

# ANTREX Electronics

Electronic Components Sourcing Information

---

## Product Reference Information

**Part Number:** MP34DB02TR  
**Manufacturer:** STMicroelectronics  
**Package:** Tape & Reel (TR), Cut Tape (CT)  
**Availability:** Please confirm with sales

**Product Page:**

<https://antrexco.com/product/details/stmicroelectronics/mp34db02tr.html>

**Request a Quote:**

[Submit RFQ for this part](#)



Scan for product page

## Contact Information

Email: [info@antrexco.com](mailto:info@antrexco.com)

WhatsApp: +86-186-8066-5326

Website: <https://antrexco.com>

## Quality & Trust

New & Original Components

Supplier verification and packaging condition review

CoC / RoHS / REACH documents available on request

Secure sourcing support for OEM / EMS projects

**Note:**

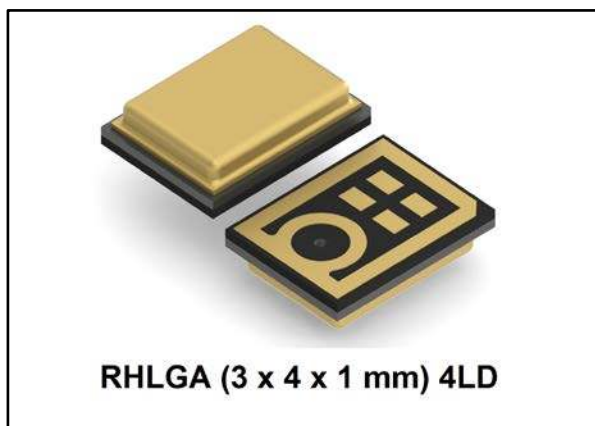
This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

---

## MEMS audio sensor omnidirectional digital microphone

Datasheet - production data



### Features

- Single supply voltage
- Low power consumption
- 120 dB SPL acoustic overload point
- 62.6 dB signal-to-noise ratio
- Omnidirectional sensitivity
- -26 dBFS sensitivity
- PDM single-bit output with option for stereo configuration
- RHLGA package
  - Bottom-port design
  - SMD-compliant
  - EMI-shielded
  - ECOPACK®, RoHS and “Green” compliant

### Applications

- Mobile terminals
- Laptop and notebook computers
- Portable media players
- VoIP

- Speech recognition
- A/V eLearning devices
- Gaming and virtual reality input devices
- Digital still and video cameras
- Antitheft systems

### Description

The MP34DB02 is an ultra-compact, low-power, omnidirectional, digital MEMS microphone built with a capacitive sensing element and an IC interface with stereo operation capability.

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

The IC interface is manufactured using a CMOS process that allows designing a dedicated circuit able to provide a digital signal externally in PDM format.

The MP34DB02 has an acoustic overload point of 120 dB SPL with a best-on-the-market 62.6 dB signal-to-noise ratio and -26 dBFS sensitivity.

The MP34DB02 is available in a bottom-port, SMD-compliant, EMI-shielded package and is guaranteed to operate over an extended temperature range from -40 °C to +85 °C.

**Table 1: Device summary**

| Part number | Temp. range [°C] | Package                  | Packing       |
|-------------|------------------|--------------------------|---------------|
| MP34DB02TR  | -40 to +85       | RHLGA 4 LD<br>(3x4x1) mm | Tape and reel |

---

## Contents

|          |                                                     |           |
|----------|-----------------------------------------------------|-----------|
| <b>1</b> | <b>Pin description .....</b>                        | <b>5</b>  |
| <b>2</b> | <b>Acoustic and electrical specifications .....</b> | <b>6</b>  |
|          | 2.1 Acoustic and electrical characteristics.....    | 6         |
|          | 2.2 Timing characteristics .....                    | 7         |
|          | 2.3 Frequency response .....                        | 8         |
| <b>3</b> | <b>Sensing element.....</b>                         | <b>9</b>  |
| <b>4</b> | <b>Absolute maximum ratings.....</b>                | <b>10</b> |
| <b>5</b> | <b>Functionality .....</b>                          | <b>11</b> |
|          | 5.1 L/R channel selection.....                      | 11        |
| <b>6</b> | <b>Application recommendations .....</b>            | <b>12</b> |
| <b>7</b> | <b>Package information .....</b>                    | <b>13</b> |
|          | 7.1 Soldering information .....                     | 13        |
|          | 7.2 RHLGA package information.....                  | 14        |
| <b>8</b> | <b>Revision history .....</b>                       | <b>16</b> |

