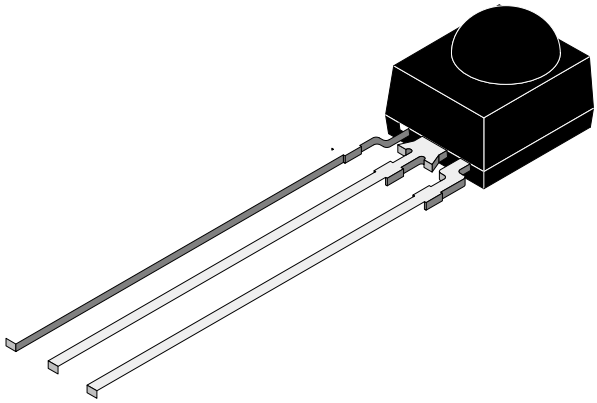
Photo Modules for PCM Remote Control Systems

Available types for different carrier frequencies

Type	fo	Type	fo
TSOP1830SS3V	30 kHz	TSOP1833SS3V	33 kHz
TSOP1836SS3V	36 kHz	TSOP1837SS3V	36.7 kHz
TSOP1838SS3V	38 kHz	TSOP1840SS3V	40 kHz
TSOP1856SS3V	56 kHz		

Description

The TSOP18..SS3V – series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.
The demodulated output signal can directly be decoded by a microprocessor. The main benefit is the reliable function even in disturbed ambient and the protection against uncontrolled output pulses.



Absolute Maximum Ratings

T_{amb} = 25°C

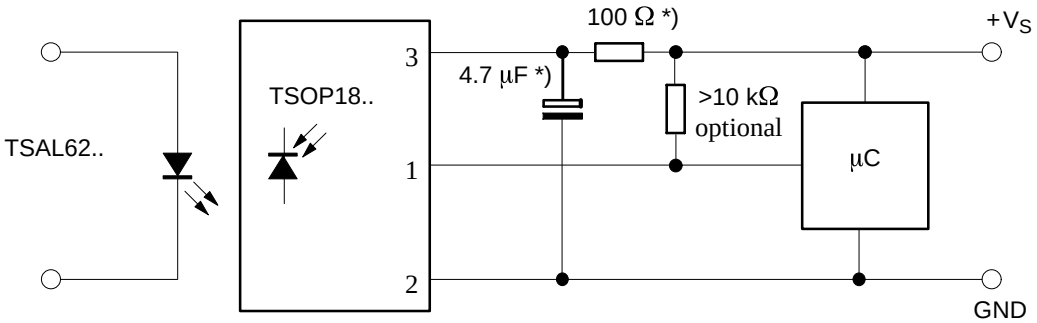
Parameter	Test Conditions	Symbol	Value	Unit
Supply Voltage	(Pin 3)	V_S	–0.3...6.0	V
Supply Current	(Pin 3)	I_S	5	mA
Output Voltage	(Pin 1)	V_O	–0.3...6.0	V
Output Current	(Pin 1)	I_O	5	mA
Junction Temperature		T_j	100	˚C
Storage Temperature Range		T_{stg}	–25...+85	˚C
Operating Temperature Range		T_{amb}	–25...+85	˚C
Power Consumption	(T_{amb} ≦ 85 ˚C)	P_{tot}	50	mW
Soldering Temperature	t ≦ 10 s, 1 mm from case	T_{sd}	260	˚C

Basic Characteristics

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Supply Current (Pin 3)	V_S = 3 V, E_v = 0	I_{SD}	0.5	0.75	1.0	mA
	V_S = 3 V, E_v = 40 klx, sunlight	I_{SH}		1.0		mA
Supply Voltage (Pin 3)		V_S	3.0		6.0	V
Transmission Distance	E_v = 0, test signal see fig.6, IR diode TSAL6200, I_F = 300 mA	d		35		m
Output Voltage Low (Pin 1)	I_{OSL} = 0.5 mA,E_e = 0.7 mW/m^2, f = f_o	V_{OSL}			250	mV
Irradiance (30 – 40 kHz)	Pulse width tolerance: $t_{pi} - 4/f_o < t_{po} < t_{pi} + 5/f_o$, test signal see fig.6	$E_{e\ min}$		0.3	0.5	mW/m^2
Irradiance (56 kHz)		$E_{e\ min}$		0.4	0.7	mW/m^2
Irradiance		$E_{e\ max}$	30			W/m^2
Directivity	Angle of half transmission distance	$\varphi_{1/2}$		±45		deg

