

GENERAL DESCRIPTION

The VA1200 is the world's first piezoelectric MEMS voice accelerometer. The VA1200 can be used to pick up the wearer's own voice through bone conduction. Using the VA1200 voice accelerometer in conjunction with a standard microphone, the application can achieve superior background and wind noise reduction.

The VA1200 has an ultra-small 2.9 mm X 2.76 mm X 0.9 mm package and is solder reflow compatible with no sensitivity degradation. It operates in environmentally harsh surroundings because it is dust and moisture resistant.

FEATURES

- Provides superior background and wind noise reduction
- Small Footprint – 2.9mm x 2.76 mm x 0.9mm
- Single Ended Analog Output
- High Frequency Bandwidth for user voice pickup

APPLICATIONS

- Truly Wireless Stereo (TWS) Headphones
- Background and Wind Noise Reduction
- Headsets
- Neckbands
- Earbuds
- Headsets / Hearables / Wearables

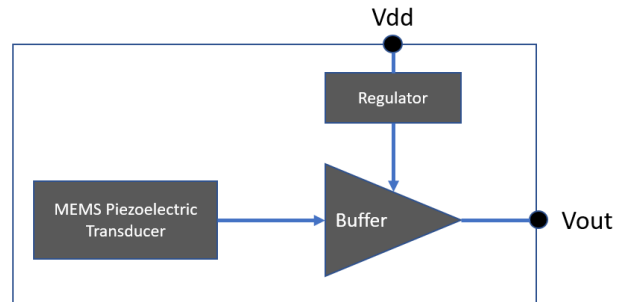
ORDERING INFORMATION

Product	Package Description	Quantity
VA1200AA	13" Tape and Reel	5,000



See Lid Marking Section for actual marking

BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT

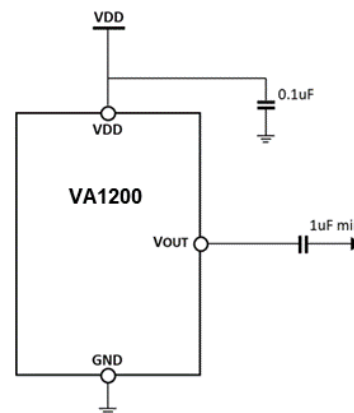


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ANALOG OUTPUT SPECIFICATIONS

All specifications are at 25°C, VDD = 1.8 V unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Sensitivity	Sens	re 1V per g @ 1kHz, Single-ended		-43		dB
Resonant Peak		Frequency		3		kHz
Acceleration Noise	An	BW = 2400 Hz, A-weighted		1.5		mg rms
Max Input Level		THD < 10%		10		g
Startup Time		Within ±0.5dB of actual sensitivity		200		µS
Sensitive Axis			Z axis			
Polarity		Acceleration in +Z direction	Increase in output voltage			

ELECTRICAL SPECIFICATIONS

All specifications are at 25°C, VDD = 1.8 V unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage	VDD		1.6	1.8	3.6	V
Supply Current	IDD	VDD ≤ 1.8 V, Mode = Normal		160		µA
Power Supply Rejection Ratio	PSRR	VDD = 1.8, 1kHz, 200mV _{PP} Sine wave		65		dB
Power Supply Rejection	PSR	VDD = 1.8, 217Hz, 100mV _{PP} square wave, 20 Hz – 20kHz, A-weighted		-85		dB(A)
Output Impedance	ZOUT			400		Ω
Output DC Offset				0.8		V

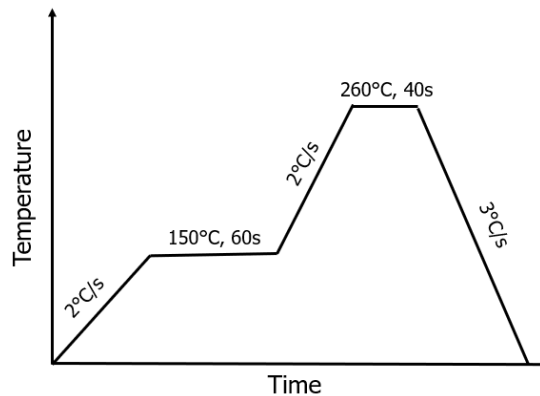
ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Supply Voltage	-0.3 to +3.6	V
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-55 to +150	°C
Mechanical Shock	10,000g per IEC 60028-2-27:2008	

RELIABILITY SPECIFICATIONS

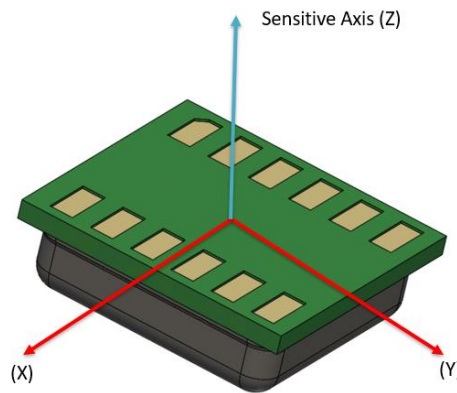
Stress Test	Description
Temperature Cycling Test	-40°C to +125°C, 850 cycles
High Temperature Operating Life	+125°C, 1000 hours, biased
High Temperature Storage	+125°C, 1000 hours, unbiased
Temperature Humidity Bias	+85°C, 85% RH, 500 hours, biased
Reflow	3 reflow cycles with peak temperature of +260°C
ESD-HBM	1 discharge, all pins, ± 2kV
ESD-CDM	3 discharges, all pins, ± 750V

