

Features

- 4.0x3.0x1.0mm Top Port
- PDM digital Output
- SNR of 65dBA
- RF Shielded
- Standard SMD Reflow Thecnology
- RoHS Compliance & Halogen Free

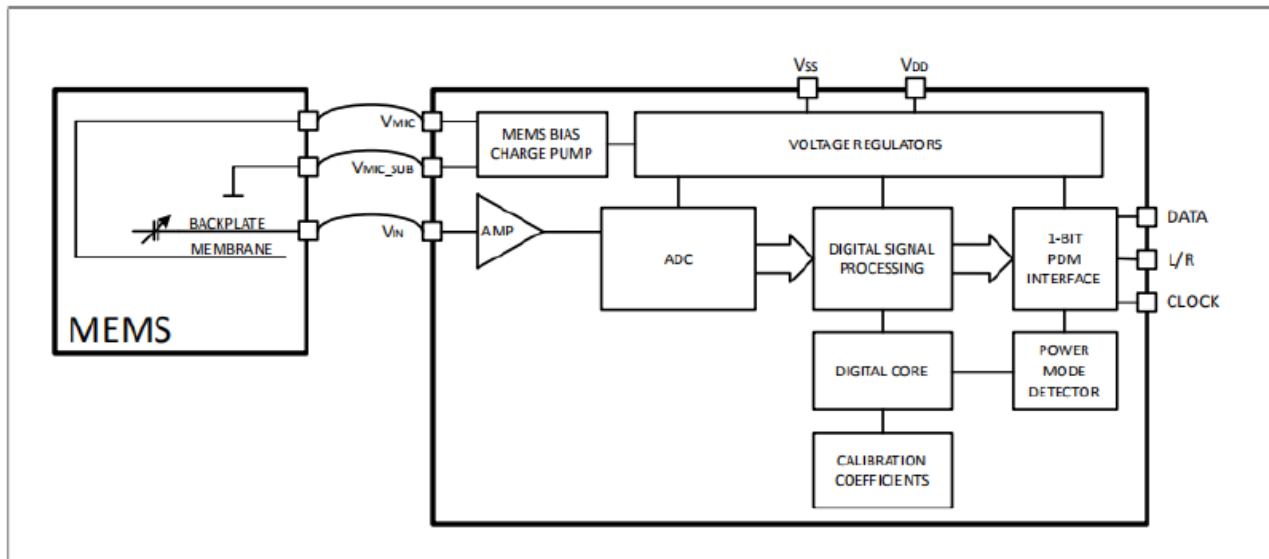
Applications

- Smart Phones
- TWS Headsets
- Smart Speakers
- Wearable Electronics
- Portable Electronics
- Smart Home Electronics



Description: RMIC-94-3.6-4030-RG-NS1 is a digital MEMS microphone. The MEMS 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.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Parameters | Value | | | Unit |
|-----------------------------|-------|-----|------|------|
| | min | typ | max | |
| Supply Voltage | | | 3.6 | V |
| Operation Temperature Range | -40 | | +70 | °C |
| Storage Temperature Range | -40 | | +125 | °C |

Note : Stresses at the maximum ratings shown in table may cause permanent damage to the device. These are stress ratings only at which the device may not function when an operation at these or any other condition beyond those specified under "Electro-Acoustic Specifications".

ELECTRICAL SPECIFICATIONS

Normal Mode: Vdd=1.8V, Fclk=2.4MHz, no load, unless otherwise specified.

| Parameters | Value | | | Unit | |
|---------------------------------|---|-----|-----|------|--------|
| | min | typ | max | | |
| Directivity | Omni-Directional | | | | |
| Clock Frequency (Fclk) | 1.38 | 2.4 | 3.3 | MHz | |
| Sensitivity (S) | 94db SPL@ 1kHz | -27 | -26 | -25 | dBFS |
| Current Consumption (I) | Vdd=1.8V Fclk=2.4MHz | | 650 | 950 | uA |
| S/N Ratio (SNR) | 94dB SPL @1kHz, A-Weighted | | 65 | | dB |
| Total Harmonic Distortion (THD) | 94dB SPL @1kHz | | | 0.5 | % |
| Low Frequency Rolloff (LFRO) | -3dB relative to 1kHz | | 35 | | Hz |
| Acoustic Overload Point (AOP) | @10% THD @1kHz | | 120 | | dB SPL |
| Power Supply Rejection (PSR) | @100mVpp Square wave, 217Hz, A-weighted | | | -80 | dBFS |

Note: Frequency response, sensitivity, phase and current consumption are tested by 100% on product line.

