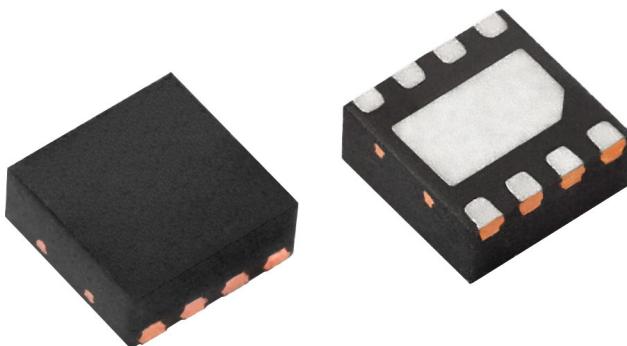


## Preamplifier Circuit for IR Remote Control



### DESCRIPTION

The VSOP383.. is designed for use in an IR receiver application together with a photo pin diode. It is a sophisticated receiver concept that is very sensitive to data signals and compatible with the most common data formats for IR remote control. On the other hand it is immune to DC current caused by DC light sources such as tungsten bulbs. The disturbance signal of fluorescent lamps is suppressed; there are no unwanted pulses at the output.

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

### FEATURES

- Narrow bandpassfilter for all common carrier frequencies
- Intelligent AGC to suppress disturbance from fluorescent lamps and CRTs
- Low power consumption
- Wide supply voltage range
- High immunity against ripple on the supply voltage
- Output active low
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### LINKS TO ADDITIONAL RESOURCES



Product Page



Marking

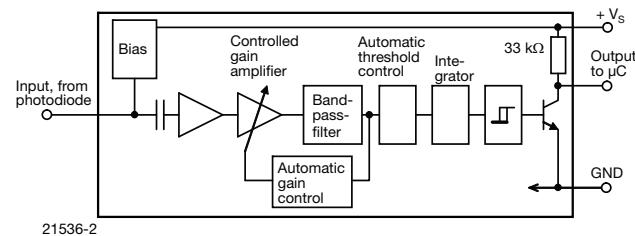
### APPLICATIONS

- Infrared remote control systems

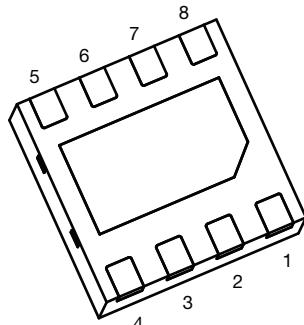
### DESIGN SUPPORT TOOLS

- [3D model](#)

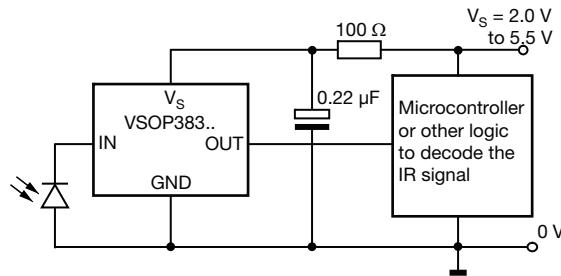
### BLOCK DIAGRAM (simplified)



Vishay recommends using a photodiode with at least 2 mm<sup>2</sup> active area for convenient function in a typical IR remote control application. The connection between the photodiode and pin 7 should be kept as short as possible and carefully shielded to prevent noise coupling.

**MECHANICAL DATA****Pinning:**1, 4, 5 = N.C., 2 =  $V_S$ , 3 = OUT, 6, 8 = GND, 7 = IN**ORDERING CODE**

VSOP.... - 3000 pieces in tape and reel

**APPLICATION CIRCUIT**

The RC filter is optional to improve the EOS robustness and the immunity to supply voltage ripple. We recommend to keep the distance between the photodiode and the input of the VSOP383.. as short as possible.

**PARTS TABLE**

AGC		NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)
Carrier frequency	36 kHz	VSOP38336 (1)(2)(3)
	38 kHz	VSOP38338 (4)(5)(6)(7)(8)(9)
Package		VSOP
Pinning		1, 4, 5 = N.C., 2 = $V_S$ , 3 = OUT, 6, 8 = GND, 7 = IN
Dimensions (mm)		2.0 W x 2.0 H x 0.76 D
Mounting		SMD
Application		Remote control
Best remote control code		(1) MCIR (2) RC5 (3) RC6 (4) NEC (5) MCIR (6) Mitsubishi (7) RECS-80 code (8) r-map (9) XMP

