

## **3SM122HZB1VD MEMS Microphone**

### **Product Description**

The *3SM122HZB1VD* microphones are integrated with specialized pre-amplification ASIC to provide high sensitivity, high SNR output from a capacitive audio sensor. It's packaged for surface mounting and high temperature re-flow assembly. *3SM122HZB1VD* which is able to endure reflow temperature up to 260°C for 30 seconds can be used in SMT process. It is widely used in telecommunication and electronics device such as mobile phone, headset.

### **Features**

- High stability - no risk of membrane aging
- Suitable for automatic pick-and-place handler and SMT process
- Miniature dimension 2.75mm x 1.85mm x 0.90mm
- Low current consumption 80uA
- RoHS/Green Compliant
- Sensitivity deviation within  $\pm 1$ dB
- Package type : LGA 4-pin

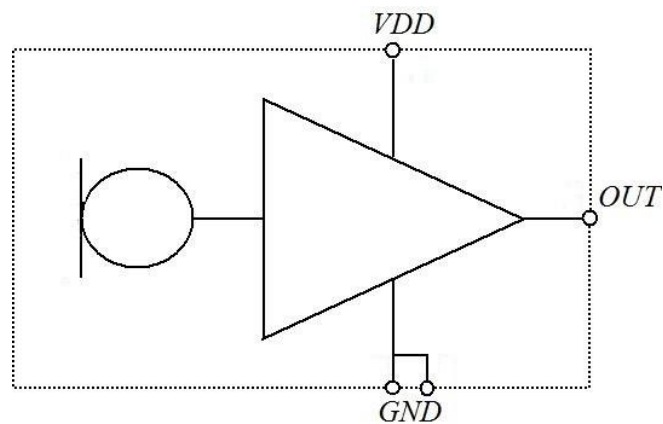
### **Applications**

- ANC Headsets
- TWS Headsets
- Wearable Devices
- IoT Devices

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## Functional Block Diagram



## Acoustical and Electrical Characteristics

Table 1 Typical test conditions are  $T_A = 23\text{ }^\circ\text{C}$ ,  $V_{DD} = 2.1\text{ V}$  and  $R.H. = 50\%$  measured in a pressure chamber test setup. All voltages refer to GND node

| Parameters                   | Symbol           | Min. | Typ. | Max. | Unit   | Test Conditions  |
|------------------------------|------------------|------|------|------|--------|--|
| <b>Acoustic</b>              |                  |      |      |      |        |  |
| Sensitivity                  | S                | -39  | -38  | -37  | dBV/Pa | 1kHz, 94dB SPL   |
| Signal to Noise Ratio        | S/N              |      | 62   |      | dBA    | A-weighted   |
| Equivalent Noise Level       | ENL              |      | 32   |      | dBA    | A-weighted   |
| Total Harmonic Distortion    | THD              |      | 0.15 |      | %      | 94dB SPL   |
| Acoustic Overload Point      | AOP              |      | 123  |      | dB SPL | 10% THD @1kHz,<br>S = Typ.   |
| <b>Electrical</b>            |                  |      |      |      |        |  |
| Supply Voltage               | Vdd              | 1.6  |      | 3.6  | V      |  |
| Current Consumption          | I <sub>sb</sub>  |      | 80   |      | μA     |  |
| Power Supply Rejection       | PSR+N            |      | -93  |      | dBA    | 217Hz, 100 mV peak<br>to peak square wave<br>superimposed on Vcc<br>2.1V |
| Power Supply Rejection Ratio | PSRR             |      | 63   |      | dB     | 217Hz, 200 mV peak<br>to peak sine wave<br>superimposed on Vcc<br>2.1V   |
| Output Impedance             | Z <sub>out</sub> |      |      | 200  | Ω      |  |
| Output DC Offset             |                  |      | 1.3  |      | V      |  |

## Temperature Range

Table 2

|                             |                  |               |
|-----------------------------|------------------|---------------|
| Storage Temperature         | T <sub>STG</sub> | -40°C ~ 100°C |
| Operating Temperature Range | T <sub>A</sub>   | -40°C ~ 85°C  |