## List of tables

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| Table 1: Device summary .....                                                        | 1  |
| Table 2: Pin description .....                                                       | 5  |
| Table 3: Acoustic and electrical characteristics .....                               | 6  |
| Table 4: Distortion specifications .....                                             | 6  |
| Table 5: Timing characteristics .....                                                | 7  |
| Table 6: Absolute maximum ratings .....                                              | 10 |
| Table 7: L/R channel selection .....                                                 | 11 |
| Table 8: Recommended soldering profile limits.....                                   | 13 |
| Table 9: RHLGA 4LD 3x4 mm (metal cap) 0.25 mm port hole package mechanical data..... | 14 |
| Table 10: Document revision history .....                                            | 16 |

## List of figures

|                                                                                |    |
|--------------------------------------------------------------------------------|----|
| Figure 1: Pin connections .....                                                | 5  |
| Figure 2: Timing waveforms .....                                               | 7  |
| Figure 3: Frequency response .....                                             | 8  |
| Figure 4: MP34DB02 electrical connections.....                                 | 12 |
| Figure 5: MP34DB02 electrical connections for stereo configuration.....        | 12 |
| Figure 6: Recommended soldering profile limits .....                           | 13 |
| Figure 7: RHLGA 4LD 3x4 mm (metal cap) 0.25 mm port hole package outline ..... | 14 |

# 1 Pin description

Figure 1: Pin connections

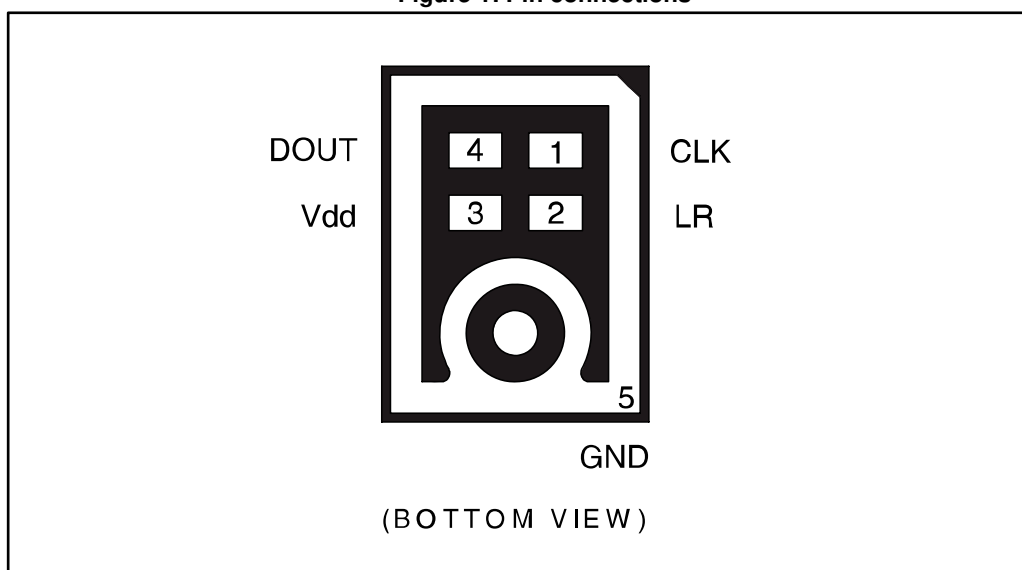


Table 2: Pin description

| Pin number      | Pin name | Function                     |
|-----------------|----------|------------------------------|
| 1               | CLK      | Synchronization input clock  |
| 2               | LR       | Left/right channel selection |
| 3               | Vdd      | Power supply                 |
| 4               | DOUT     | Left/right PDM data output   |
| 5 (ground ring) | GND      | 0 V supply                   |

## 2 Acoustic and electrical specifications

### 2.1 Acoustic and electrical characteristics

The values listed in the table below are specified for Vdd = 1.8 V, Clock = 2.4 MHz, T = 25 °C, unless otherwise noted.

