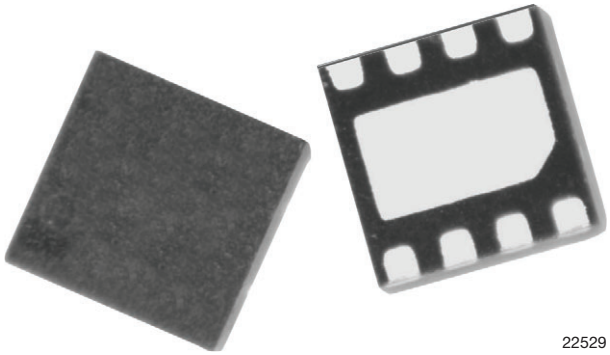
Preamplifier Circuit for IR Remote Control

(please see PCN OMV-877-2015, datasheet is valid until 30th June 2016)



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FEATURES

- Narrow bandpassfilter for all common carrier frequencies
- High immunity against DC light
- 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
- IC manufactured in CMOS technology
- Small QFN package with 2 mm width
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

MECHANICAL DATA

Pinning:

1, 4, 5 = N.C., 2 = V_S, 3 = OUT, 6, 8 = GND, 7 = IN

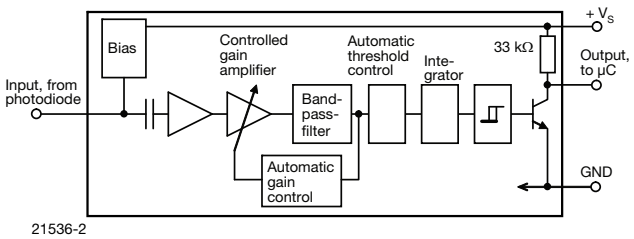
DESCRIPTION

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.

PARTS TABLE

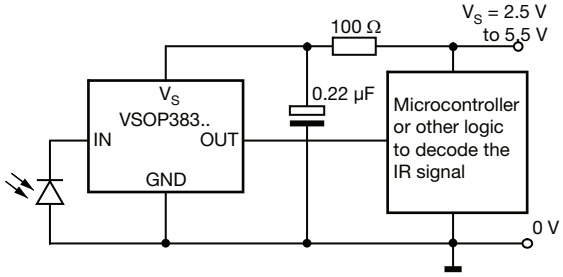
AGC		NOISY ENVIRONMENTS AND SHORT BURSTS (AGC3)
Carrier frequency	36 kHz	VSOP38336 (1)(2)
	38 kHz	VSOP38338 (3)(4)(5)(6)
Package		VSOP
Pinning		1, 4, 5 = N.C., 2 = V_S, 3 = OUT, 6, 8 = GND, 7 = IN
Dimensions (mm)		2.0 W x 2.0 H x 0.76 D
Mounting		SMD
Application		Remote control
Best remote control code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

BLOCK DIAGRAM (simplified)



Vishay recommends using a photodiode with at least 2.3 mm² area. The connection between the photodiode and pin 7 should be kept as short as possible and carefully shielded to prevent noise coupling.

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.

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °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} ≤ 85 °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 °C to +85 °C)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Supply voltage		V_S	2.5	-	5.5	V
Supply current (pin 2)	I_{IN} = 0, V_S = 5 V	I_S	0.25	0.35	0.45	mA
Output voltage low (pin 3)	I_{OL} = 2 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	-	kΩ
Max. input DC current	V_{IN} > 0	$I_{IN\text{-}DCmax.}$	400	-	-	µA
Min. signal detection current	$I_{IN\text{-}DC}$ = 0, f_C = f_{BPF}	$I_{IN\text{-}min.}$	-	400	800	pA
	$I_{IN\text{-}DC}$ = 100 µA, f_C = f_{BPF}	$I_{IN\text{-}min.}$	-	5	10	nA
Output pulse width	$I_{IN\text{-}DC}$ = 0, f_C = f_{BPF}, I_{IN} = 0.8 nA to 50 µA, testsignal see fig. 1, BER ≤ 2%	t_{po}	t_{pi} - 6/f_0	t_{pi}	t_{pi} + 6/f_0	µs
Accuracy of bandpass center frequency	T_{amb} = + 25 °C	f_{BPF}	f_0 - 4 %	f_0	f_0 + 4 %	kHz
Bandwidth of bandpassfilter	- 3 dB, f_0 = 38 kHz	B	-	3.8	-	kHz