## Reliability Qualifications

Table 3

| Test Item                       | Description   |
|---------------------------------|---|
| High Temperature Storage        | Storage at 105°C for 1,000 hours<br>IEC 60068-2-2 Test Ba   |
| Low Temperature Storage         | Storage at -40°C for 1,000 hours<br>IEC 60068-2-1 Test Aa   |
| High Temperature Operation Bias | Under Bias at 105°C for , 1,000 hours<br>IEC 60068-2-2 Test Ba  |
| Low Temperature Operation Bias  | Under Bias at -40°C for , 1,000 hours<br>IEC 60068-2-1 Test Aa  |
| Temperature Humidity Bias       | Under Bias at 85°C/85%RH for 1,000 hours<br>JESD22-A101-B   |
| Thermal Shock                   | Thermal Shock 100 cycles from -40°C~125°C, 100 cycles<br>IEC 60068-2-14   |
| Reflow                          | 5 reflow cycles with peak 260°C<br>J-STD-020D   |
| Vibration                       | 4 cycles lasting 12 minutes from 20 to 2,000Hz in X, Y and Z with peak acceleration of 20G<br>MIL 883E, Method 2007.2, A  |
| Shock                           | 3 pulses 10,000G in X,Y and Z<br>IEC 60068-2-27, Test Ea  |
| ESD                             | HBM:3KV, MM:300V, CDM:500V<br>Air Discharge:12KV,<br>Contact Discharg:8KV<br>JESD22-A114(HBM);<br>JESD22-A115(MM)<br>JESD22-C101(CDM)<br>IEC 61000-4-2(Air Discharge)<br>IEC 61000-4-2(Contact Discharge) |