**Table 3: Acoustic and electrical characteristics**

| Sym.   | Parameter                                             | Test condition                            | Min. | Typ. <sup>(1)</sup> | Max. | Unit   |
|--------|-------------------------------------------------------|-------------------------------------------|------|---------------------|------|--------|
| Vdd    | Supply voltage                                        |                                           | 1.64 | 1.8                 | 3.6  | V      |
| Idd    | Current consumption in normal mode                    | Mean value <sup>(2)</sup>                 |      | 0.65                |      | mA     |
| IddPdn | Current consumption in power-down mode <sup>(3)</sup> |                                           |      | 20                  |      | μA     |
| Sc     | Short-circuit current                                 |                                           | 1    |                     | 10   | mA     |
| AOP    | Acoustic overload point                               |                                           |      | 120                 |      | dB SPL |
| So     | Sensitivity                                           | at 1 kHz, 1 Pa                            | -29  | -26                 | -23  | dB FS  |
| SNR    | Signal-to-noise ratio                                 | A-weighted at 1 kHz, 1 Pa                 |      | 62.6                |      | dB     |
| PSR    | Power supply rejection                                | 100 mVpp square wave @ 217 Hz, A-weighted |      | -86                 |      | dB FS  |
| Clock  | Input clock frequency <sup>(4)</sup>                  |                                           | 1    | 2.4                 | 3.25 | MHz    |
| TWK    | Wake-up time <sup>(5)</sup>                           | guaranteed by design                      |      |                     | 10   | ms     |
| Top    | Operating temperature range                           |                                           | -40  |                     | +85  | °C     |

**Notes:**

<sup>(1)</sup>Typical specifications are not guaranteed.

<sup>(2)</sup>No load on DOUT line.

<sup>(3)</sup>Input clock in static mode.

<sup>(4)</sup>Duty cycle: min = 40% max = 60%

<sup>(5)</sup>Time from the first clock edge to valid output data.

**Table 4: Distortion specifications**

| Parameter  | Test condition             | Value        |
|------------|----------------------------|--------------|
| Distortion | 100 dB SPL (50 Hz - 4 kHz) | < 1% THD + N |
| Distortion | 115 dB SPL (1 kHz)         | < 5% THD + N |

