

**MODEL:** CMM-4020DT-261L-TR | **DESCRIPTION:** MEMS MICROPHONE**FEATURES**

- top port
- digital PDM
- low-power mode

**ELECTRICAL**

| parameter                              | conditions/description                      | min  | typ  | max  | units  |
|----------------------------------------|---------------------------------------------|------|------|------|--------|
| directivity                            | omnidirectional                             |      |      |      |        |
| sensitivity [S]                        | at 94 dB SPL, 1 kHz                         | -27  | -26  | -25  | dB FS  |
| supply voltage [V <sub>DD</sub> ]      |                                             | 1.70 |      | 3.60 | V      |
| current consumption [I <sub>DD</sub> ] | low-power mode                              | 230  | 330  | 450  | μA     |
|                                        | normal mode                                 | 550  | 650  | 870  | μA     |
| signal to noise ratio [S/N]            | BW = 20 Hz~20 kHz [A-weighted]              |      |      |      |        |
|                                        | low-power mode                              | 62   | 64   | 66   | dBA    |
|                                        | normal mode                                 | 62   | 64   | 66   | dBA    |
| total harmonic distortion [THD]        | at 94 dB SPL, 1 kHz                         | 0.05 | 0.10 | 0.50 | %      |
| acoustic overload point [AOP]          | at 10% THD, 1 kHz                           | 118  | 120  | 122  | dB SPL |
| phase                                  | low-power mode: 500~8 kHz @ 94 dB           | -5   | 0    | 5    | deg    |
|                                        | normal mode: 500~10 kHz @ 94 dB             | -5   | 0    | 5    | deg    |
| power supply rejection [PSR]           | 100 mVp-p square wave @ 217 Hz [A-weighted] | -90  | -80  | -70  | dB FS  |