Low Power Mode: Vdd=1.8V, Fclk=768kHz.

| Parameters | | Value | | | Unit |
|---------------------------------|---|-------|-----|-----|------|
| | | min | typ | max | |
| Clock Frequency (Fc) | | 512 | 768 | 850 | kHz |
| Sensitivity (S) | 94db SPL@ 1kHz | -27 | -26 | -25 | dBFS |
| Current Consumption (I) | Vdd=1.8V | | 240 | 350 | uA |
| S/N Ratio (SNR) | 94dB SPL @1kHz, A-Weighted | | 64 | | dBA |
| Total Harmonic Distortion (THD) | @94dB SPL @1kHz | | | 0.5 | % |
| Acoustic Overload Point (AOP) | @10% THD @1kHz | | 120 | | dB |
| Power Supply Rejection (PSR) | @100mVpp Square wave, 217Hz, A-weighted | | | -80 | dB |

Sleep Mode: Vdd=1.8V, Fclk=350kHz

| Parameters | | Value | | | Unit |
|-------------------------|--|-------|-----|-----|------|
| | | min | typ | max | |
| Clock Frequency (Fc) | | | | 350 | kHz |
| Current Consumption (I) | | | 25 | 50 | uA |

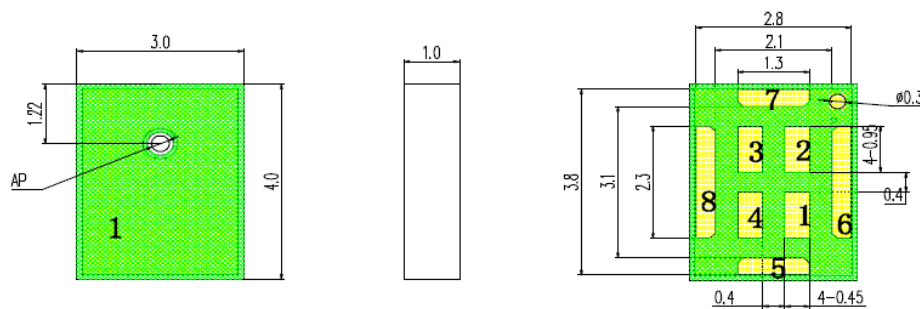
General Microphone Specification

| Parameters | | Value | | | Unit |
|----------------------------|--|----------------------------|-----|-----|------|
| | | min | typ | max | |
| Supply Voltage | Vdd | 1.62 | 1.8 | 3.6 | V |
| DC Output | Full scale=+100 | - | 0 | - | %FS |
| Polarity | Increasing sound pressure | Increasing density of 1' s | | | |
| Data Format | | ½ Cycle PDM | | | |
| Short Output Current (Isc) | Data pin short to GND | 1 | | 20 | mA |
| Output Load (Cload) | | | | 200 | pF |
| Fall Asleep Time (Tslp) | Fclk<350kHz | | | 20 | us |
| Wake-Up Time (Twk) | Fclk>350kHz | | | 20 | ms |
| Power Up Time (Tpu) | Time to start up in any mode after Vdd off for >10ms Clock remained on | | | 20 | ms |
| Start Time | Time to start up in any mode after Vdd and clock applied | | | 50 | ms |
| Mode Change Time (Tmc) | Time to switch between modes. VDD remains on | | | 50 | us |

Digital Interface Electrical Specifications

| Parameters | | Value | | | Unit |
|--------------------------------|--|----------|-----|----------|------|
| | | min | typ | max | |
| Input Logic Low Level | VIL | -0.3 | | 0.35xVDD | V |
| Input Logic High Level | VIH | 0.65xVDD | | VDD+0.3 | V |
| Output Logic Low Level | VOL | | | 0.3xVDD | V |
| Output Logic High Level | VOH | 0.7xVDD | | | V |
| Hysteresis Width | Vhyst | 0.05xVDD | | | V |
| Clock Frequency | Fclk | 0.35 | | 3.3 | MHz |
| Clock Duty Cycle | Fclock<=2.65MHz | 45 | | 55 | % |
| | Fclock>=2.9MHzs | 48 | | 52 | |
| Delay Time to Data Line Driven | Delay time from CLOCK Edge (50% VDD) to DATA driven. | 40 | | 80 | ns |
| Delay Time for DATA Valid | Delay time from CLOCK Edge (0.50 x VDD) to DATA valid (<0.30 x VDD or >0.70 x VDD) | | | 100 | ns |
| Delay time for DATA High-Z. | Delay time from CLOCK Edge (50% VDD) to DATA high impedance state. | 5 | | 30 | ns |

