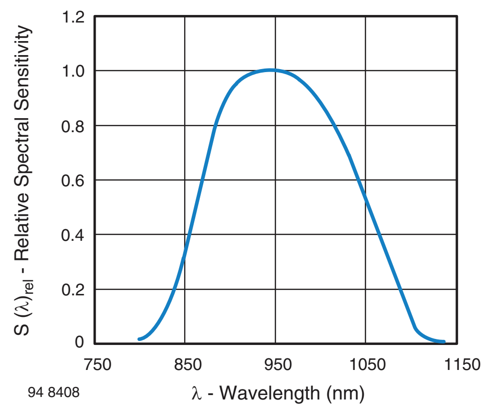


Fig. 11 - Relative Spectral Sensitivity vs. Wavelength

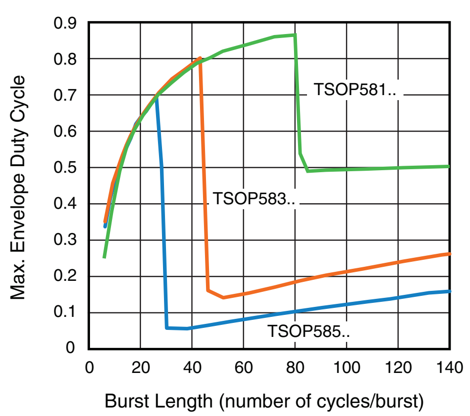


Fig. 9 - Max. Envelope Duty Cycle vs. Burst Length

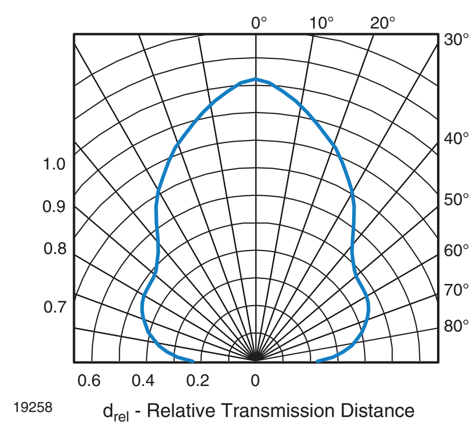


Fig. 12 - Horizontal Directivity

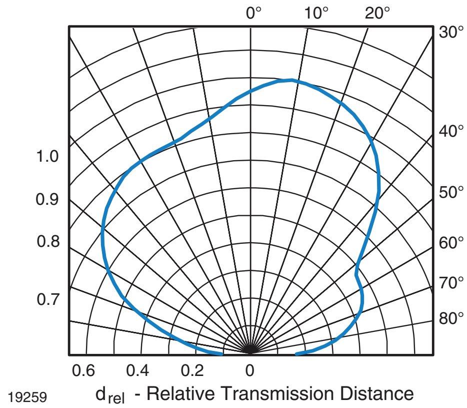


Fig. 13 - Vertical Directivity

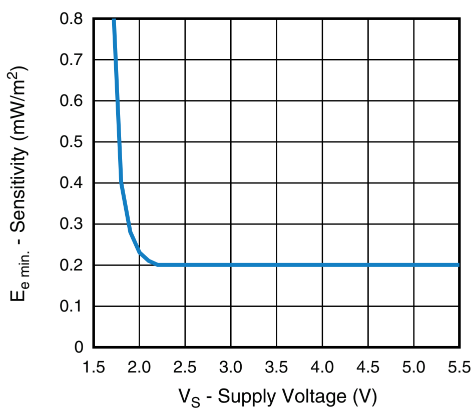


Fig. 14 - Sensitivity vs. Supply Voltage

SUITABLE DATA FORMAT

These products 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 IR receiver 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
- Modulated IR signals from common fluorescent lamps (example of noise pattern is shown in Fig. 15 or Fig. 16)
- 2.4 GHz and 5 GHz Wi-Fi