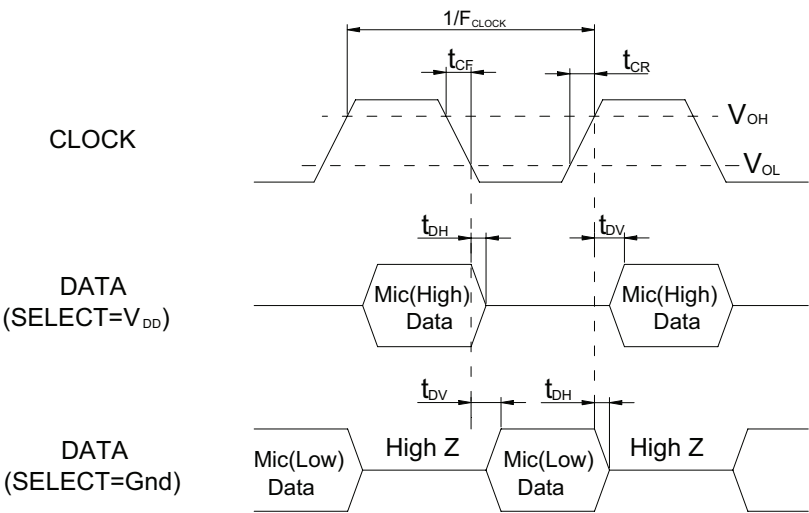
DIGITAL INTERFACE

| parameter                                       | conditions/description                                                                | min                   | typ                       | max                 | units |
|-------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------|---------------------------|---------------------|-------|
| clock frequency                                 | sleep mode                                                                            | 0                     |                           | 1                   | kHz   |
|                                                 | low-power mode                                                                        | 40                    |                           | 900                 | kHz   |
|                                                 | normal mode                                                                           | 1.2                   |                           | 4.0                 | MHz   |
| sleep current (I <sub>SLEEP</sub> )             | F <sub>CLOCK</sub> = 250 kHz                                                          |                       | 10                        |                     | μA    |
| DC output                                       | full scale= ±100                                                                      |                       | 4                         |                     | %FS   |
| polarity                                        | input higher voltage                                                                  |                       | increasing density of 1's |                     |       |
| data format                                     | 1/2 cycle PDM                                                                         |                       |                           |                     |       |
| short circuit output current (I <sub>sc</sub> ) | grounded data pin                                                                     | 1                     |                           | 20                  | mA    |
| output load (C <sub>LOAD</sub> )                |                                                                                       |                       |                           | 100                 | pF    |
| fall-asleep time                                | F <sub>CLOCK</sub> < 1 kHz                                                            |                       |                           | 10                  | ms    |
| wake-up time                                    | F <sub>CLOCK</sub> ≥ 40 kHz                                                           |                       |                           | 52                  | ms    |
| startup time (T <sub>start</sub> )              | time to start up in any mode after V <sub>DD</sub> and C <sub>CLOCK</sub> are applied |                       | 50                        |                     | ms    |
| mode switch time                                | time to switch between modes, V <sub>DD</sub> remains on                              |                       |                           | 20                  | ms    |
| clock duty cycle                                |                                                                                       | 40                    |                           | 60                  | %     |
| logic input high (V <sub>IH</sub> )             | I <sub>OUT</sub> = 1 mA                                                               | 0.7XV <sub>DD</sub>   |                           | 3.6                 | V     |
| logic input low (V <sub>IL</sub> )              | I <sub>OUT</sub> = 1 mA                                                               | -0.3                  |                           | 0.3XV <sub>DD</sub> | V     |
| logic output high (V <sub>OH</sub> )            | I <sub>OUT</sub> = 1 mA                                                               | V <sub>DD</sub> -0.45 |                           | V <sub>DD</sub>     | V     |
| logic output low (V <sub>OL</sub> )             | I <sub>OUT</sub> = 1 mA                                                               | 0                     |                           | 0.45                | V     |

Notes: 1. All specifications measured at 23±2°C, humidity at 55±20%, V<sub>DD</sub> = 1.8 V, F<sub>CLOCK</sub> = 2.4 MHz (normal mode), F<sub>CLOCK</sub> = 768 kHz (low-power mode), L/R pin grounded, no load, unless otherwise noted.

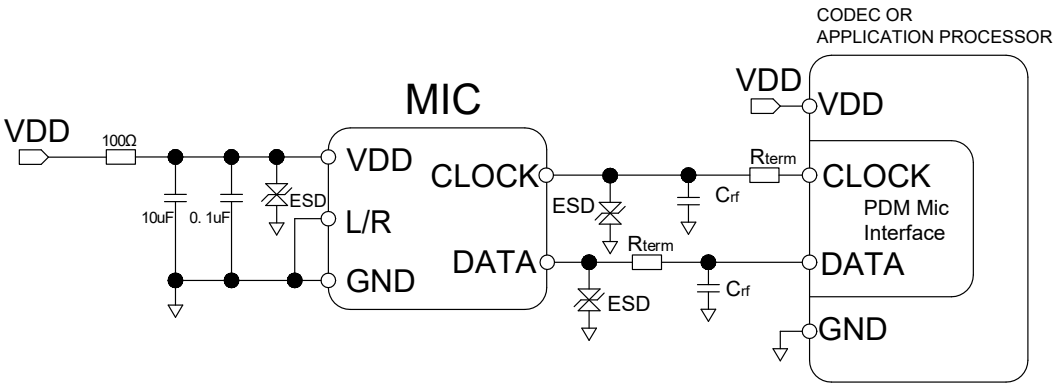
TIMING CHARACTERISTICS

| parameter            | conditions/description           | min | typ | max | units |
|----------------------|----------------------------------|-----|-----|-----|-------|
| clock rise/fall time | T <sub>CR</sub> /T <sub>CF</sub> |     |     | 13  | ns    |
| DATA into hi Z time  | t <sub>DH</sub>                  |     |     | 15  | ns    |
| data valid time      | t <sub>DV</sub>                  | 18  |     | 40  | ns    |