## 2.2 Timing characteristics

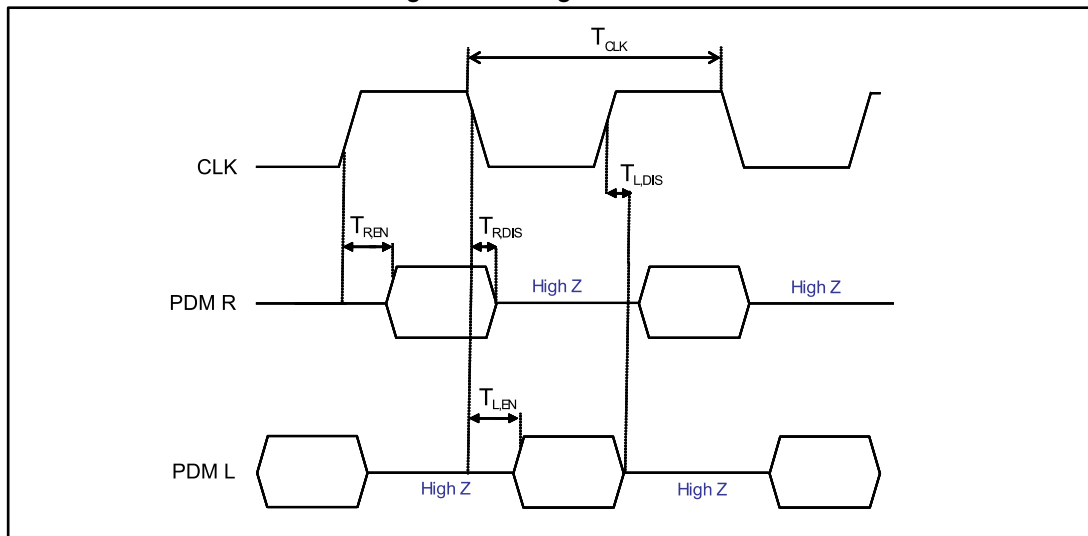
Table 5: Timing characteristics

| Parameter   | Description                             | Min               | Max               | Unit |
|-------------|-----------------------------------------|-------------------|-------------------|------|
| $f_{CLK}$   | Clock frequency for normal mode         | 1                 | 3.25              | MHz  |
| $f_{PD}$    | Clock frequency for power-down mode     |                   | 0.23              | MHz  |
| $T_{CLK}$   | Clock period for normal mode            | 308               | 1000              | ns   |
| $T_{R,EN}$  | Data enabled on DATA line, L/R pin = 1  | 18 <sup>(1)</sup> | 30 <sup>(1)</sup> | ns   |
| $T_{R,DIS}$ | Data disabled on DATA line, L/R pin = 1 |                   | 16 <sup>(1)</sup> | ns   |
| $T_{L,EN}$  | Data enabled on DATA line, L/R pin = 0  | 18 <sup>(1)</sup> | 30 <sup>(1)</sup> | ns   |
| $T_{L,DIS}$ | Data disabled on DATA line, L/R pin = 0 |                   | 16 <sup>(1)</sup> | ns   |

**Notes:**

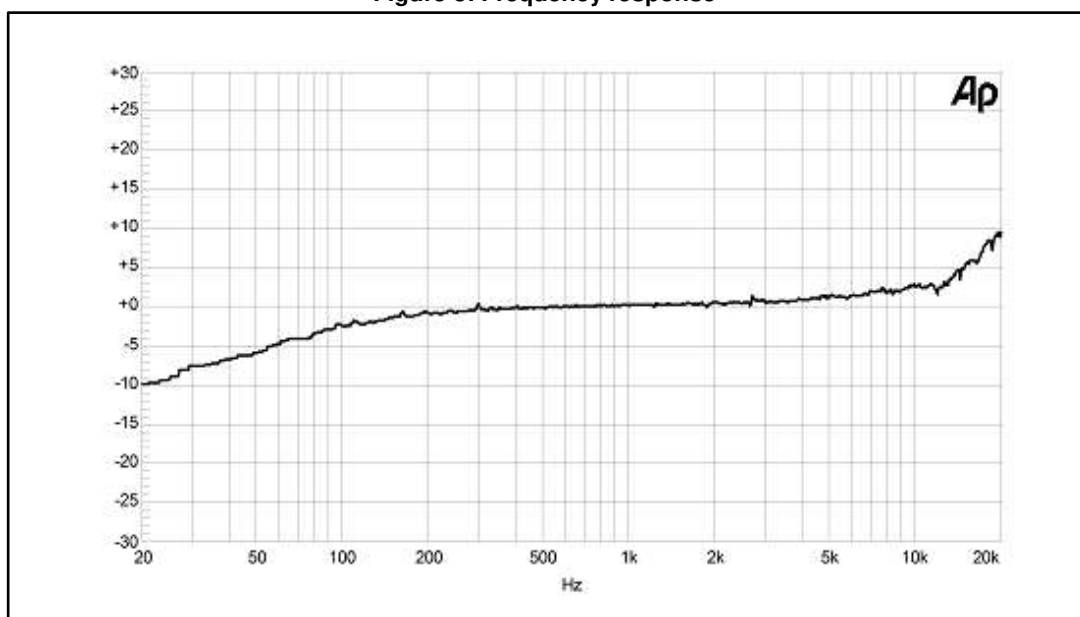
<sup>(1)</sup>From design simulations

Figure 2: Timing waveforms



## 2.3 Frequency response

Figure 3: Frequency response



### 3 Sensing element

The sensing element shall mean the acoustic sensor consisting of a conductive movable plate and a fixed plate placed in a tiny silicon chip. This sensor transduces the sound pressure into the changes of coupled capacity between those two plates.

Omron Corporation supplies this element for STMicroelectronics.

## 4 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 6: Absolute maximum ratings

| Symbol           | Ratings                            | Maximum value                | Unit |
|------------------|------------------------------------|------------------------------|------|
| V <sub>dd</sub>  | Supply voltage                     | -0.3 to 6                    | V    |
| V <sub>in</sub>  | Input voltage on any control pin   | -0.3 to V <sub>dd</sub> +0.3 | V    |
| T <sub>STG</sub> | Storage temperature range          | -40 to +125                  | °C   |
| ESD              | Electrostatic discharge protection | 2 (HBM)                      | kV   |



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



This device is sensitive to electrostatic discharge (ESD), improper handling can cause permanent damage to the part.

## 5 Functionality

### 5.1 L/R channel selection

The L/R digital pad lets the user select the DOUT signal pattern as explained in [Table 7: "L/R channel selection"](#). The L/R pin must be connected to Vdd or GND.