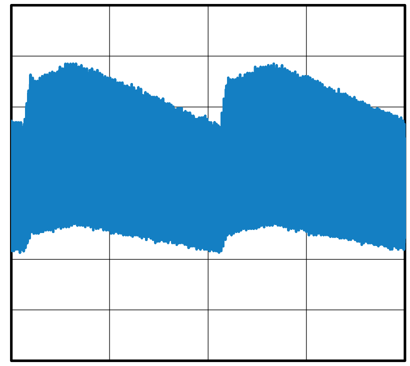


Fig. 15 - IR Disturbance from Fluorescent Lamp With Low Modulation

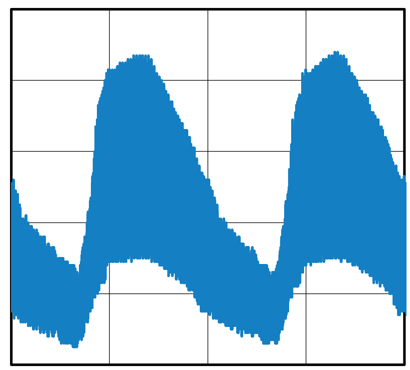


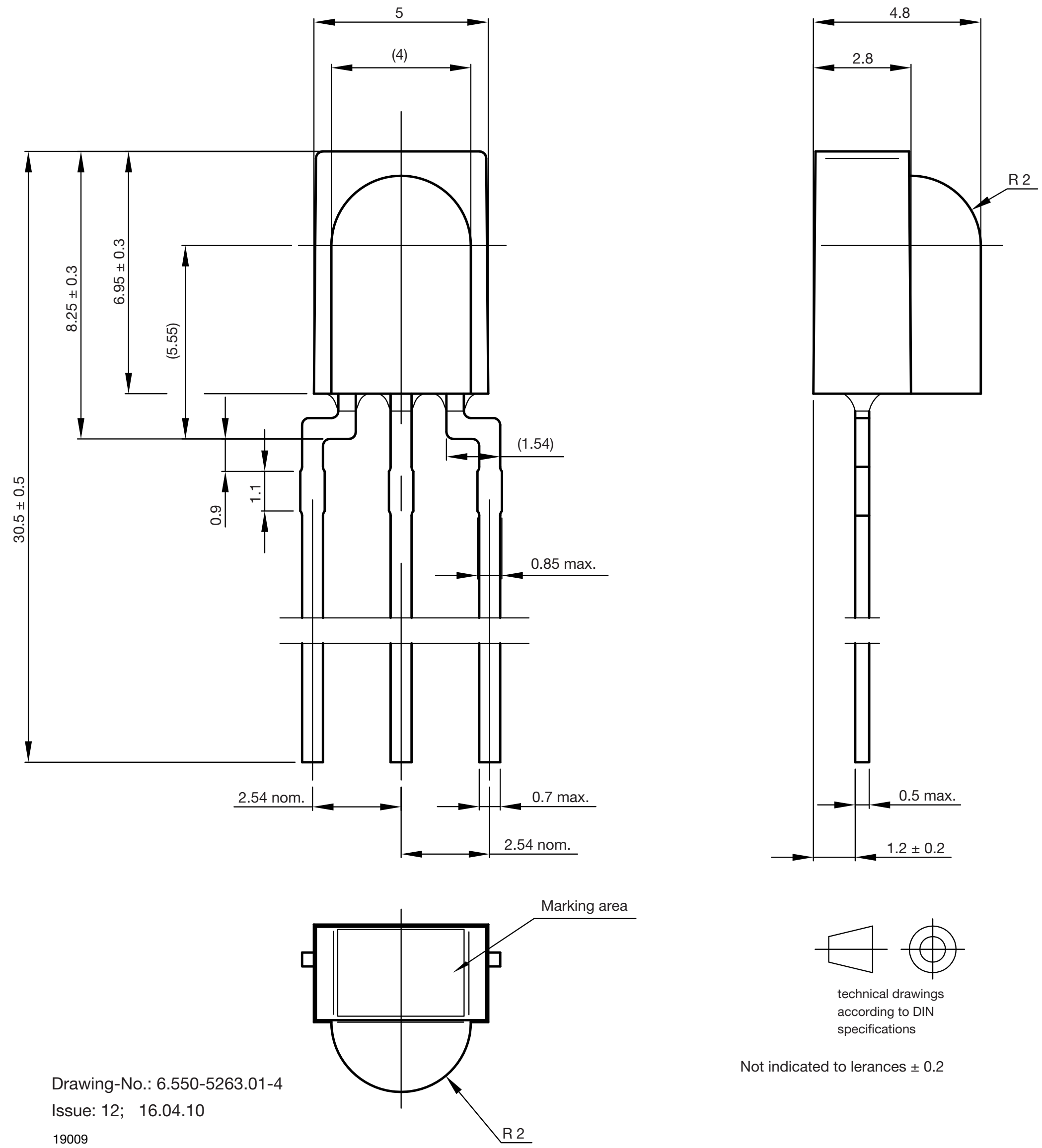
Fig. 16 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP581..	TSOP583..	TSOP585..
Minimum burst length	6 cycles/burst	6 cycles/burst	6 cycles/burst
After each burst of length A gap time is required of	6 to 70 cycles ≥ 10 cycles	6 to 35 cycles ≥ 10 cycles	6 to 24 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 1.2 x burst length	35 cycles > 6 x burst length	24 cycles > 25 ms
Maximum number of continuous short bursts/second	2000	2000	2000
MCIR code	Yes	Preferred	Yes
XMP-1, XMP-2 code	Yes	Preferred	Yes
Suppression of interference from fluorescent lamps	Mild disturbance patterns are suppressed (example: signal pattern of Fig. 15)	Complex disturbance patterns are suppressed (example: signal pattern of Fig. 16)	Critical disturbance patterns are suppressed, e.g. highly dimmed LCDs

Note

- For data formats with long bursts (more than 10 carrier cycles) please see the datasheet for TSOP582.., TSOP584..

PACKAGE DIMENSIONS in millimeters



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