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage	Pin 2	$V_S$	-0.3 to +6	V
Supply current	Pin 2	$I_S$	3	mA
Output voltage	Pin 3	$V_O$	-0.3 to ( $V_S + 0.3$ )	V
Output sink current	Pin 3	$I_O$	5	mA
Power dissipation	$T_{amb} \leq 85^\circ\text{C}$	$P_{tot}$	10	mW
Operating temperature range		$T_{amb}$	-25 to +85	°C
Storage temperature range		$T_{stg}$	-25 to +85	°C
ESD stress, HBM	Pin 2, pin 3, MIL-STD-883C	$V_{ESD}$	2000	V
	Pin 7, MIL-STD-883C	$V_{ESD}$	500	V
ESD stress, MM	Pin 2, pin 3, MIL-STD-883C	$V_{ESD}$	200	V
	Pin 7, MIL-STD-883C	$V_{ESD}$	100	V

**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 CHARACTERISTICS ( $T_{amb} = -30 \text{ }^{\circ}\text{C}$ to $+85 \text{ }^{\circ}\text{C}$ )						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		$V_S$	2.0	-	5.5	V
Supply current (pin 2)	$I_{IN} = 0, V_S = 5 \text{ V}$	$I_S$	0.25	0.35	0.45	mA
Output voltage low (pin 3)	$I_{OL} = 2 \text{ mA}$	$V_{OL}$	-	-	100	mV
Output voltage high (pin 3)	$I_{OL} = 0$	$V_{OH}$	$V_S - 0.25$	-	-	V
Internal pull up resistor (pin 2, pin 3)		$R_{PU}$	-	33	-	k $\Omega$
Max. input DC current	$V_{IN} > 0$	$I_{IN-DCmax.}$	400	-	-	$\mu\text{A}$
Min. signal detection current	$I_{IN-DC} = 0, f_C = f_{BPF}$	$I_{IN-min.}$	-	400	800	pA
	$I_{IN-DC} = 100 \mu\text{A}, f_C = f_{BPF}$	$I_{IN-min.}$	-	5	10	nA
Max. signal detection current	Burst length $t_{pi} > 2 \text{ ms}$	$I_{IN-max.}$	0.1	1	-	mA
	Burst length $t_{pi} < 2 \text{ ms}$	$I_{IN-max.}$	0.5	1	-	mA
Output pulse width	$I_{IN-DC} = 0, f_C = f_{BPF}, I_{IN} = 0.8 \text{ nA to } 50 \mu\text{A}, \text{ testsignal see Fig. 1, BER} \leq 2\%$	$t_{po}$	$t_{pi} - 4/f_0$	$t_{pi}$	$t_{pi} + 4/f_0$	$\mu\text{s}$
Accuracy of bandpass center frequency	$T_{amb} = +25 \text{ }^{\circ}\text{C}$	$f_{BPF}$	$f_0 - 4\%$	$f_0$	$f_0 + 4\%$	kHz
Bandwidth of bandpassfilter	-3 dB, $f_0 = 38 \text{ kHz}$	B	-	3.8	-	kHz