## Reflow Profile

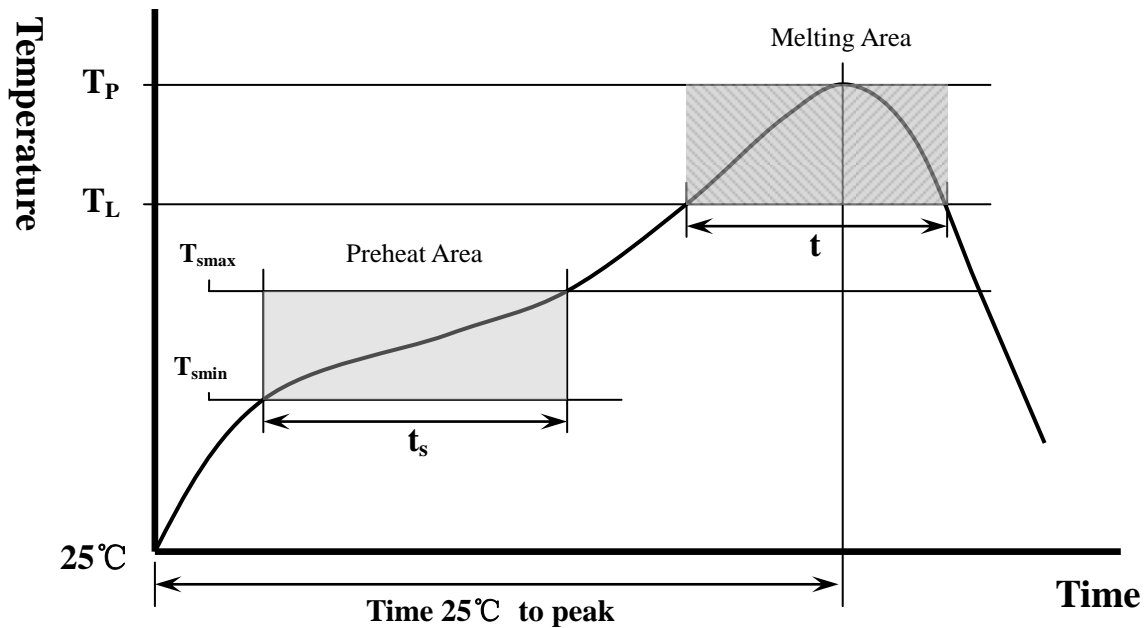


Table 4. Recommended Reflow Profile Limits

| Profile Feature  | Pb-free          |
|--|------------------|
| Preheat  |                  |
| Minimum temperature (T <sub>smmin</sub> )                    | 150 °C           |
| Maximum temperature (T <sub>smmax</sub> )                    | 200 °C           |
| Time (t <sub>s</sub> )                                       | 60~180 sec       |
| Average Ramp up rate (T <sub>smmax</sub> to T <sub>p</sub> ) | 3 °C/sec         |
| Melting area   |                  |