Application Circuit



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*) recommended to suppress power supply disturbances

Suitable Data Format

The circuit of the TSOP18..SS3V is designed in that way that unexpected output pulses due to noise or disturbance signals are avoided. A bandpassfilter, an integrator stage and an automatic gain control are used to suppress such disturbances.
The distinguishing mark between data signal (not suppressed) and disturbance signal (supressed) are carrier frequency, burst length and Signal Gap Time (see diagram below).

The data signal should fullfill the following condition:

- Carrier frequency should be close to center frequency of the bandpass (e.g. 38kHz).
- Burst length should be 6 cycles/burst or longer.
- After each burst a gap time of at least 9 cycles is neccessary.
- The data format should not make a continuous signal transmission. There must be a Signal Gap Time (longer than 25ms) at least each 150ms (see Figure A)

Some examples for suitable data format are:
NEC Code (repetitive pulse), NEC Code (repetitive data), Toshiba Micom Format, Sharp Code, RC5 Code, RECS–80 Code, R–2000 Code.

When a disturbance signal is applied to the TSOP18..SS3V it can still receive the data signal. However the sensitivity is reduced to that level that no unexpected pulses will occure.

Some examples for such disturbance signals which are suppressed by the TSOP18..SS3V are:

- DC light (e.g. from tungsten bulb or sunlight),
- Continuous signal at 38kHz or at any other frequency,
- Signals from fluorescent lamps (see figure B).
- Continuous IR signal (e.g. 1ms burst, 2ms pause)

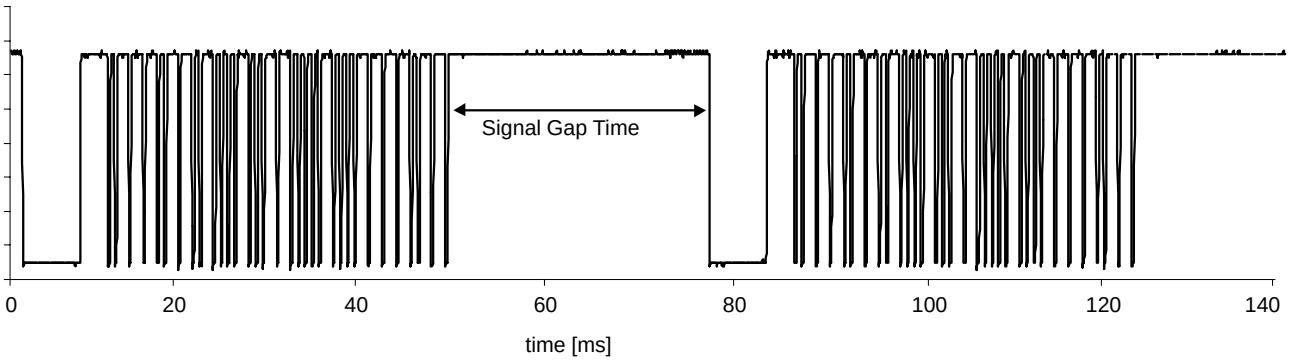
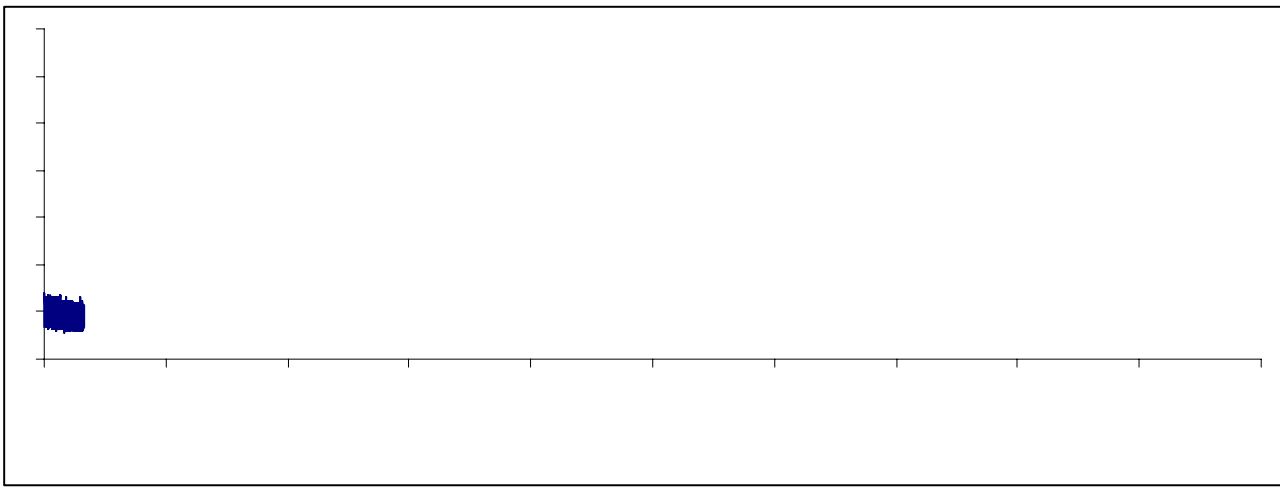