DIMENSIONS



Top View

Side View

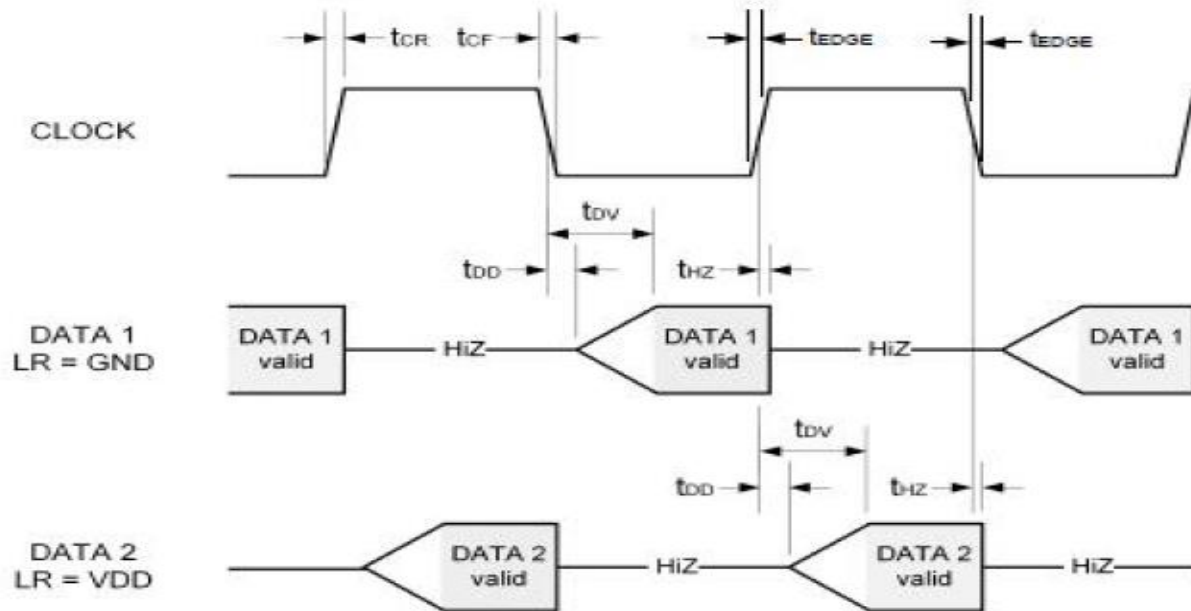
Bottom View

Unit: mm Unmarked Tolerance: ± 0.1 (mm)

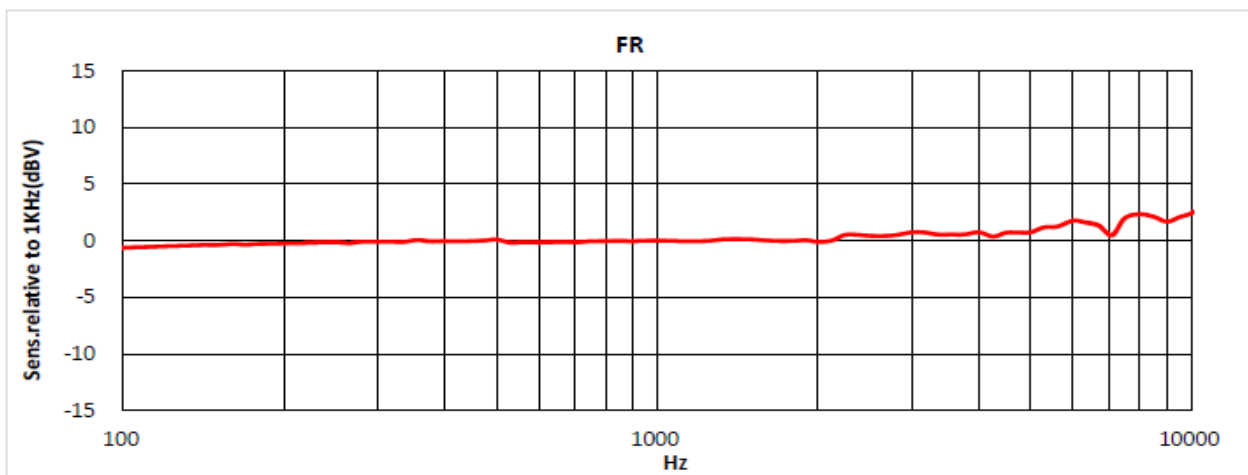
| Item | Dimension | Tolerance(+/-) | Units |
|-------------------|-----------|----------------|-------|
| Length(L) | 4.0 | 0.10 | mm |
| Width(W) | 3.0 | 0.10 | mm |
| Height(H) | 1.0 | 0.10 | mm |
| Acoustic Port(AP) | Ø0.25 | 0.075 | mm |