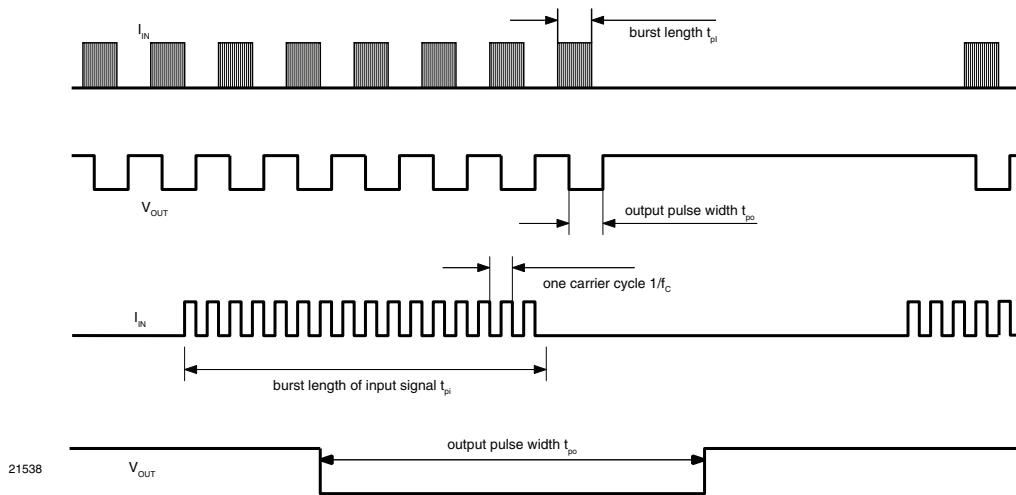


Fig. 1 - Testsignal

21538

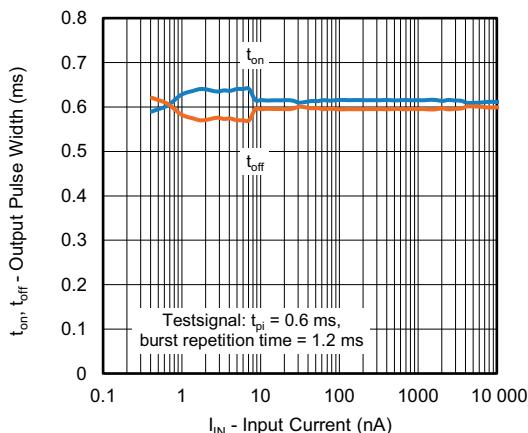
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$ ,  $V_S = 3.3\text{ V}$ , unless otherwise specified)