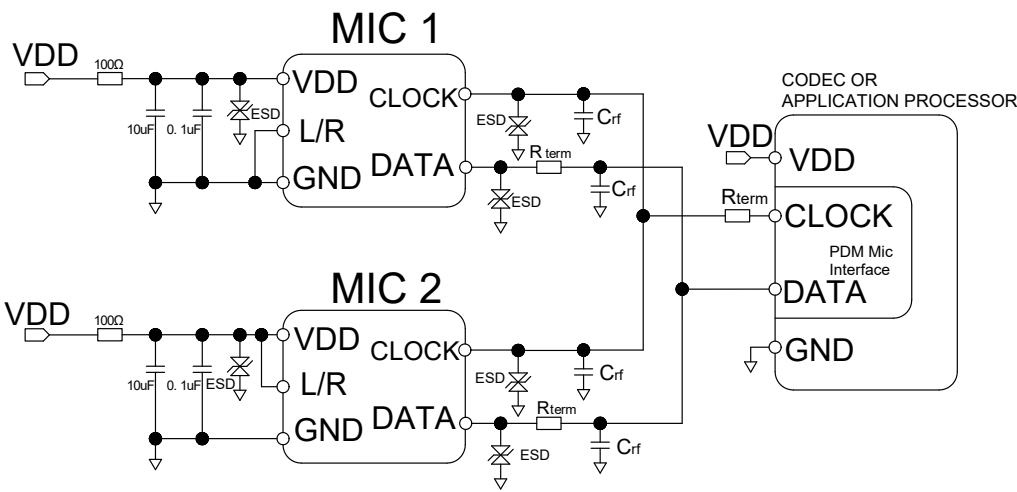


|            |                 |                    |                    |
|------------|-----------------|--------------------|--------------------|
| Microphone | Select [L/R]    | Asserts DATA On    | Latch DATA On      |
| Mic[High]  | V <sub>DD</sub> | rising clock edge  | falling clock edge |
| Mic[Low]   | GND             | falling clock edge | rising clock edge  |

RECOMMENDED INTERFACE CIRCUIT



Single MIC



Double MIC

Notes: 2. Power supply decoupling capacitors (0.1  $\mu$ F, 10  $\mu$ F, 100 ohm resistor, and the ESD diode) should be placed as near as possible to  $V_{DD}$  of the device.  
3. Crf and Rterm are all used for debugging. Actually their values or NC are based on the debugging result.

ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -40 |     | 100 | °C    |
| storage temperature   | in packaging           | -40 |     | 100 | °C    |
| RoHS                  | yes                    |     |     |     |       |