**Table 7: L/R channel selection**

| L/R | CLK low        | CLK high       |
|-----|----------------|----------------|
| GND | Data valid     | High impedance |
| Vdd | High impedance | Data valid     |

## 6 Application recommendations

Figure 4: MP34DB02 electrical connections

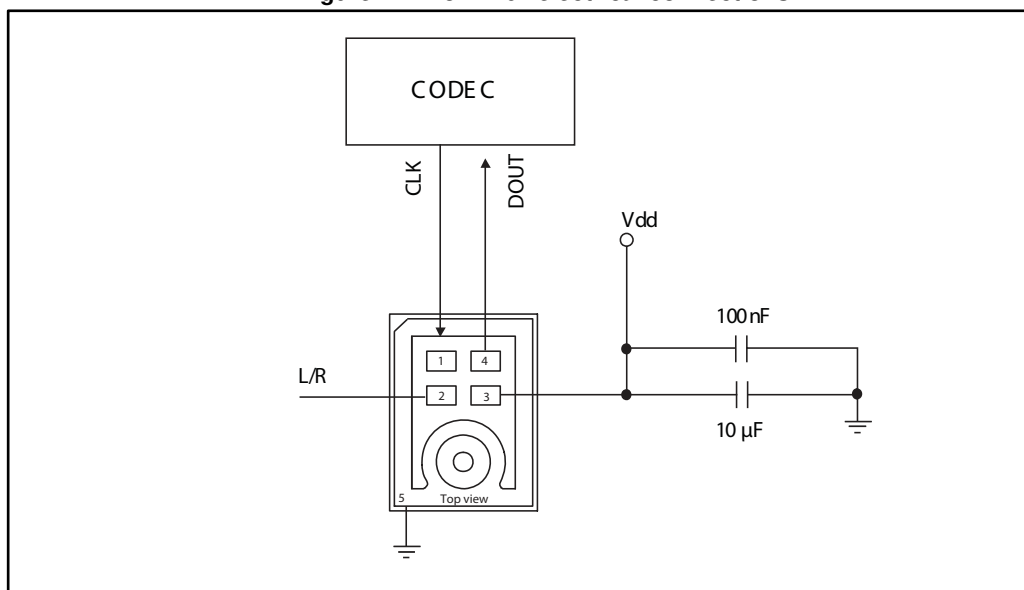
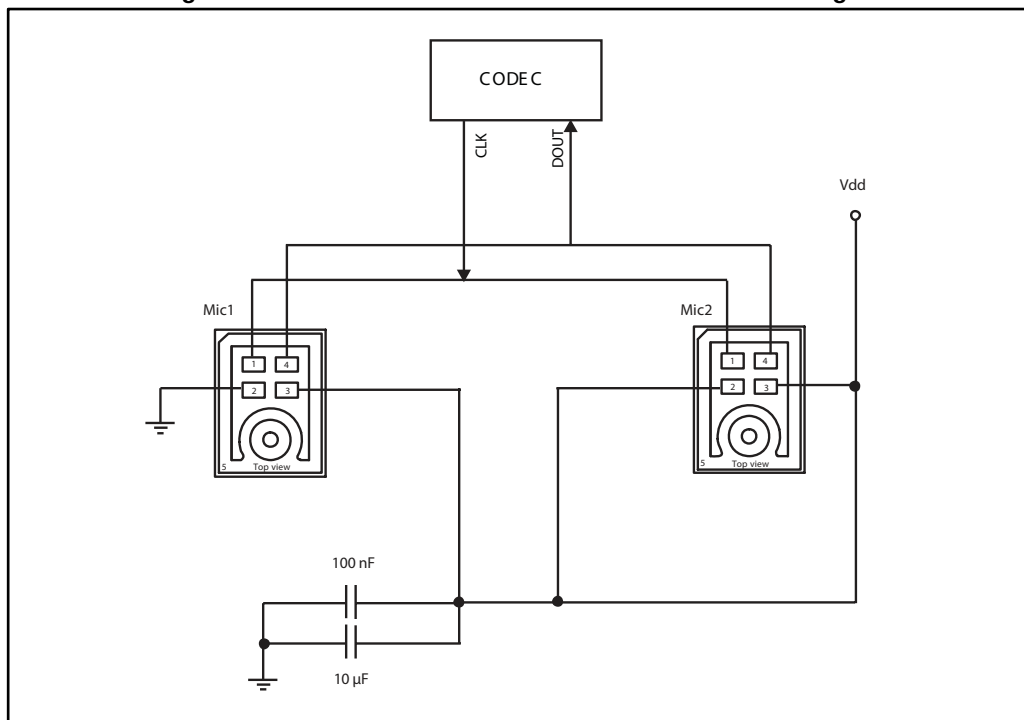