Fig. 2 - Output Pulse Diagram

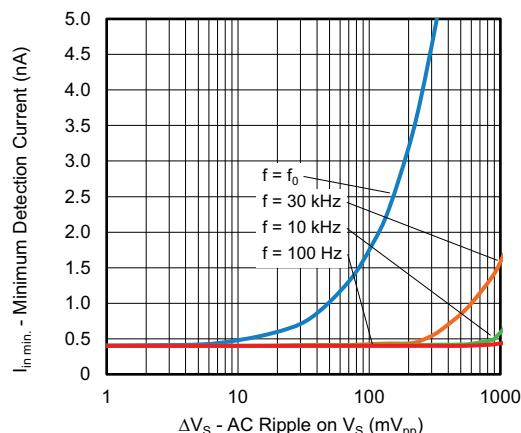


Fig. 5 - Suppression of Ripple on Supply Voltage

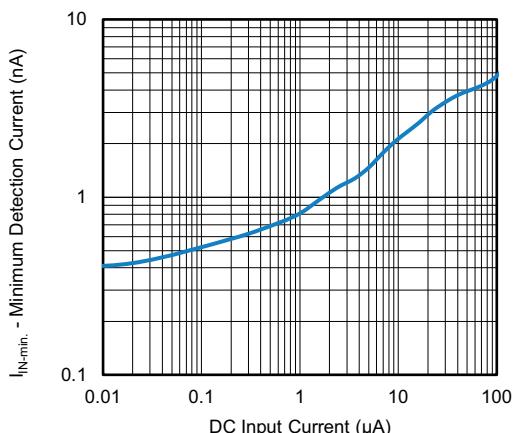


Fig. 3 - Sensitivity vs. DC Input Current

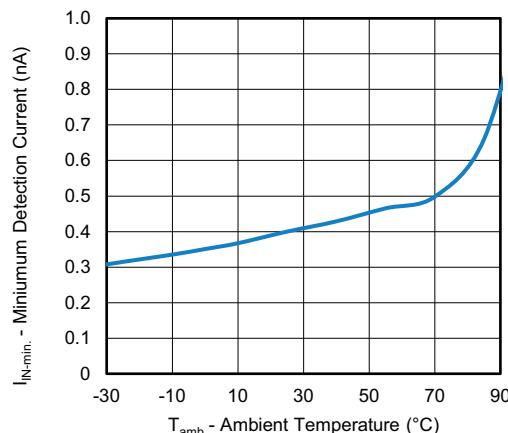


Fig. 6 - Sensitivity vs. Temperature

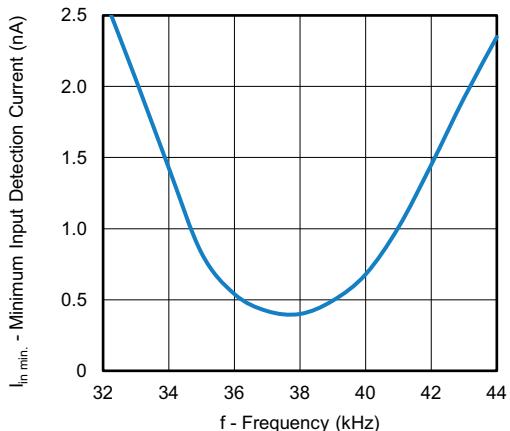


Fig. 4 - Bandpassfilter Characteristic

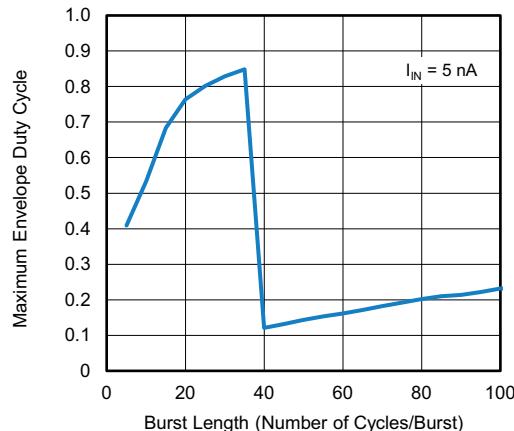
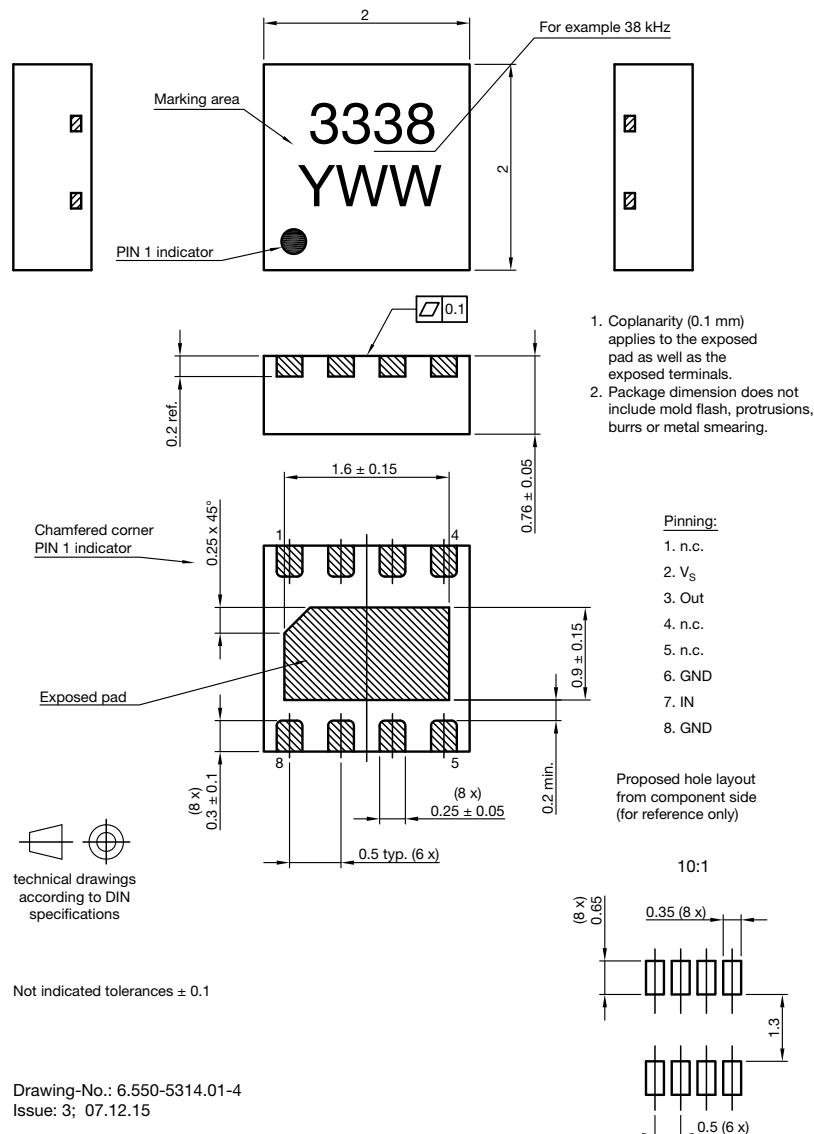


Fig. 7 - Maximum Envelope Duty Cycle

**PACKAGE DIMENSIONS** in millimeters

## ASSEMBLY INSTRUCTIONS

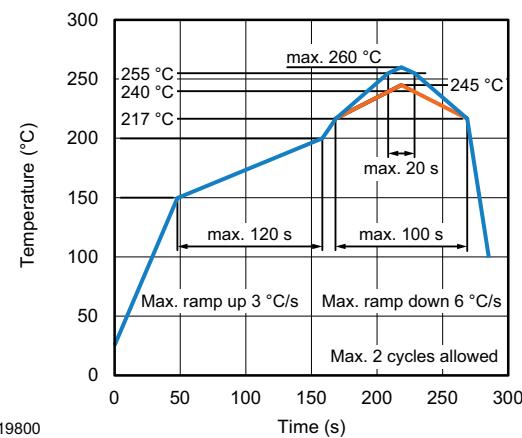
### Reflow Soldering

- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Exercise extreme care to keep the maximum temperature below 260 °C. The temperature shown in the profile means the temperature at the device surface. Since there is a temperature difference between the component and the circuit board, it should be verified that the temperature of the device is accurately being measured
- Handling after reflow should be done only after the work surface has been cooled off