| Melting temperature (T <sub>L</sub> )                        | 217 °C           |
| Time maintained above melting (t)                            | 60~150 sec       |
| Peak Temperature (T <sub>P</sub> )                           | 260 °C           |
| Time within 5°C of actual peak temperature                   | 20~40 sec        |
| Ramp down rate   | 6 °C/sec maximum |
| Time 25°C to peak temperature                                | 8 minute maximum |

## Pin Definition and Function

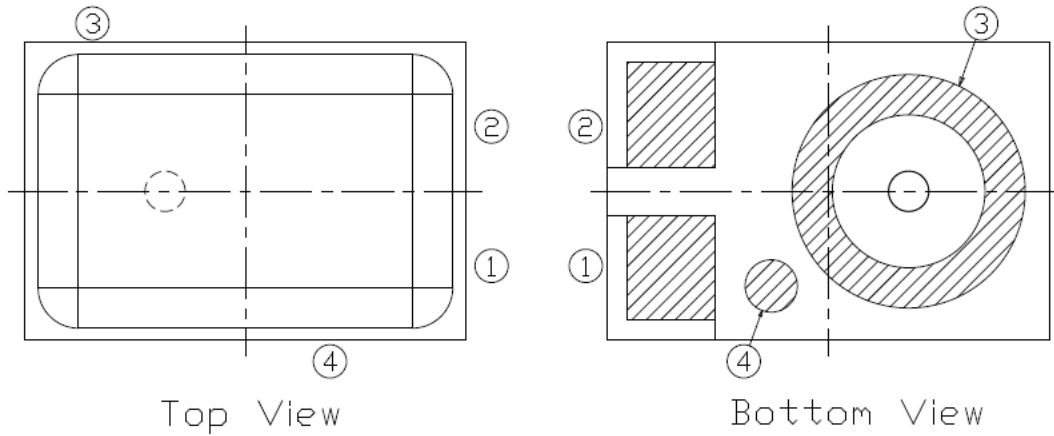
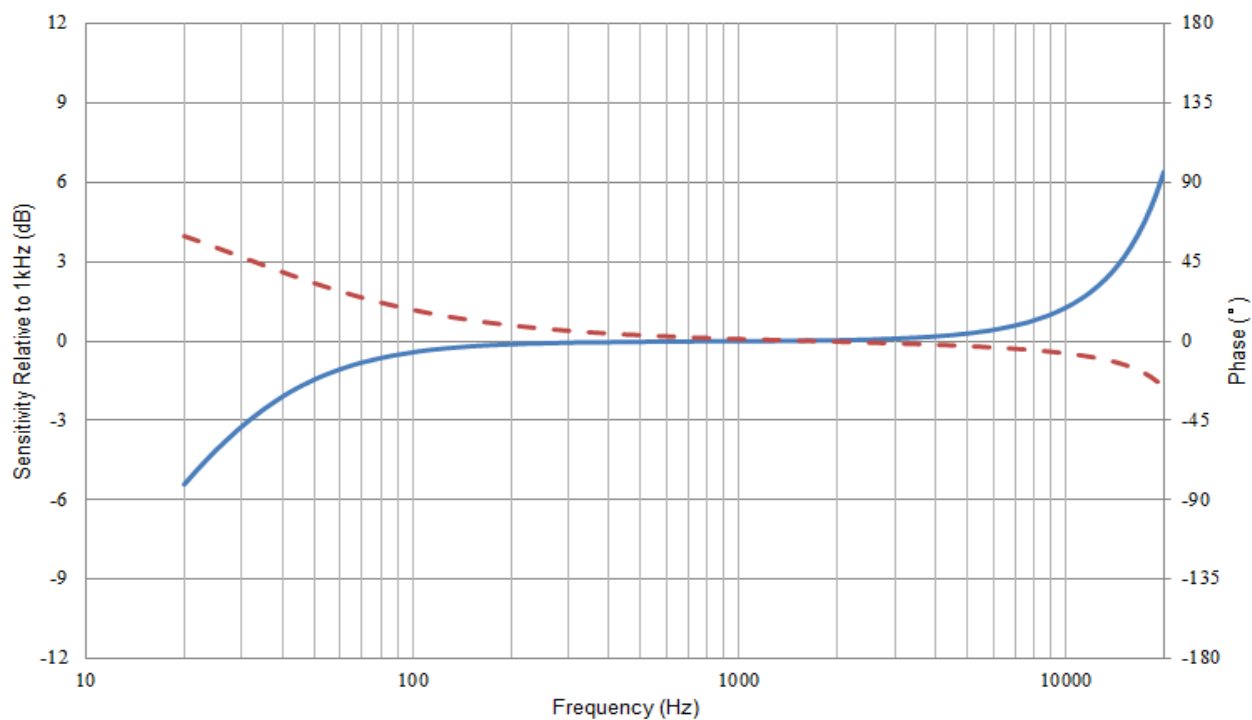


