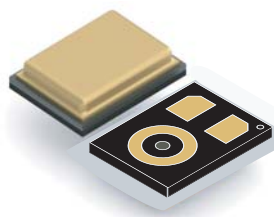


## MEMS audio sensor high-performance analog bottom-port microphone

Datasheet - production data



**RHLGA metal cap 3-lead**  
**3.35 x 2.5 x 0.98 mm**

### Description

The MP23AB02B is a compact, low-power microphone built with a low-profile sensing element.

The sensing element, capable of detecting acoustic waves, is manufactured using a specialized silicon micromachining process to produce audio sensors.

The MP23AB02B has an acoustic overload point of 124 dBSPL with a 64dB signal-to-noise ratio.

The MP23AB02B is available in a package compliant with reflow soldering and is guaranteed to operate over an extended temperature range from -40 °C to +85 °C.

### Features

- Single supply voltage operation
- Low power consumption
- Omnidirectional sensitivity
- High signal-to-noise ratio
- High bandwidth
- Package compliant with reflow soldering

**Table 1. Device summary**

Order code	Temperature range (°C)	Package	Packing
MP23AB02B	-40 to +85	(3.35 x 2.5 x 0.98) mm	Tray
MP23AB02BTR	-40 to +85	(3.35 x 2.5 x 0.98) mm	Tape and reel

# 1 Pin description

Figure 1. Pin connections

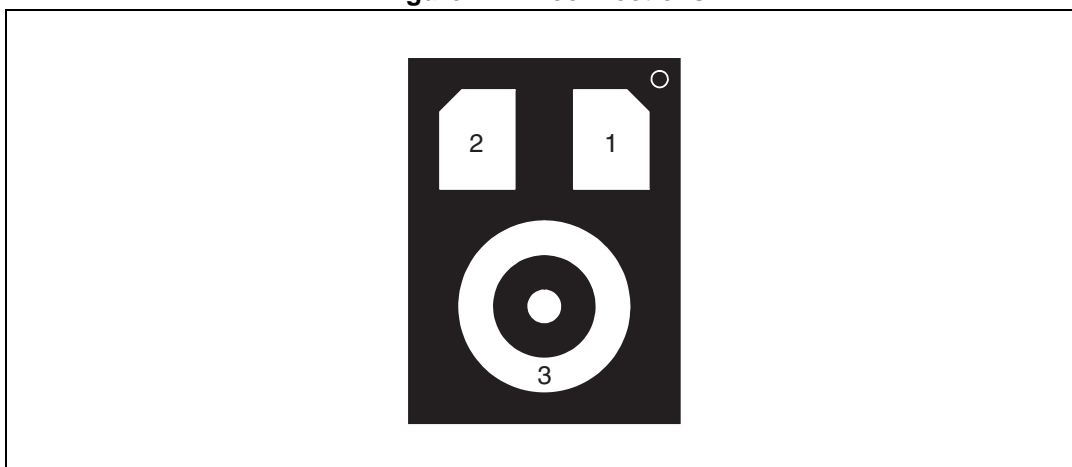


Table 2. Pin description

Pin n°	Pin name	Function
1	Out	Analog output
2	Vdd	Power supply
3	GND	Ground

## 2 Acoustic and electrical specifications

### 2.1 Acoustic and electrical characteristics

The values listed in the table below are specified for  $V_{dd} = 1.8\text{ V}$ ,  $T_{amb} = 25\text{ °C}$  unless otherwise specified.