SOLDER REFLOW PROFILE



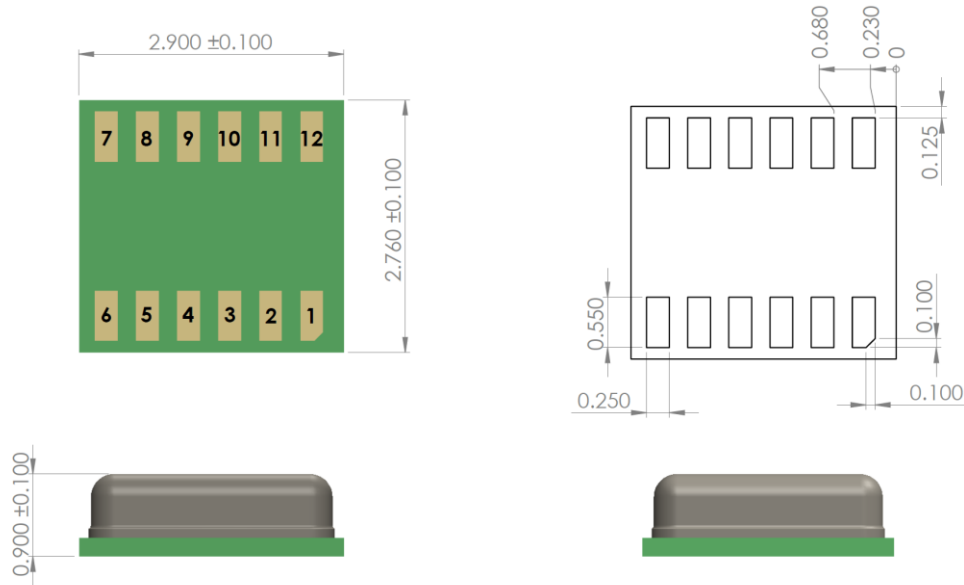
Solder Reflow Profile

SENSITIVE AXIS



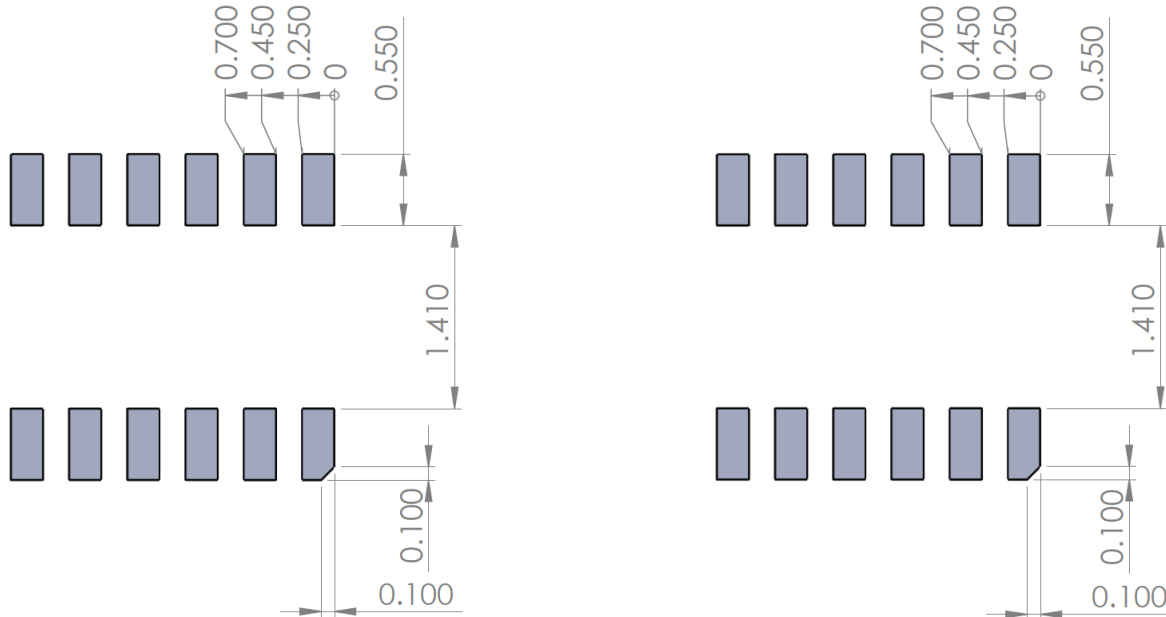
Note: Sensitive Axis (Z), Direction Shown (Z-)