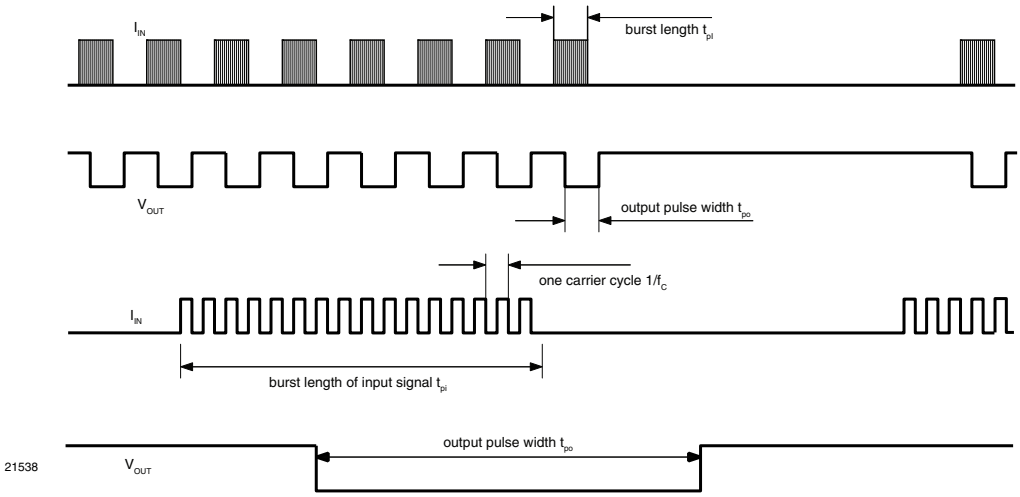

Fig. 1 - Testsignal

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TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, V_S = 3.3 V, unless otherwise specified)