Figure A: Data Signal (Output of IR Receiver) with a Signal Gap Time of 45ms



Typical Characteristics (T_{amb} = 25°C unless otherwise specified)

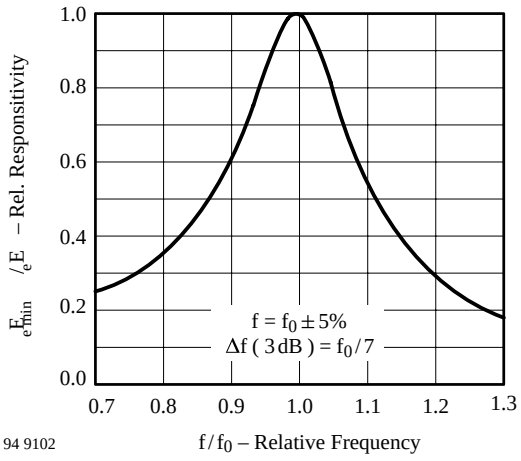


Figure 1. Frequency Dependence of Responsivity

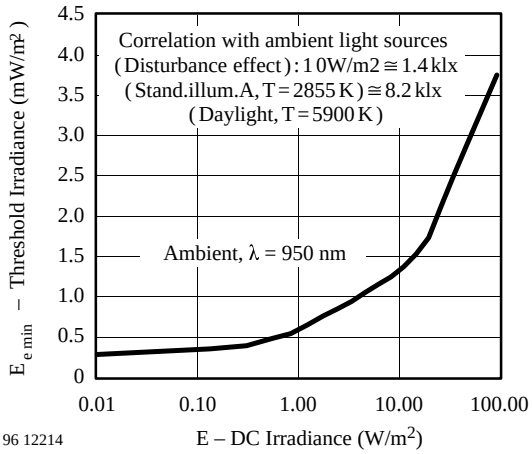