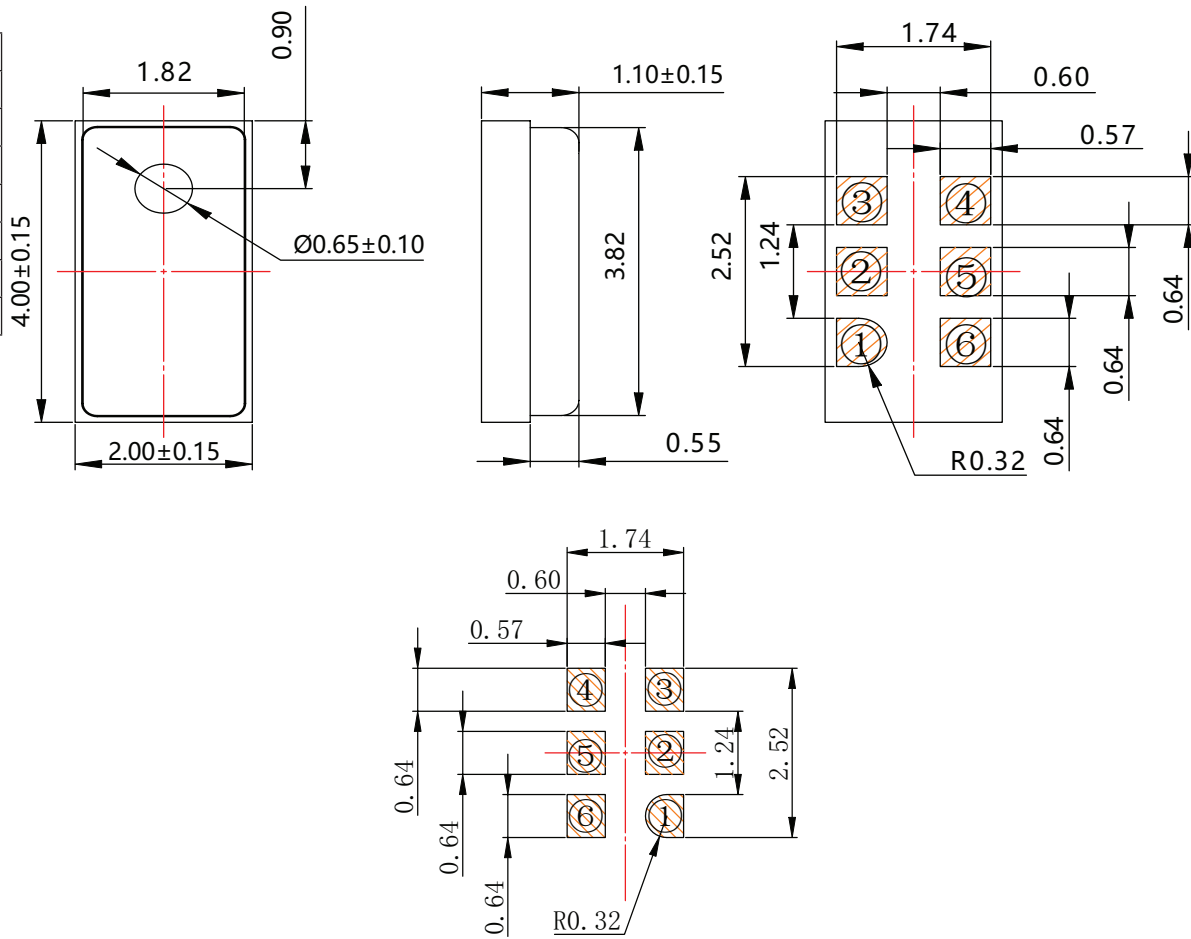
MECHANICAL

| parameter     | conditions/description | min    | typ    | max    | units |
|---------------|------------------------|--------|--------|--------|-------|
| dimensions    | 4.00 x 2.00 x 1.10     |        |        |        | mm    |
| acoustic port | top                    |        |        |        | mm    |
| terminals     | surface mount          |        |        |        |       |
| weight        |                        | 0.0156 | 0.0186 | 0.0216 | g     |