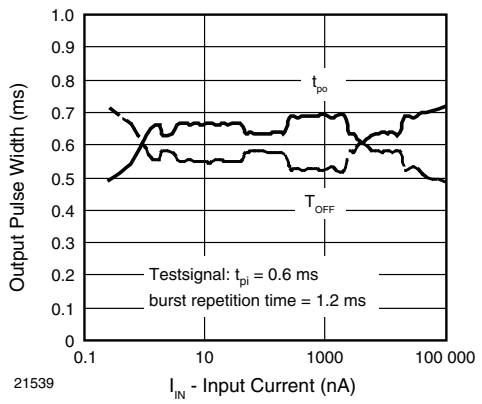

Fig. 2 - Output Pulse Diagram

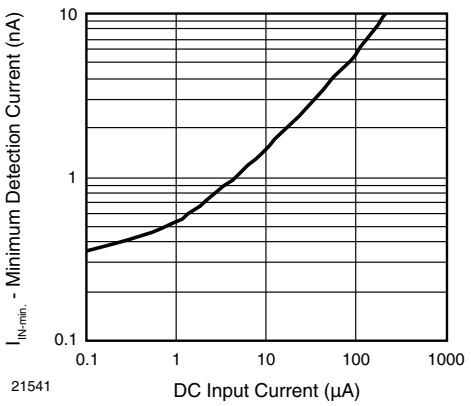

Fig. 3 - Sensitivity vs. DC Input Current

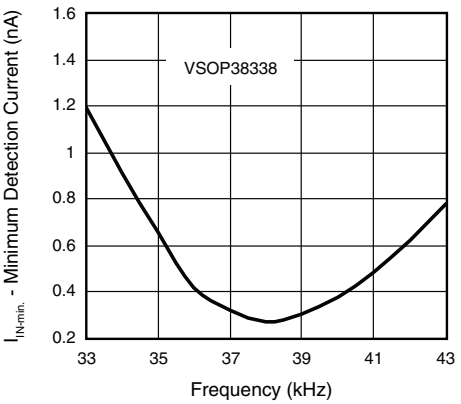

Fig. 4 - Bandpassfilter Characteristic

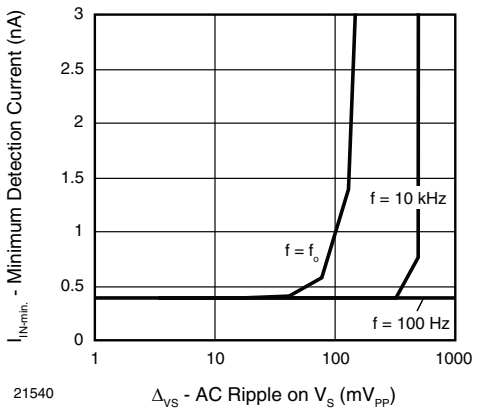

Fig. 5 - Suppression of Ripple on Supply Voltage

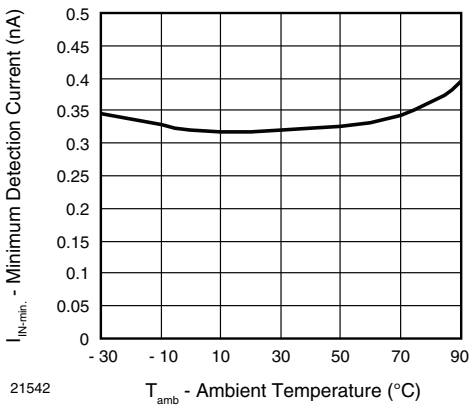

Fig. 6 - Sensitivity vs. Temperature

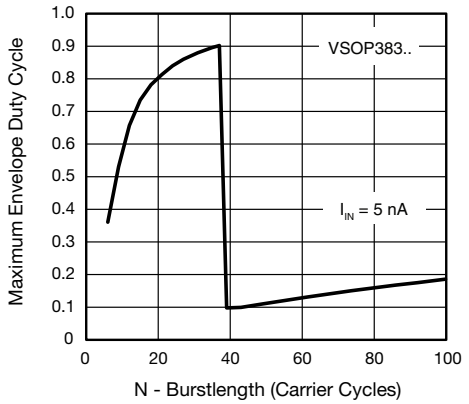

Fig. 7 - Maximum Envelope Duty Cycle

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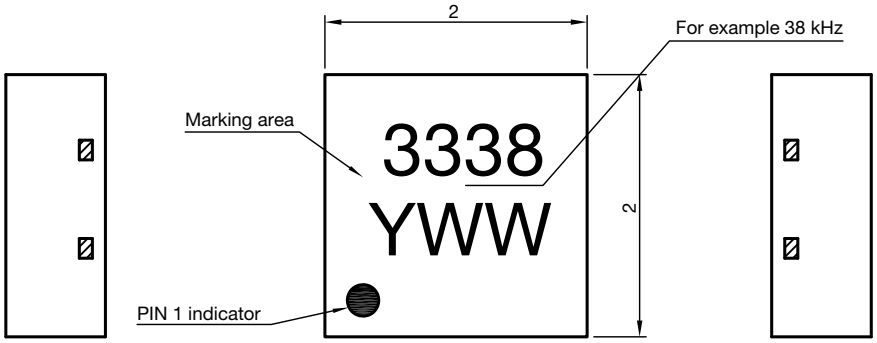
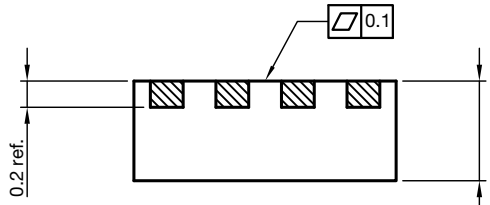
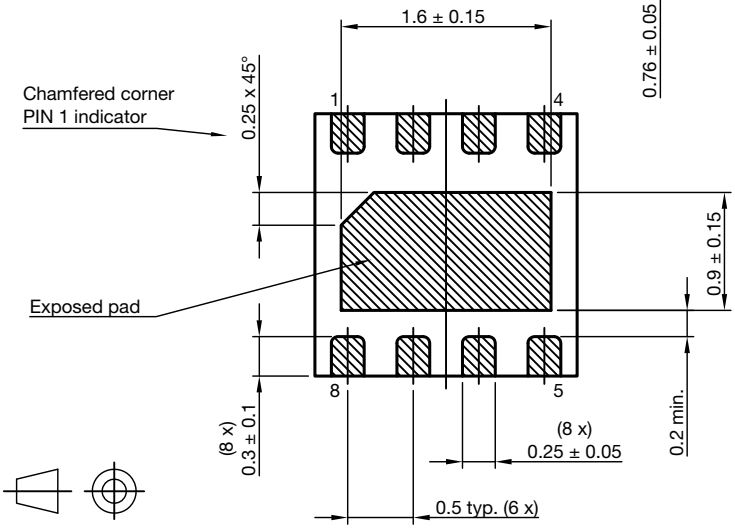
PACKAGE DIMENSIONS in millimeters





1. Coplanarity (0.1 mm) applies to the exposed pad as well as the exposed terminals.
2. Package dimension does not include mold flash, protrusions, burrs or metal smearing.