Figure 5: MP34DB02 electrical connections for stereo configuration



Power supply decoupling capacitors (100 nF ceramic, 10 µF ceramic) should be placed as near as possible to pin 3 of the device (common design practice).

The L/R pin must be connected to Vdd or GND (refer to [Table 7: "L/R channel selection"](#)).

## 7 Package information

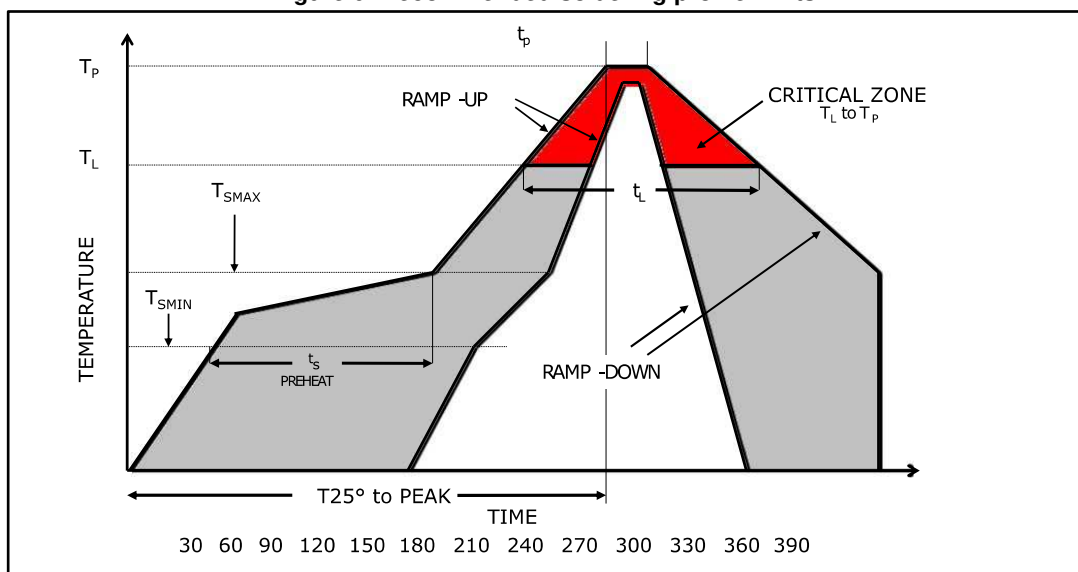
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

### 7.1 Soldering information

The RHLGA (3 x 4 x 1) mm package is also compliant with the RoHS and “Green” standards and is qualified for soldering heat resistance according to JEDEC J-STD-020.

Landing pattern and soldering recommendations are available at [www.st.com](http://www.st.com).

**Figure 6: Recommended soldering profile limits**



**Table 8: Recommended soldering profile limits**

| Desription                                    | Parameter           | Pb free           |
|-----------------------------------------------|---------------------|-------------------|
| Average ramp rate                             | $T_L$ to $T_P$      | 3 °C/sec max      |
| Preheat                                       |                     |                   |
| Minimum temperature                           | $T_{SMIN}$          | 150 °C            |
| Maximum temperature                           | $T_{SMAX}$          | 200 °C            |
| Time ( $T_{SMIN}$ to $T_{SMAX}$ )             | $t_s$               | 60 sec to 120 sec |
| Ramp-up rate                                  | $T_{SMAX}$ to $T_L$ |                   |
| Time maintained above liquidus temperature    | $t_L$               | 60 sec to 150 sec |
| Liquidus temperature                          | $T_L$               | 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     |