**Table 3. Acoustic and electrical characteristics**

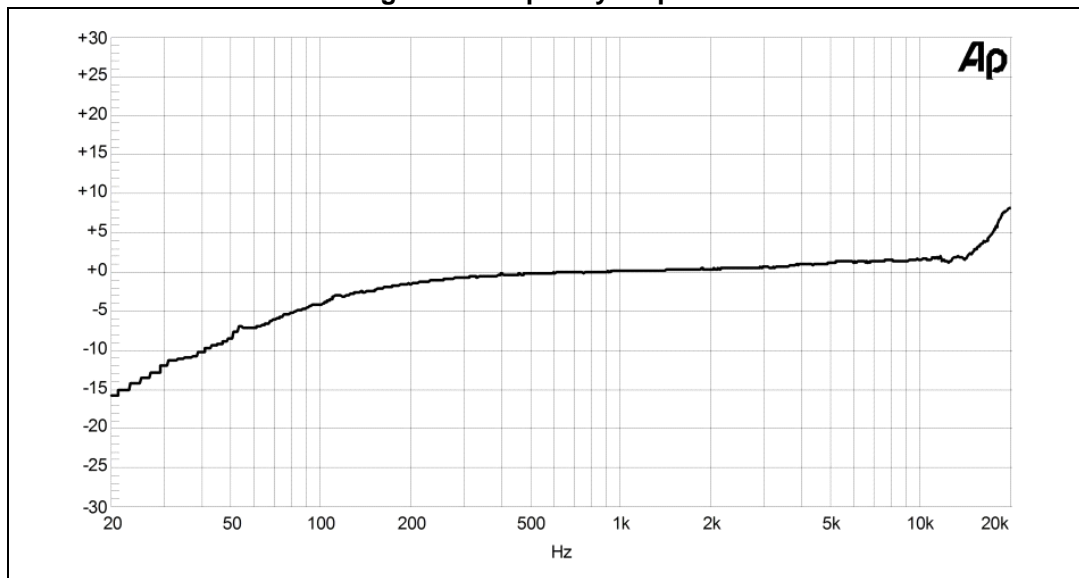
Symbol	Parameter	Test condition	Min.	Typ. <sup>(1)</sup>	Max.	Unit
Vdd	Supply voltage		1.6	1.8	3.6	V
Idd	Current consumption	mean value = 2 V		150	220	μA
So	Sensitivity	1 kHz (0 dB = 1 V/Pa)	-41	-38	-35	dBV/PA
SNR	Signal-to-noise ratio	A-weighted, 1 kHz (0 dB = 1 V/Pa)		64		dBA
Top	Operating temperature range		-40		+85	°C

1. Typical specifications are not guaranteed

**Table 4. Distortion specifications at 1 kHz**

Parameter	Test condition	Value
Distortion	94	< 0.5%
Distortion	120	< 2%
Distortion	124	= 10%

**Figure 2. Frequency response**



### 3 Absolute maximum ratings

Stresses above those listed as “Absolute maximum ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device under these conditions is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

**Table 5. Absolute maximum ratings**

Symbol	Ratings	Maximum value	Unit
V <sub>dd</sub>	Supply voltage	-0.5 to 4	V
T <sub>STG</sub>	Storage temperature range	-40 to +125	°C



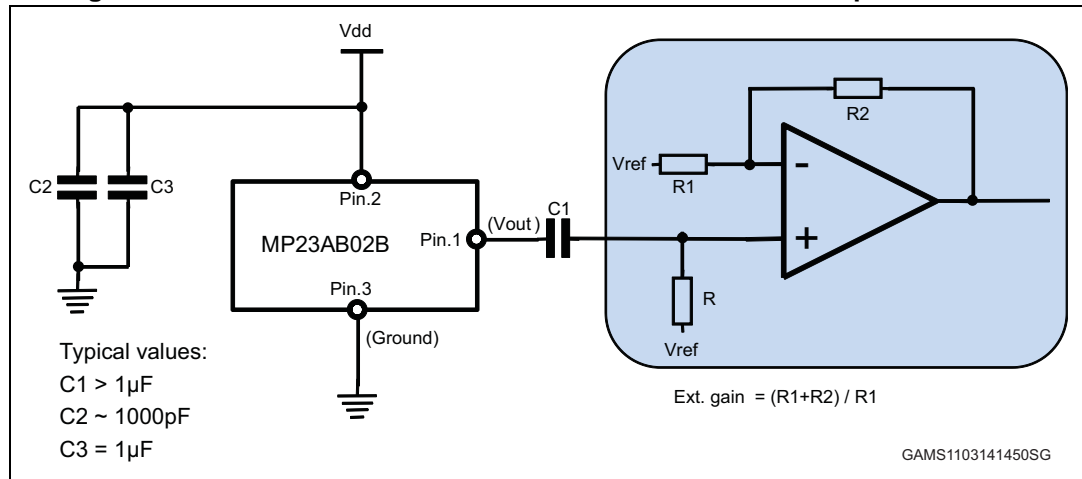
This device is sensitive to mechanical shock, improper handling can cause permanent damage to the part.