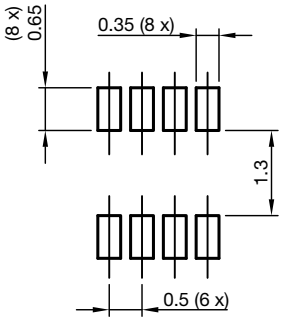


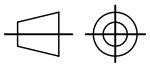
Pinning:

1. n.c.
2. V_S
3. Out
4. n.c.
5. n.c.
6. GND
7. IN
8. GND

Proposed hole layout from component side (for reference only)

10:1





technical drawings according to DIN specifications

Not indicated tolerances ± 0.1

Drawing-No.: 6.550-5314.01-4
Issue: 3; 07.12.15

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ASSEMBLY INSTRUCTIONS

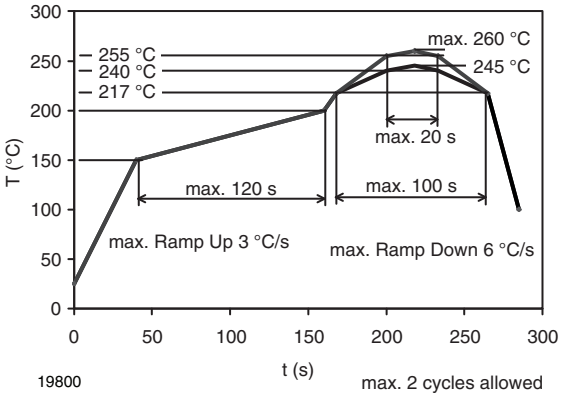
Reflow Soldering

- 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



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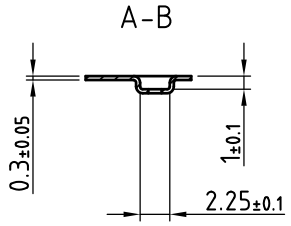
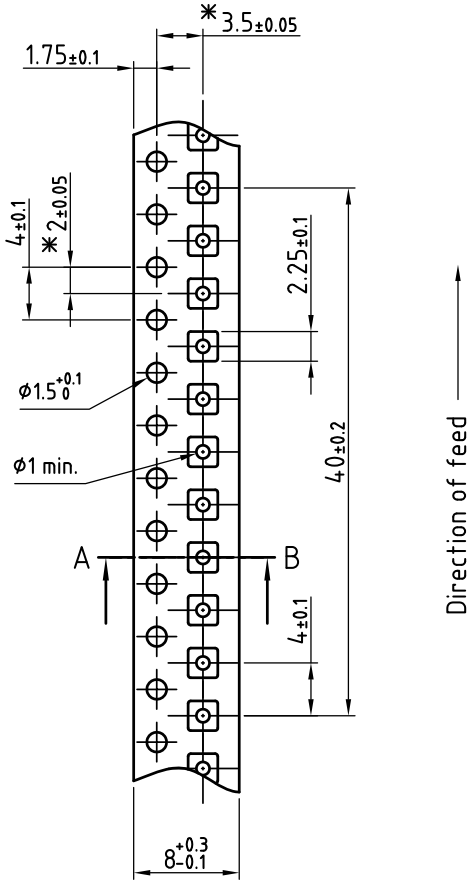
TAPING VERSION VSOP DIMENSIONS in millimeters





* Measured from centerline of sprocket hole to centerline of pocket

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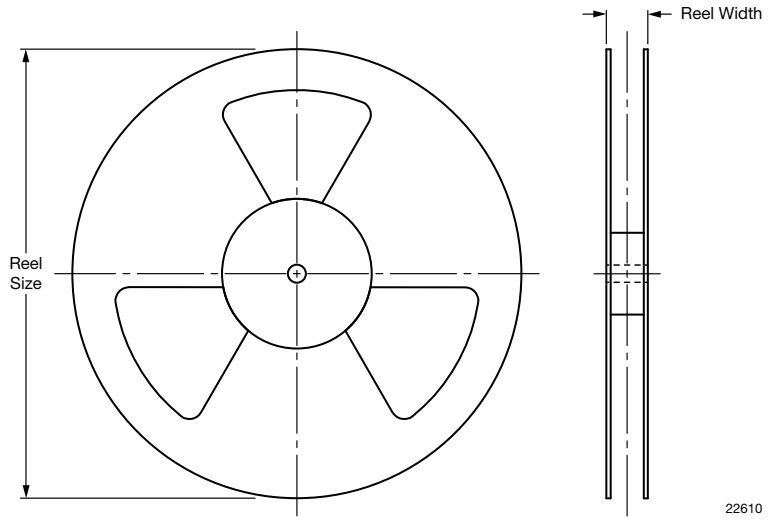
REEL DIMENSIONS in millimeters



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 WRITTING	**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	xxxxxxx+	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

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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

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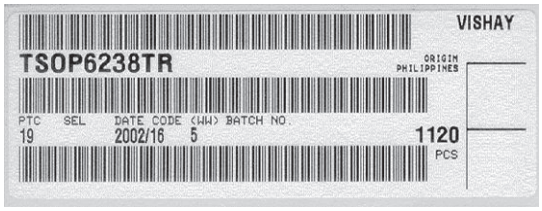

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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

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