## 7.2 RHLGA package information

Figure 7: RHLGA 4LD 3x4 mm (metal cap) 0.25 mm port hole package outline

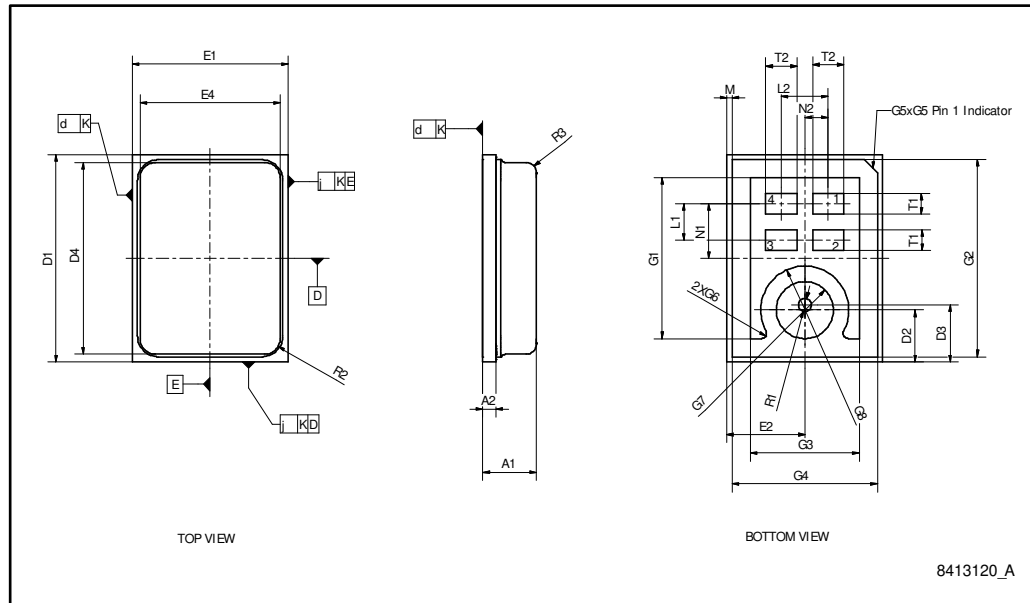


Table 9: RHLGA 4LD 3x4 mm (metal cap) 0.25 mm port hole package mechanical data

| Symbol | mm.   |       |       |
|--------|-------|-------|-------|
|        | Min.  | Typ.  | Max.  |
| A1     | 0.900 | 1.000 | 1.100 |
| A2     | 0.200 | 0.250 | 0.300 |
| D1     | 3.900 | 4.000 | 4.100 |
| D2     | 0.900 | 1.000 | 1.100 |
| D3     | 1.000 | 1.100 | 1.200 |
| D4     | 3.610 | 3.700 | 3.790 |
| R1     | 0.200 | 0.250 | 0.300 |
| R2     |       | 0.280 |       |
| R3     |       | 0.250 |       |
| E1     | 2.900 | 3.000 | 3.100 |
| E2     | 1.300 | 1.500 | 1.700 |
| E4     | 2.610 | 2.700 | 2.790 |
| L1     | 0.650 | 0.700 | 0.750 |
| L2     | 0.850 | 0.900 | 0.950 |
| N1     | 1.000 | 1.050 | 1.100 |
| N2     | 0.400 | 0.450 | 0.500 |
| T1     | 0.350 | 0.400 | 0.450 |
| T2     | 0.550 | 0.600 | 0.650 |
| G1     | 3.050 | 3.100 | 3.150 |
| G2     | 3.750 | 3.800 | 3.850 |
| G3     | 2.050 | 2.100 | 2.150 |

| Symbol | mm.   |       |       |
|--------|-------|-------|-------|
|        | Min.  | Typ.  | Max.  |
| G4     | 2.750 | 2.800 | 2.850 |
| G5     | 0.250 | 0.300 | 0.350 |
| G6     | 0.050 | 0.100 | 0.150 |
| G7     | 0.500 | 0.550 | 0.600 |
| G8     | 0.800 | 0.850 | 0.900 |
| M      |       | 0.100 |       |
| K      |       | 0.050 |       |

## 8 Revision history

Table 10: Document revision history

| Date        | Revision | Changes                                                                                                                                |
|-------------|----------|----------------------------------------------------------------------------------------------------------------------------------------|
| 21-Mar-2014 | 1        | Initial release                                                                                                                        |
| 28-Apr-2016 | 2        | Updated <a href="#">Table 1: "Device summary"</a><br>Updated PSR in <a href="#">Table 3: "Acoustic and electrical characteristics"</a> |

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2016 STMicroelectronics – All rights reserved