MECHANICAL DRAWING

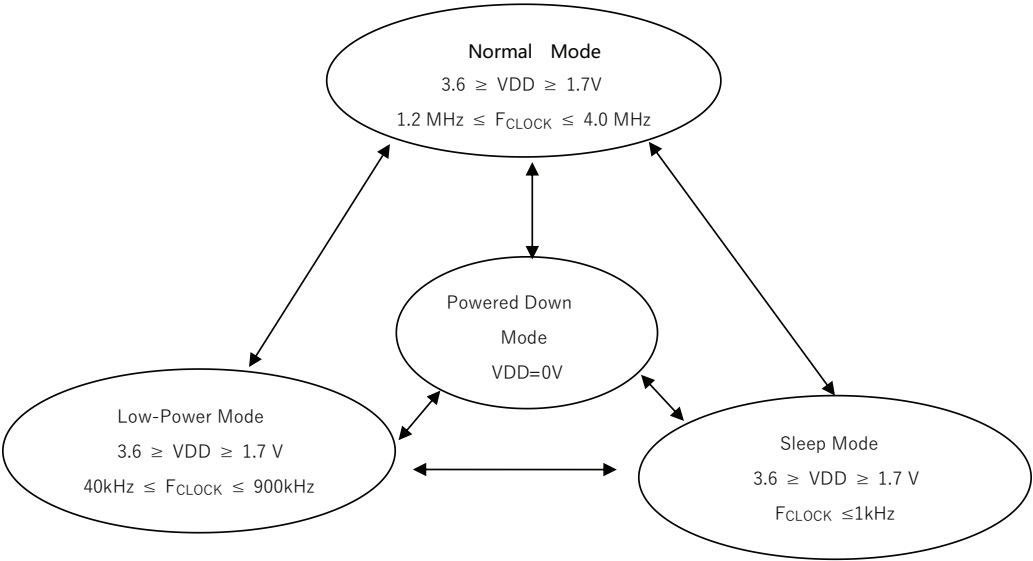
units: mm  
tolerance: ±0.10 mm

| TERMINAL CONNECTIONS |          |
|----------------------|----------|
| TERM.                | FUNCTION |
| 1                    | VDD      |
| 2                    | GND      |
| 3                    | DATA     |
| 4                    | CLOCK    |
| 5                    | GND      |
| 6                    | L/R      |