Table 5

| Pin # | Symbol     | Function             |
|-------|------------|----------------------|
| 1     | VDD        | Power supply         |
| 2     | OUTPUT     | Analog signal output |
| 3     | GND        | Ground               |
| 4     | No Connect | N/A                  |

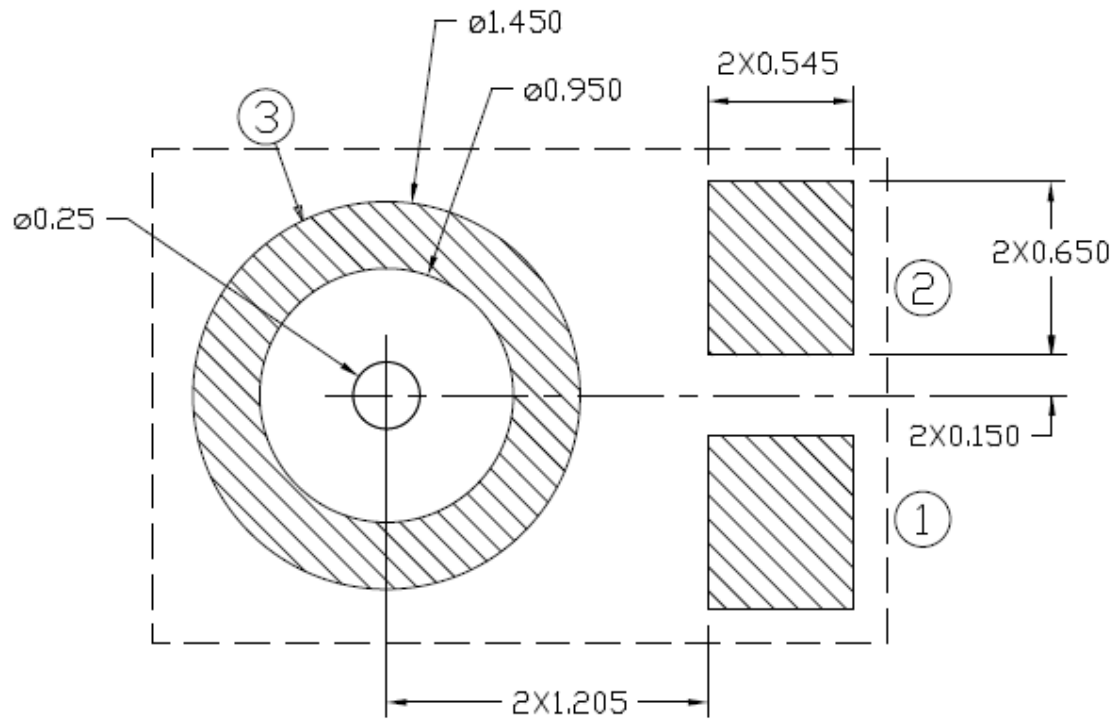
## Frequency and Phase Response



*Typical frequency response normalized to 1KHz (Measured)*

## PCB Land Pattern Layout

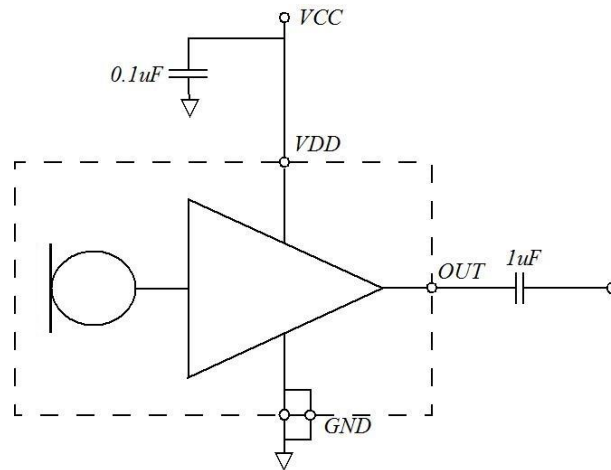
### Recommended Land Pattern





## Application Circuit

Typical Application:



## Handling Instructions

The MEMS microphone can be handled using standard pick-and-place and chip-shooting equipment. Care should be taken to avoid damage to the MEMS microphone structure as follows:

- Do not apply vacuum nozzle over the acoustic port (AP) of the microphone to avoid damage to the device.
- Do not blow air directly into acoustic port. If air gun cleaning is required, the minimum distance is 10cm and the maximum air blow pressure is 30psi.
- Brushing the board with/without solvents may damage the device.
- Do not use excessive force to place the microphone on the PCB.
- In case of manual handling, it should be handled with plastic tweezers to avoid damage to the device.
- Do not open and remove IC from packaging until devices are ready to be mounted.
- Suggest PCB depaneling be done with depaneling cutter/router, or manually de-panel PCB with care and without any contact of MEMS Microphone.