| Pin No. | Pin Name | Type | Description |
|---------|----------|-------------|----------------|
| 1 | Data | Signal | Output Signal |
| 2 | CLK | Clock | Clock input |
| 3 | L/R | L/R Channel | Channel select |
| 4 | VDD | Power | Power Supply |
| 5 | GND | Ground | Ground |
| 6 | GND | Ground | Ground |
| 7 | GND | Ground | Ground |
| 8 | GND | Ground | Ground |

DIGITAL INTERFACE TIMING SPECIFICATION

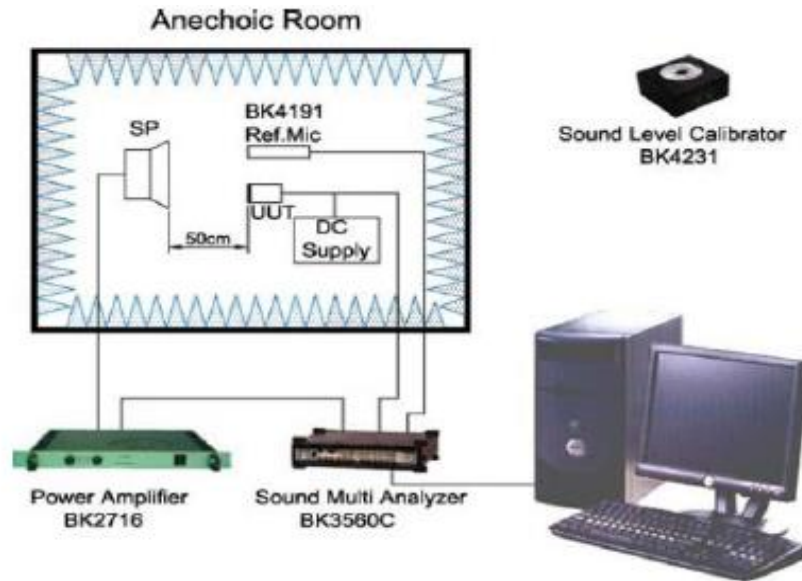


FREQUENCY CHARACTERISTICS

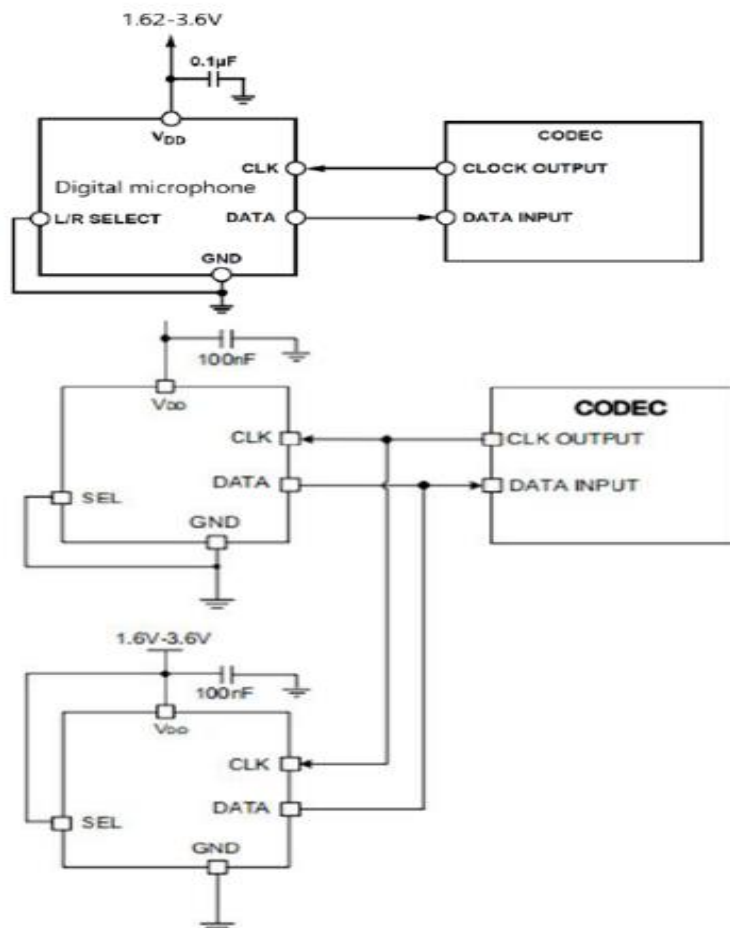