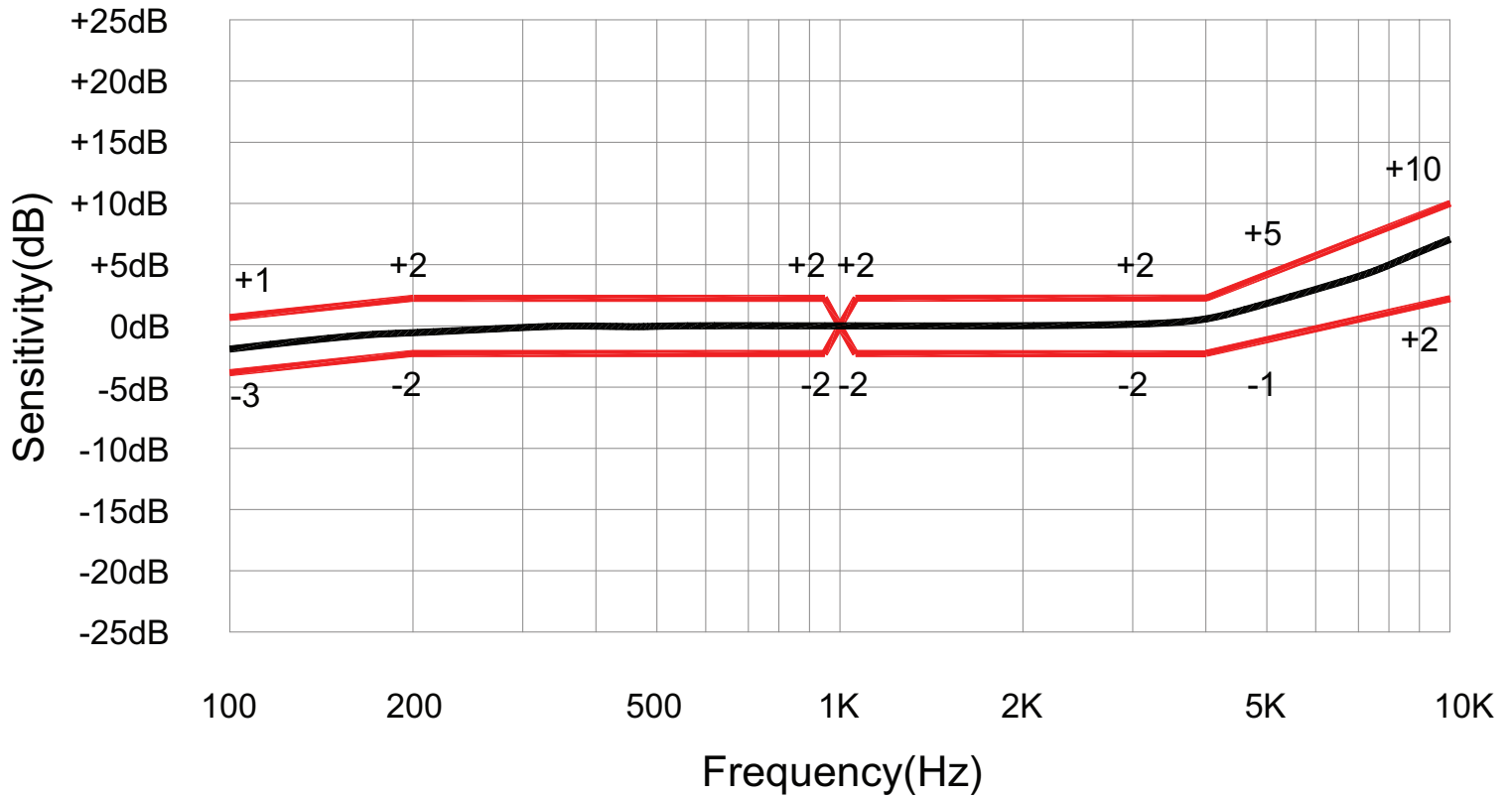


Recommended PCB Layout  
Top View

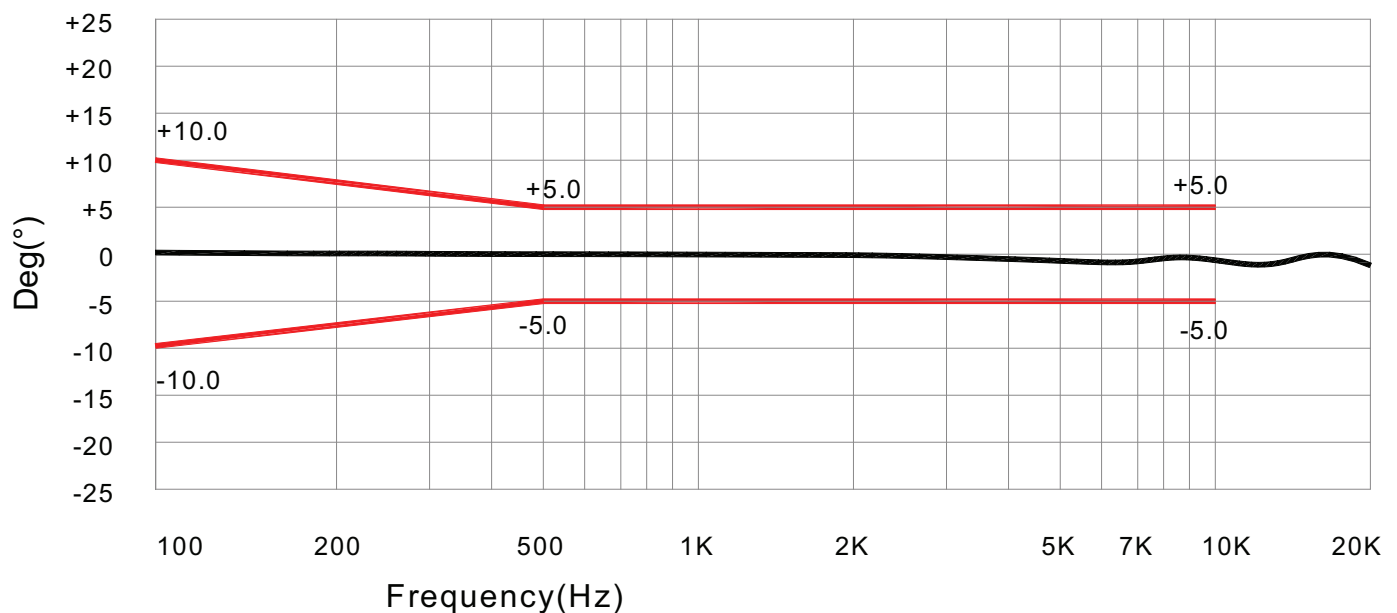
MICROPHONE STATE



## FREQUENCY RESPONSE CURVE



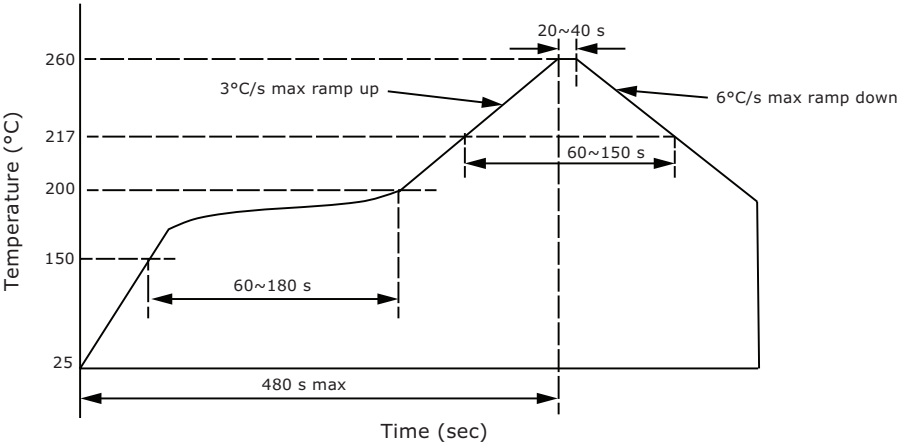
## PHASE CURVE



SOLDERABILITY

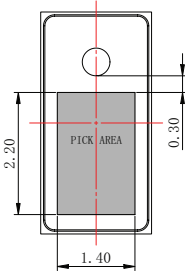
| parameter                     | conditions/description | min | typ | max | units |
|-------------------------------|------------------------|-----|-----|-----|-------|
| reflow soldering <sup>2</sup> | see reflow profile     |     |     | 260 | °C    |

Note: 2. Not recommended to exceed 3 reflow cycles.