## Dimensions

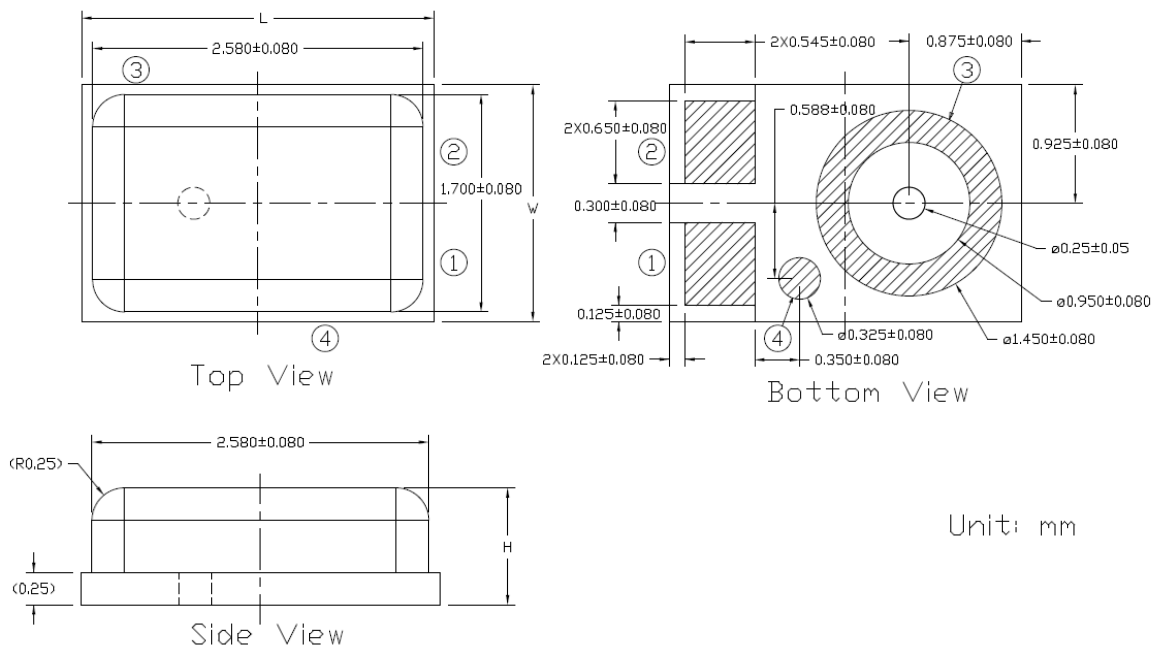
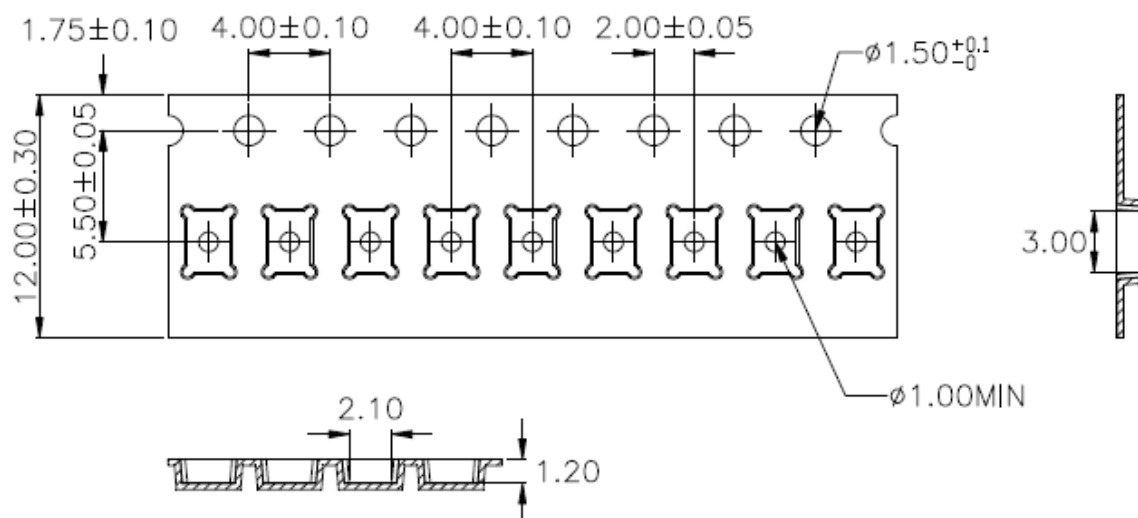


Table 6(Top View)

| Item          | Dimension      | Tolerance     |
|---------------|----------------|---------------|
| Length (L)    | 2.75 mm        | $\pm 0.10$ mm |
| Width (W)     | 1.85 mm        | $\pm 0.10$ mm |
| Height (H)    | 0.90 mm        | $\pm 0.10$ mm |
| Acoustic Port | $\phi 0.25$ mm | $\pm 0.05$ mm |