This device is ESD-sensitive, improper handling can cause permanent damage to the part.

## 4 Application recommendations

Figure 3. MP23AB02B electrical connections and external component values



## 5 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 4. RHLGA metal cap 3-lead 3.35 mm x 2.5 mm x 0.98 mm package outline

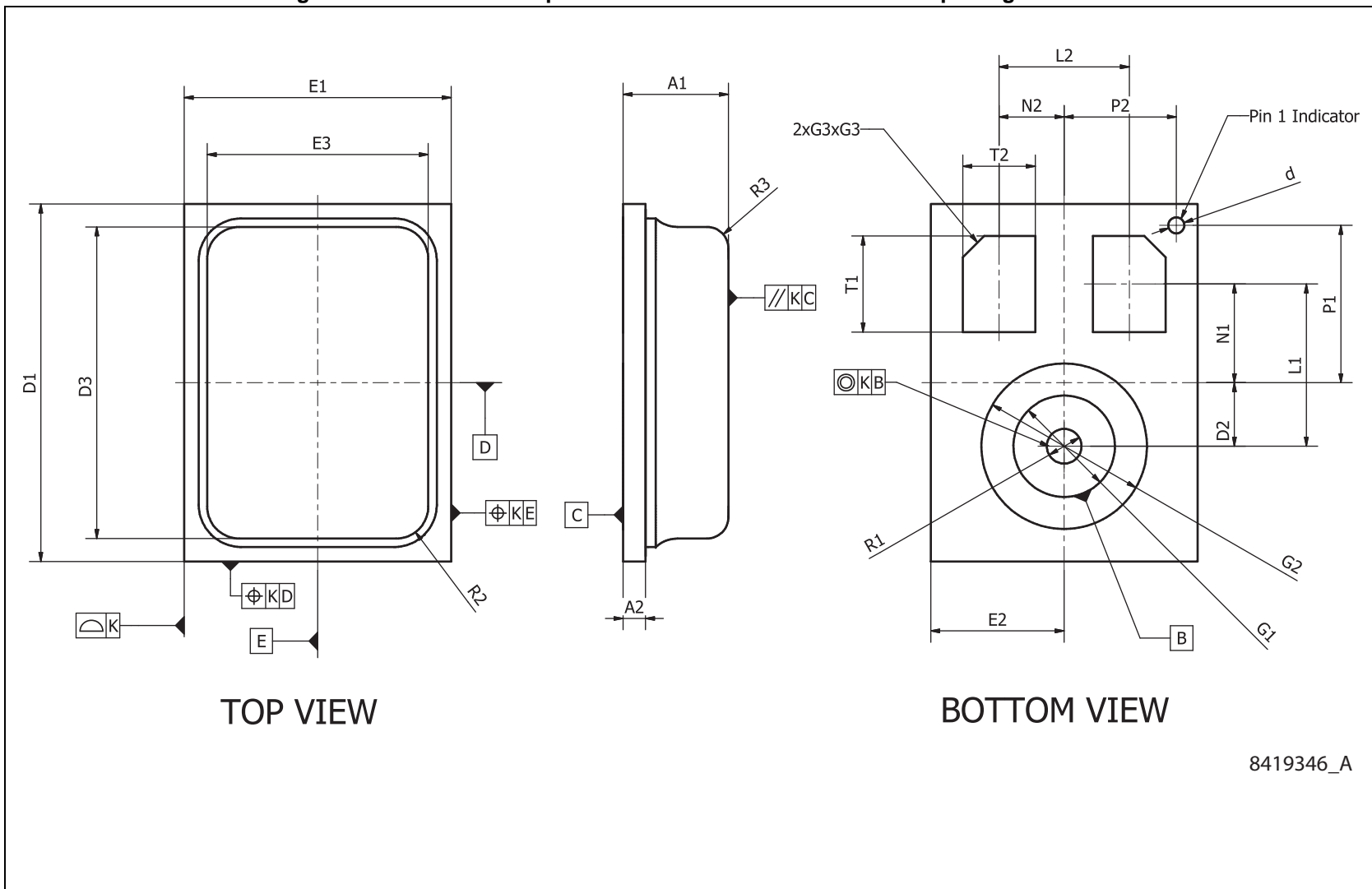
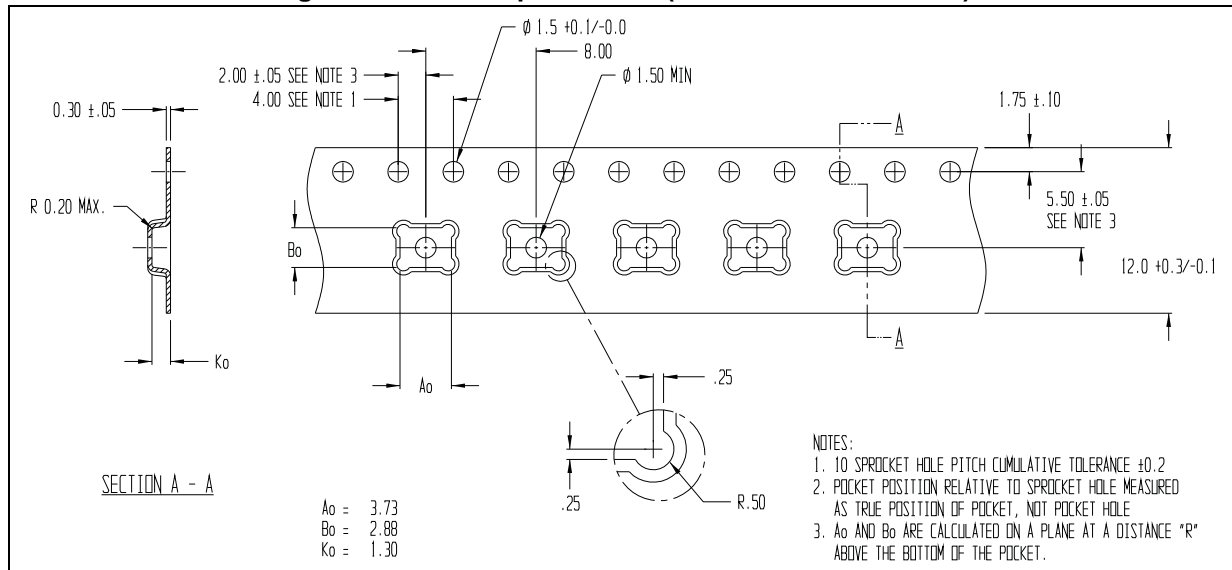