DIMENSIONS AND PIN LAYOUT



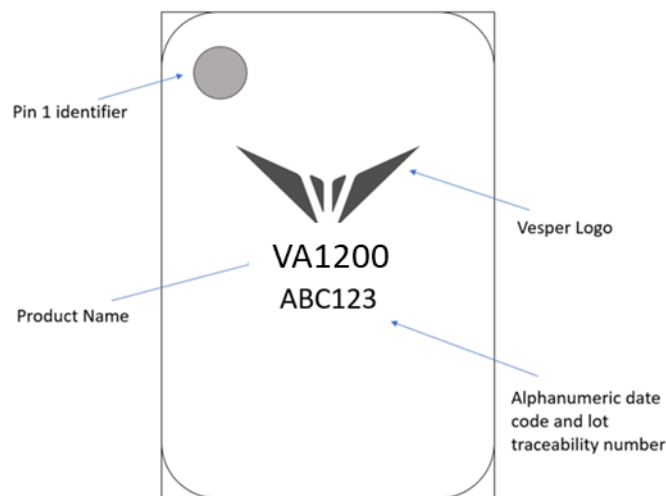
Pin Number	Pin Name	Description
1	Vout	Analog Output
2	Gnd	Ground
3	Gnd	Ground
4	Gnd	Ground
5	Gnd	Ground
6	Gnd	Ground
7	Gnd	Ground
8	Gnd	Ground
9	Gnd	Ground
10	Gnd	Ground
11	Gnd	Ground
12	Vdd	Power

PCB DESIGN AND LAND PATTERN LAYOUT



PCB and Solder Stencil Pattern – All dimensions are in mm

LID MARKING



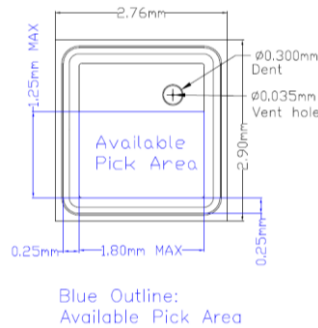
Lid Marking Description

Note: Parts marked "VE" in the product name are Engineering samples. Final samples will be marked "VA"

HANDLING INSTRUCTIONS

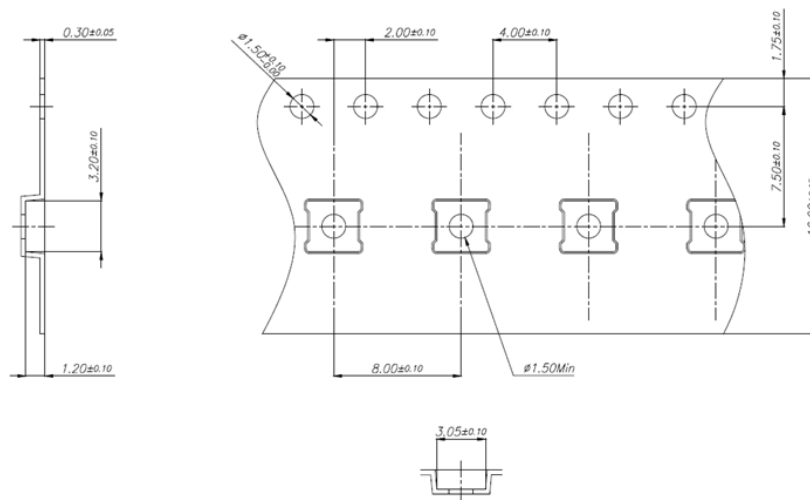
Vesper’s piezoelectric MEMS devices are very resistant to harsh environments such as dust and moisture. However, to avoid mechanical damage to the MEMS structure, we recommend using appropriate handling procedures when manually handling the parts or when using pick and place equipment. The following guidelines will avoid damage:

- A vacuum pen may be used with care on the top side only as specified within the datasheet.
- Do not apply very high air pressure over the vent hole.
- Do not insert any large particles or objects in the vent hole. The MEMS structure is resistant to small particles per IP5x specification.
- Do not board wash or clean after the reflow process or expose the vent hole to harsh chemicals.
- Use a placement force of <1,000g when using a pick and place machine.
- Recommended device pick location is given below



Recommended device pick location

TAPE AND REEL SPECIFICATIONS



Tape & Reel specification

REVISION HISTORY

Revision	Date	Description
0.0.0	08/08/2019	Initial Revision
0.0.1	08/14/2019	Updated package pinout
0.0.2	09/24/2019	Updated package pinout
0.0.3	03/05/2020	Updated NC Pins (2-11) to GND
0.0.4	03/16/2020	Added Lid Marking, PCB land and Stencil pattern, Tape & Reel specification and lid marking to identify Pin 1 orientation
0.0.5	4/6/2020	Revised Sensitivity, Resonant Peak Renamed "Overload level" to "Max Input Level"



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手机:156-2521-4151

网址: <http://www.dwintech.com/VespermemsFlyer.htm>

深圳市南频科技有限公司

D-Win Technology(HongKong) Co.,Ltd