Figure 2. Sensitivity in Bright Ambient

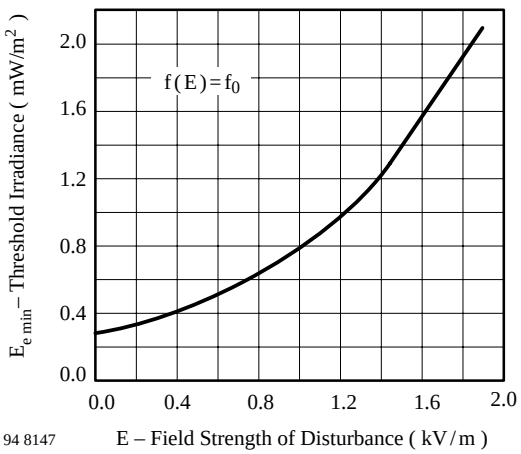


Figure 3. Sensitivity vs. Electric Field Disturbances

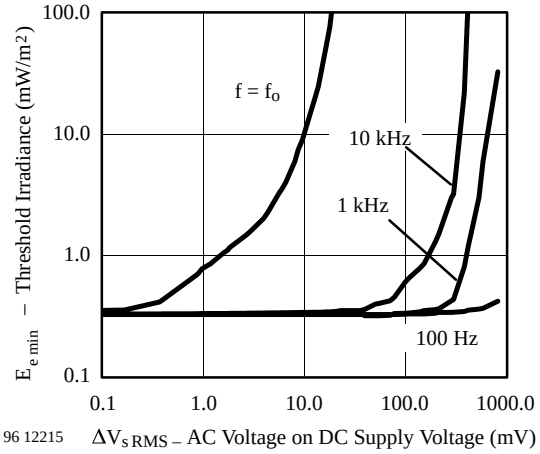


Figure 4. Sensitivity vs. Supply Voltage Disturbances

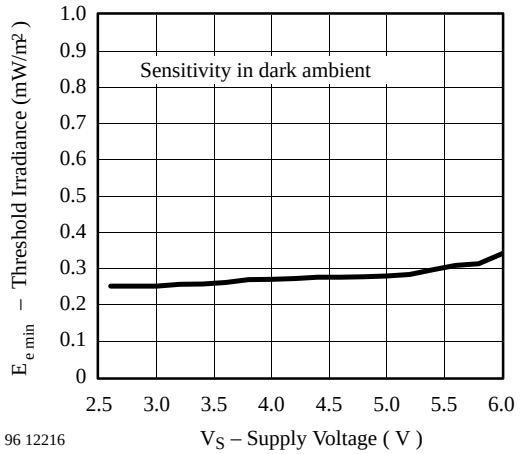
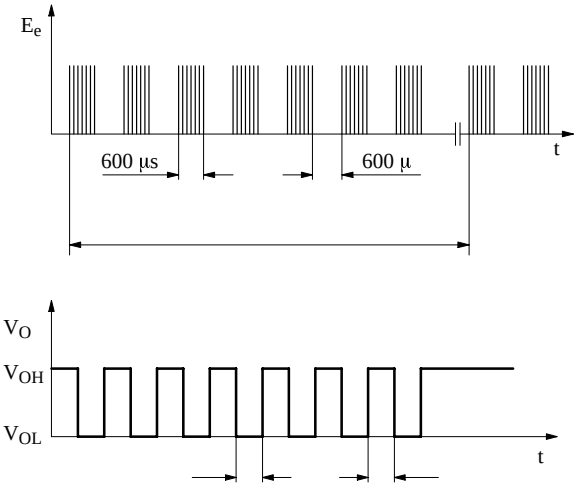