Table 6. RHLGA metal cap 3-lead (3.35 x 2.5 x 0.98 mm) package dimensions

Reference	Dimensions (mm)		
	Min.	Typ.	Max.
A1	0.880	0.980	1.080
A2	0.200	0.250	0.300
D1	3.250	3.350	3.450
D2	0.495	0.595	0.695
D3	2.770	2.920	3.070
R1	0.275	0.325	0.375
R2		0.28	
R3		0.25	
E1	2.400	2.500	2.600
E2	1.150	1.250	1.350
E3	1.920	2.070	2.220
L1	1.480	1.520	1.560
L2	1.180	1.220	1.260
N1	0.885	0.925	0.965
N2	0.570	0.610	0.650
T1	0.860	0.900	0.940
T2	0.640	0.680	0.720
G1	0.900	0.950	1.000
G2	1.400	1.550	1.600
G3	0.100	0.150	0.200
P1	1.425	1.475	1.525
P2	1.000	1.050	1.100
d		0.150	
K		0.050	



**Figure 5. RHLGA tape and reel (dimensions are in mm.)**



## 6 Soldering information

Figure 6. Recommended soldering profile limits

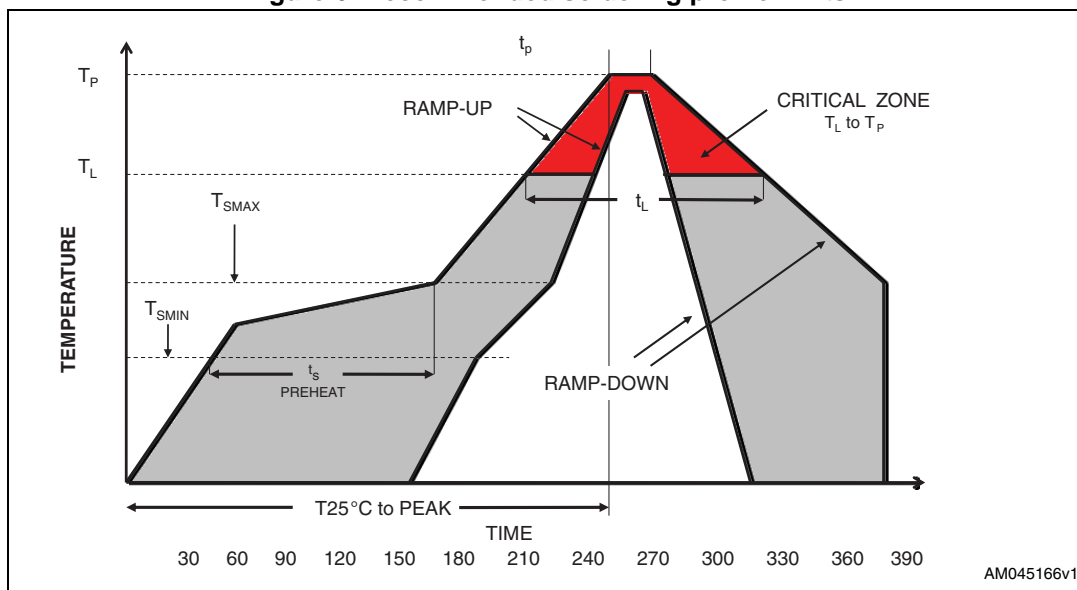


Table 7. Recommended soldering profile limits

Description	Parameter	Pb free
Average ramp rate	$T_L$ to $T_P$	3 °C/sec max
Preheat Minimum temperature Maximum temperature Time ( $T_{SMIN}$ to $T_{SMAX}$ )	$T_{SMIN}$ $T_{SMAX}$ $t_s$	150 °C 200 °C 60 sec to 120 sec
Ramp-up rate	$T_{SMAX}$ to $T_L$	
Time maintained above liquidus temperature Liquidus temperature	$t_L$ $T_L$	60 sec to 150 sec 217 °C
Peak temperature	$T_P$	260 °C max
Time within 5 °C of actual peak temperature		20 sec to 40 sec
Ramp-down rate		6 °C/sec max
Time 25 °C ( $t = 25$ °C) to peak temperature		8 minutes max

## 7 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
21-Mar-2014	1	Initial release.

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)