## Package Information

### Carrier Tape:



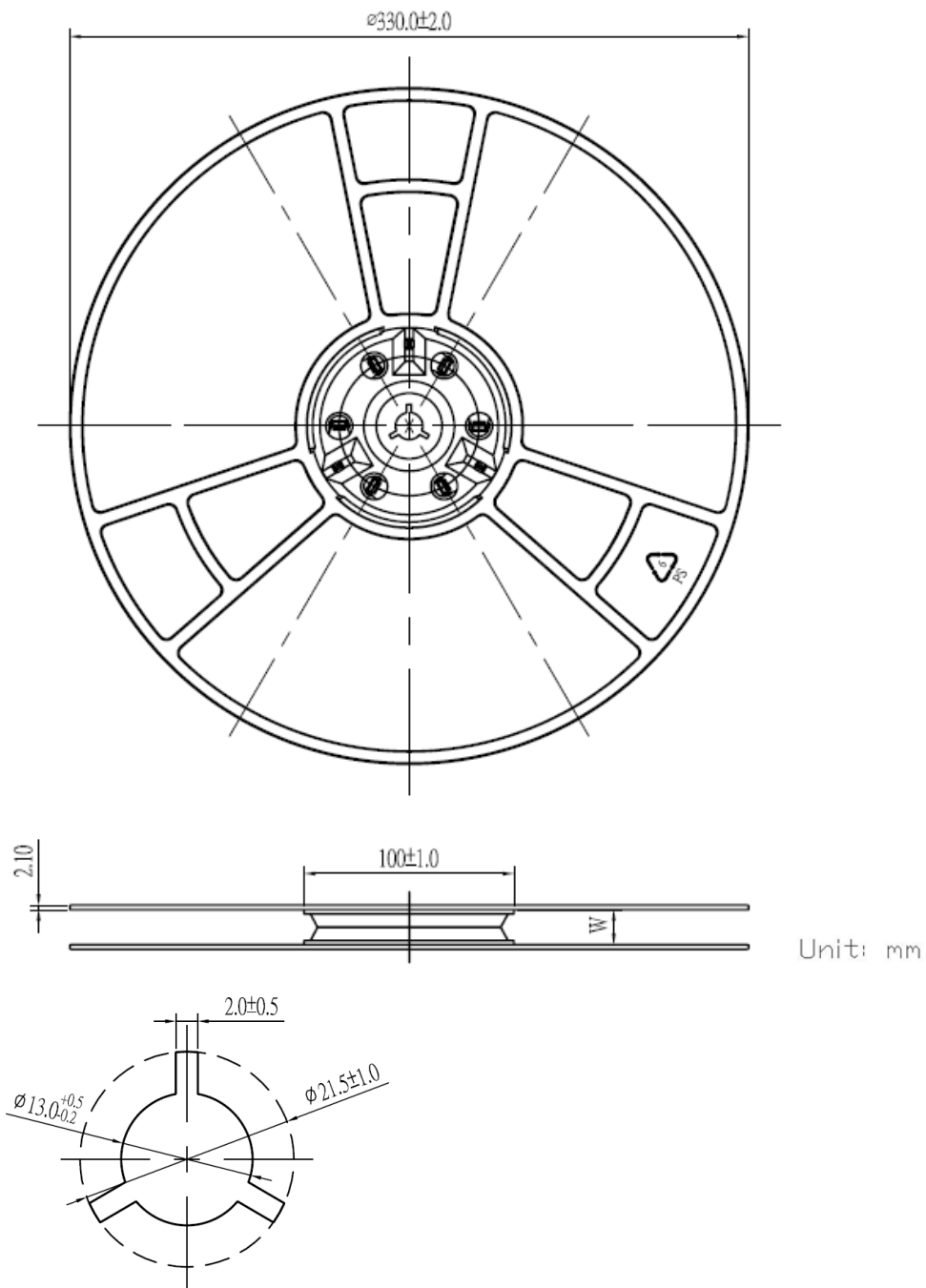
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.20$ .
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481 requirements.
5. Thickness :  $0.30 \pm 0.05$  mm.
6. Packing length per 19" reel : 500.0 Meters (1:15). W=105
7. Component load per 13" reel : 8000 pcs.

Unit: mm

Note:

MSL(Moisture sensitivity level) Class1.

13" Tape Reel :



## Revision History

| Revision | Date       | Description  |
|----------|------------|--|
| 1.0      | 2019/03/08 | Formal release   |
| 1.1      | 2019/04/23 | Modify “Applications”<br>Modify “Reliability Qualifications-ESD” |
| 1.2      | 2019/05/10 | Add “Package Information”  |

单击下面可查看定价，库存，交付和生命周期等信息

[>>3S\(Solid state system\)\(鑫创科技\)](#)