Frequency response curve normalized to 1kHz

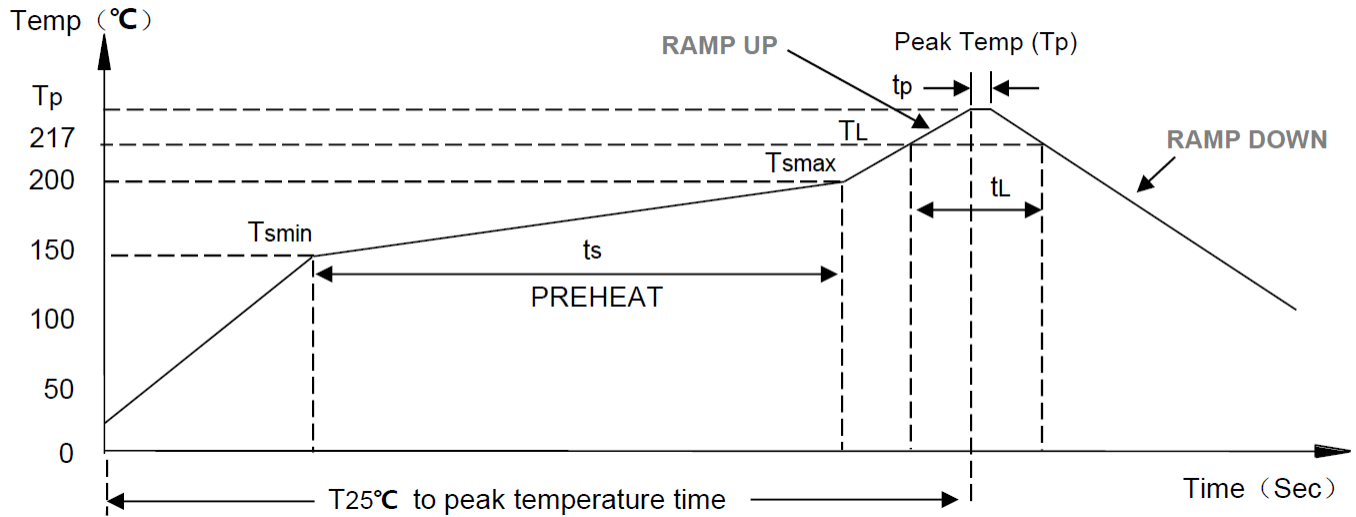
MEASUREMENT SYSTEM SETUP



TYPICAL APPLICATION CIRCUIT



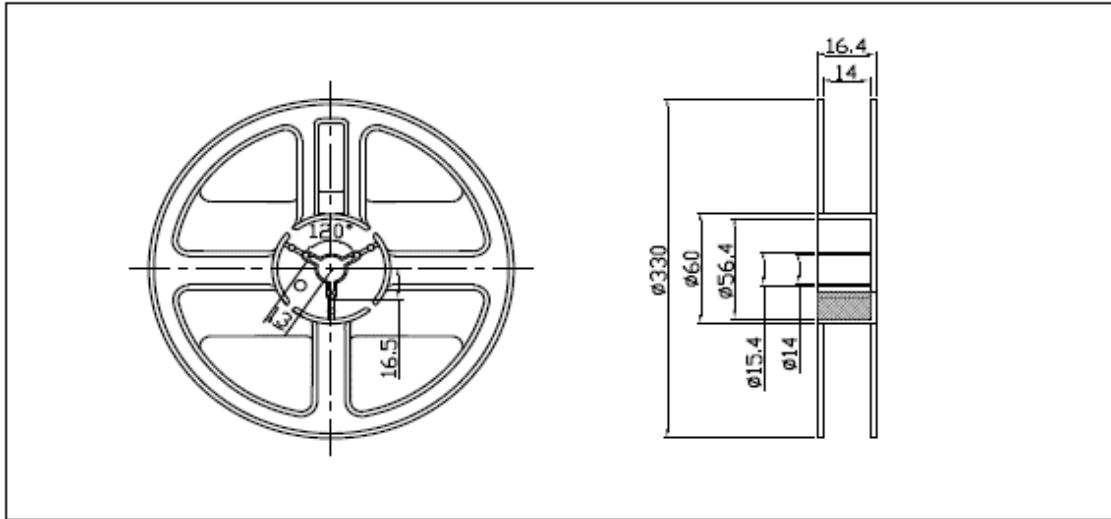
REFLOW PROFILE



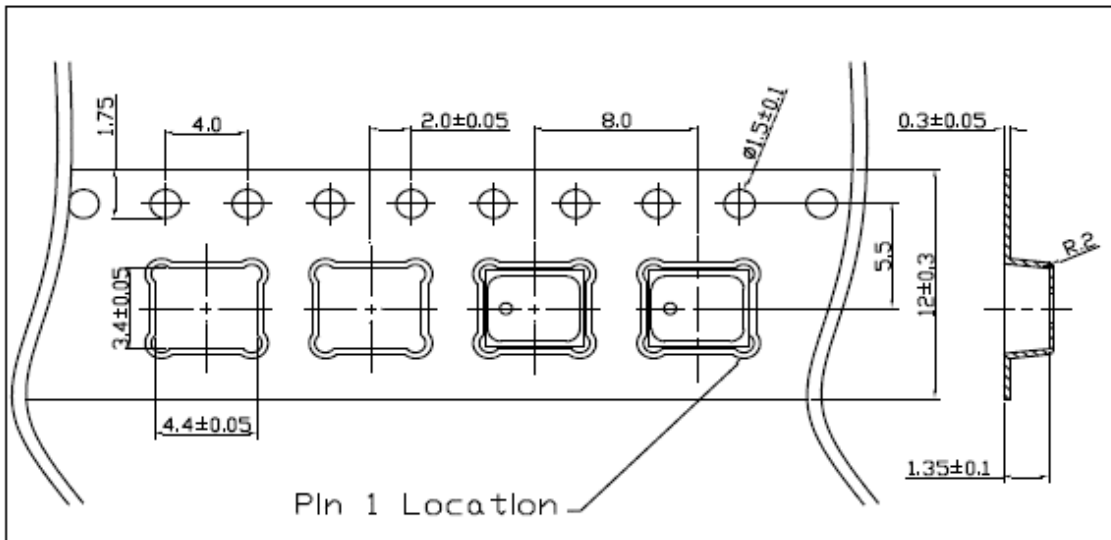
| Parameter | | Specification |
|---|---|------------------|
| Average temperature change rate (TSMAX to TP) | | 3°C /second max. |
| Preheat | Temperature min.(T _{SMIN}) | 150°C |
| | Temperature max.(T _{SMAX}) | 200°C |
| | Time T _{SMIN} to T _{SMAX} | 60-180 Seconds |
| Time Maintained Above Liquidous | | 60-150 Seconds |
| Liquidous Temperature | | 217°C |
| Peak Temperature | | 260°C +0°C/-5°C |
| Time Within +5°C of Actual Peak Temperature | | 20 sec to 40 sec |
| Ramp-Down Rate | | 3°C/sec max |
| Time +25°C (t _{25°C}) to Peak Temperature | | 8 min max |

PACKAGING

13" Reel drawing:



Tape drawing:



APPROVAL

| | |
|-------------|--------------------|
| DRAWN BY | JS, May 31, 2024 |
| APPROVED BY | AR, May 31, 2024 |
| REVISION | A, Initial Release |

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