Figure 5. Sensitivity vs. Supply Voltage



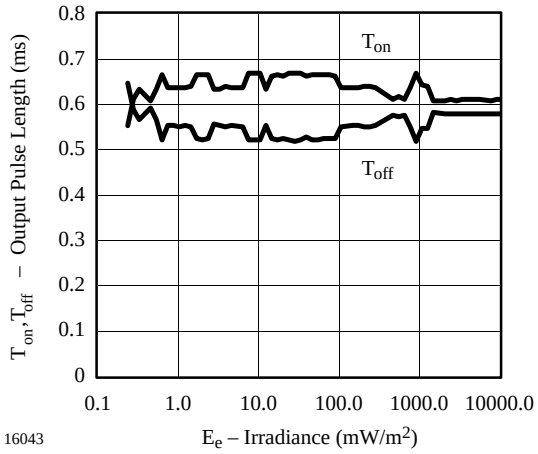


Figure 7. Output Pulse Diagram

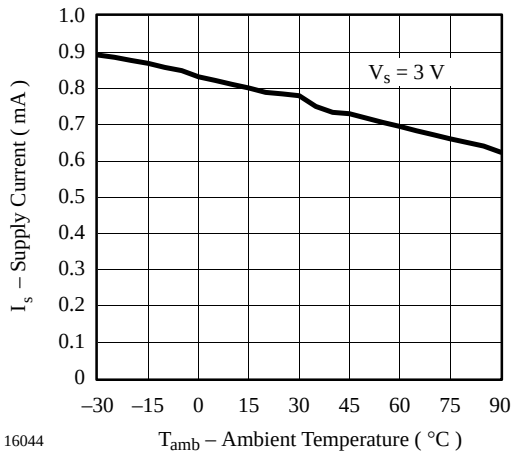


Figure 8. Supply Current vs. Ambient Temperature

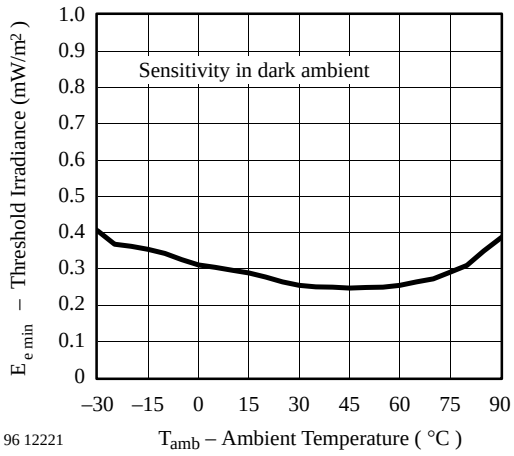


Figure 9. Sensitivity vs. Ambient Temperature

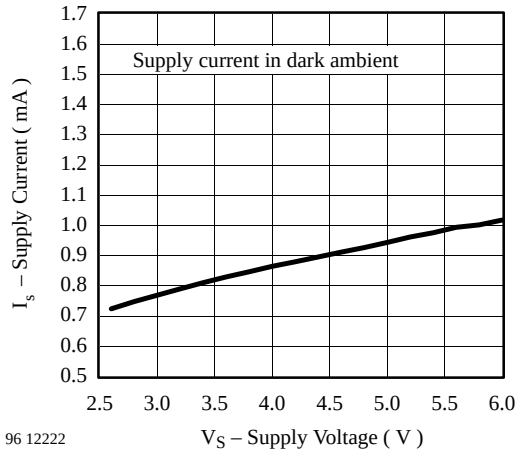