### Manual Soldering

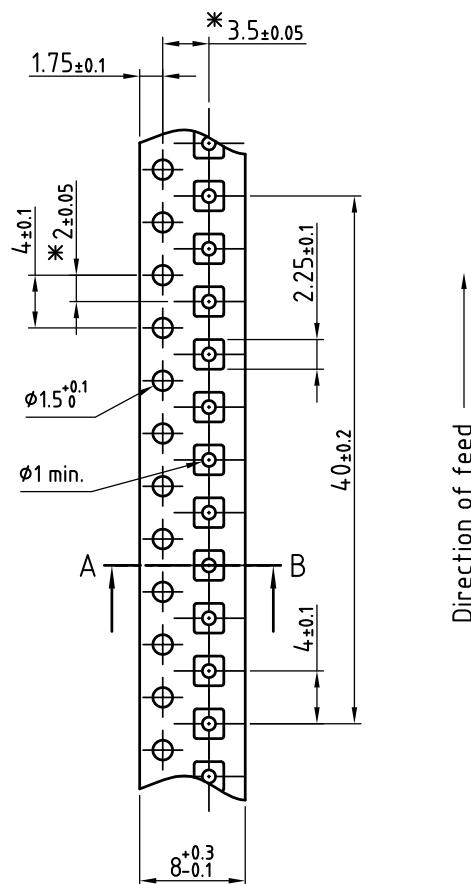
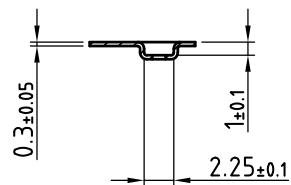
- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off.

## VISHAY LEAD (PB)-FREE REFLOW SOLDER PROFILE

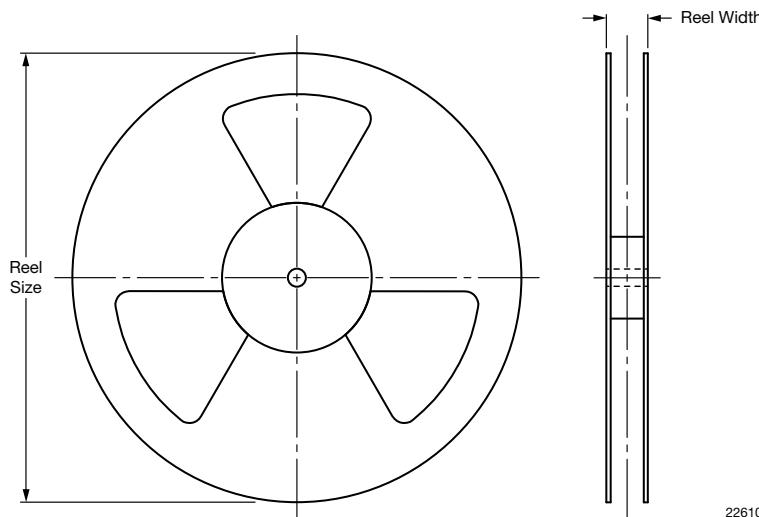


**TAPING VERSION VSOP DIMENSIONS** in millimeters

A-B



\* Measured from centerline of sprocket hole to centerline of pocket

**REEL DIMENSIONS** in millimeters

REEL				
REEL SIZE (inch)	REEL WIDTH (mm)	TRAILER LENGTH (mm)	LEADER LENGTH (mm)	QANTITY PER REEL
7	8.4	160	400	3000

**LABEL****Standard bar code labels for finished goods**

The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled

with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain Vishay Semiconductor GmbH specific data.

VISHAY SEMICONDUCTOR GMBH STANDARD BAR CODE PRODUCT LABEL (finished goods)		
PLAIN WRITING	ABBREVIATION	LENGTH
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by	ACC	-
Packed by	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	xxxxxxxx+	Company logo
LONG BAR CODE TOP	TYPE	LENGTH
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
SHORT BAR CODE BOTTOM	TYPE	LENGTH
Selection-code	X	3
Data-code	N	3
Batch-number	X	10
Filter	-	1
Total length	-	17



### ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electrostatic sensitive devices warning labels are on the packaging.

### VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.



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