HANDLING RECOMMENDATIONS

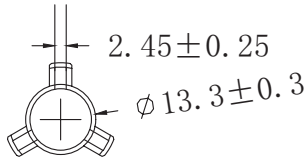
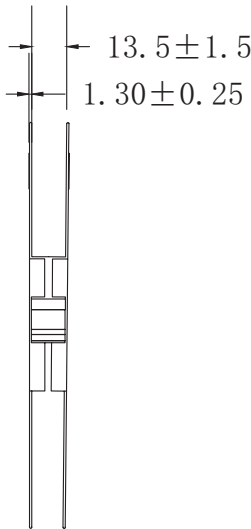
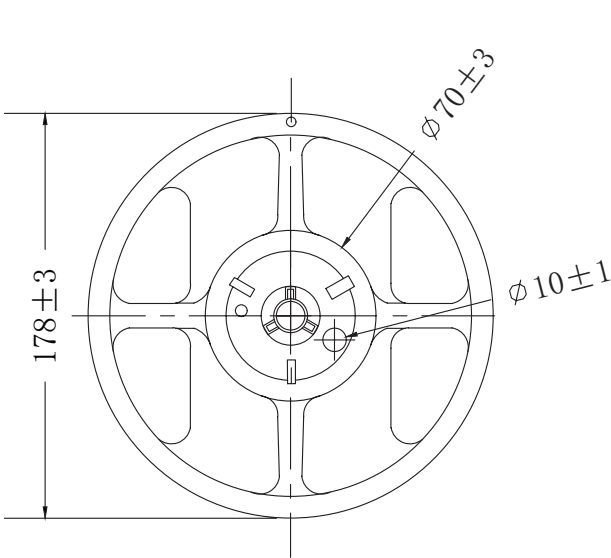
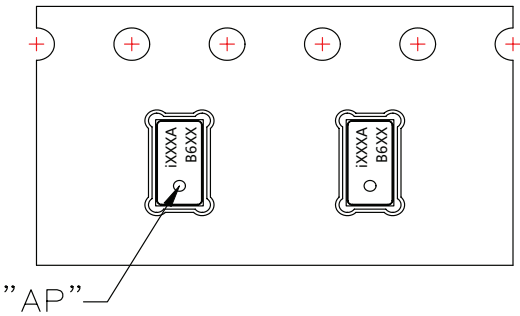
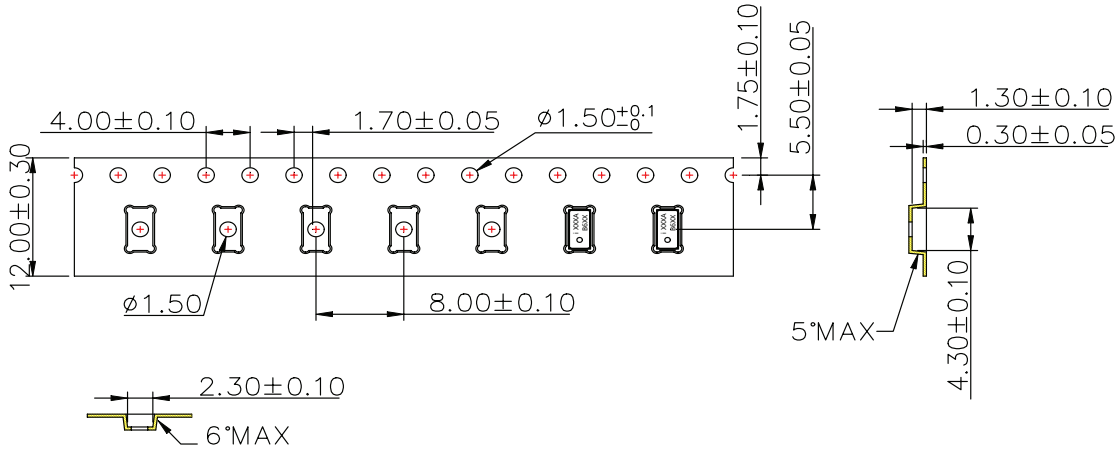
1. Not recommended to blow air heavily over acoustic port as debris could impact mic function.
2. Not suitable for wash process after reflow.
3. Not recommended to brush board with or without solvents after reflow process.
4. Not recommended to directly expose to ultrasonic processing or cleaning.
5. Not recommended to insert any object in port of device at any time.
6. Not recommended to apply over 30 psi of air pressure into the port hole.
7. Not recommended to pull a vacuum over port hole.
8. Not recommended to apply a vacuum when repackaging into sealed bag a rate faster than 0.5 atm/sec.
9. Not recommended to clean table or carried plate with air guarding system that could induce particle floating inside mic.



Recommended Vacuum Nozzle Pickup  
Top View

PACKAGING

| parameter   | conditions/description | min | typ | max | units |
|-------------|------------------------|-----|-----|-----|-------|
| reel size   | Ø178 mm                |     |     |     |       |
| reel QTY    | 1,000 pcs per reel     |     |     |     |       |
| carton size | 415 x 235 x 215 mm     |     |     |     |       |
| carton QTY  | 20,000 pcs             |     |     |     |       |



REVISION HISTORY

| rev. | description     | date       |
|------|-----------------|------------|
| 1.0  | initial release | 09/15/2026 |

The revision history provided is for informational purposes only and is believed to be accurate.



Same Sky offers a one (1) year limited warranty. Complete warranty information is listed on our website.

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