Figure 10. Supply Current vs. Supply Voltage

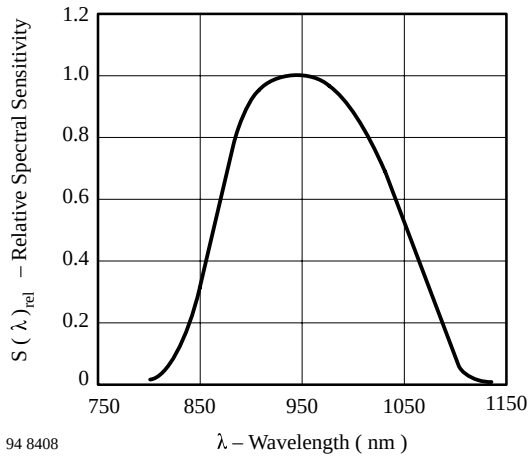


Figure 11. Relative Spectral Sensitivity vs. Wavelength

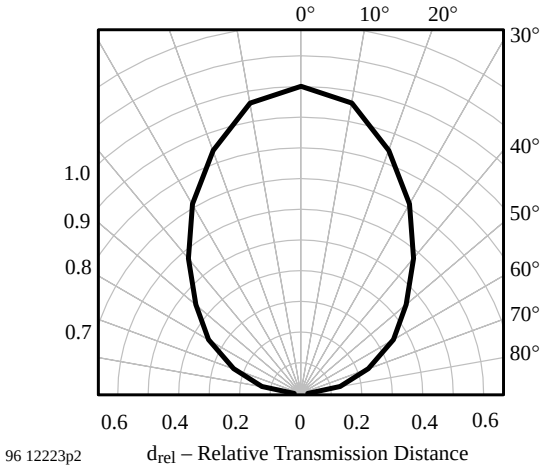
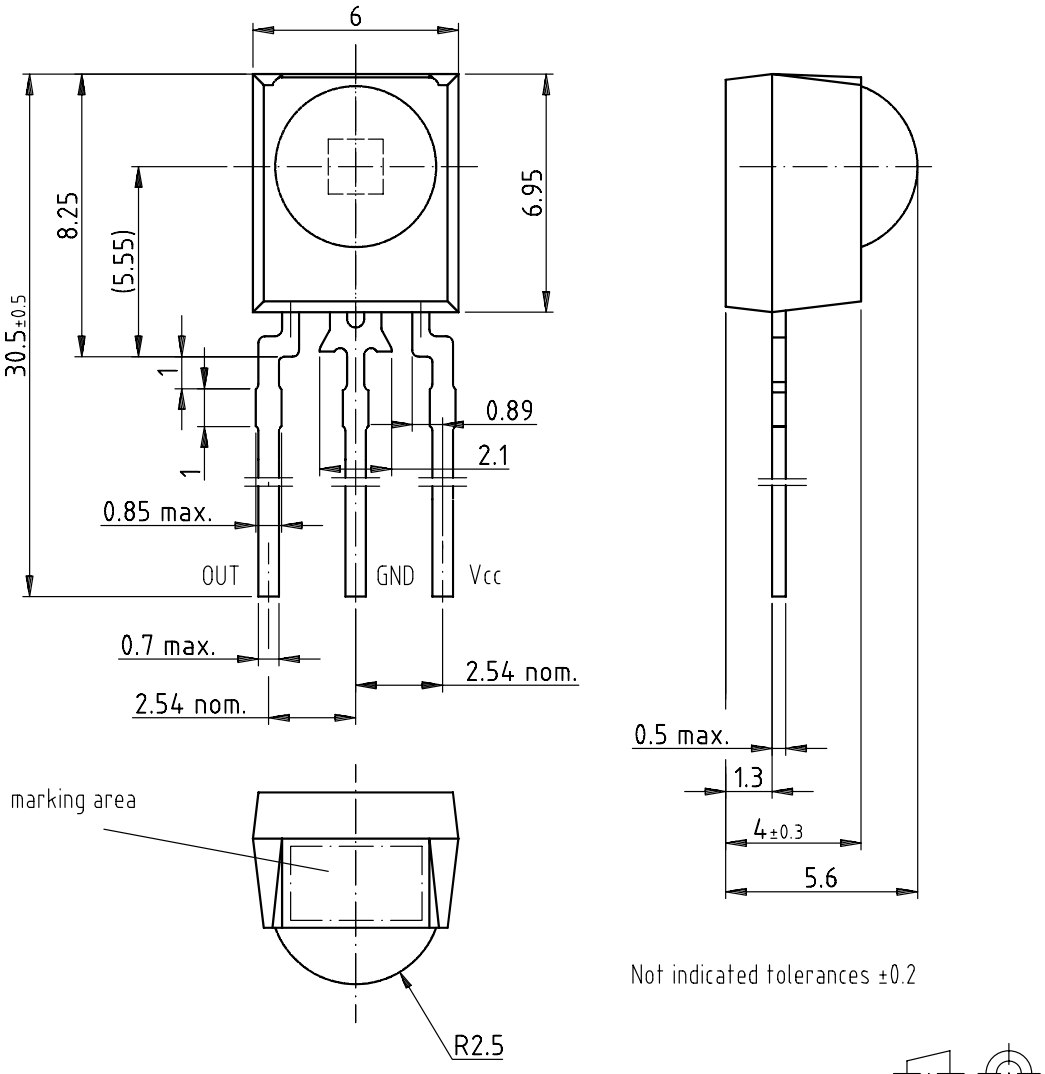


Figure 12. Directivity

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.