

# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL

## ABM8W SERIES



3.2 x 2.5 x 0.75mm



RoHS/RoHS II Compliant

MSL = N/A: NOT APPLICABLE

### FEATURES

- Optimized for energy saving wearables and IoT applications
- Plated at exceptionally low plating capacitance, as low as 4pF, with optimized ESR
- 0.75 mm max height ideally suited for height constrained designs
- Seam sealed for longterm reliability

### APPLICATIONS

- Wearables
- Internet of Things (IoT)
- Bluetooth/Bluetooth Low Energy (BLE)
- Wireless modules
- Machine-to-machine (M2M) connectivity
- Ultra-low power MCU
- Near Field Communication (NFC)
- ISM Band

### STANDARD SPECIFICATIONS

| Parameters                                                          | Minimum     | Typical | Maximum | Units | Notes                |
|---------------------------------------------------------------------|-------------|---------|---------|-------|----------------------|
| Frequency Range                                                     | 10.0000     |         | 54.0000 | MHz   |                      |
| Operation Mode                                                      | Fundamental |         |         |       |                      |
| Operating Temperature Range                                         | -40         |         | +125    | °C    | See options          |
| Storage Temperature                                                 | -55         |         | +125    | °C    |                      |
| Frequency Tolerance @ +25°C                                         | -10         |         | +10     | ppm   | See options          |
| Frequency Stability over the Operating Temperature ( ref. to +25°C) | -10         |         | +10     | ppm   | See options          |
| Equivalent series resistance (R1)<br>(over -40°C to +125°C)         |             | < 100   | 200     | Ω     | 10.0000 – 11.9999MHz |
|                                                                     |             | < 60    | 100     |       | 12.0000 – 15.9999MHz |
|                                                                     |             | < 40    | 70      |       | 16.0000 – 19.9999MHz |
|                                                                     |             | < 25    | 50      |       | 20.0000 – 29.9999MHz |
|                                                                     |             | < 20    | 40      |       | 30.0000 – 39.9999MHz |
|                                                                     |             | < 18    | 30      |       | 40.0000 – 54.0000MHz |
| Shunt capacitance (C0)                                              |             | < 1.2   | 2.0     | pF    |                      |
| Load capacitance (CL)                                               |             | 4.0     |         | pF    | See options          |
| Drive Level                                                         |             | 10      | 100     | μW    |                      |
| Aging (1 year)                                                      | -2          |         | +2      | ppm   | @ 25°C±3°C           |
| Insulation Resistance                                               | 500         |         |         | MΩ    | @ 100Vdc ± 15V       |

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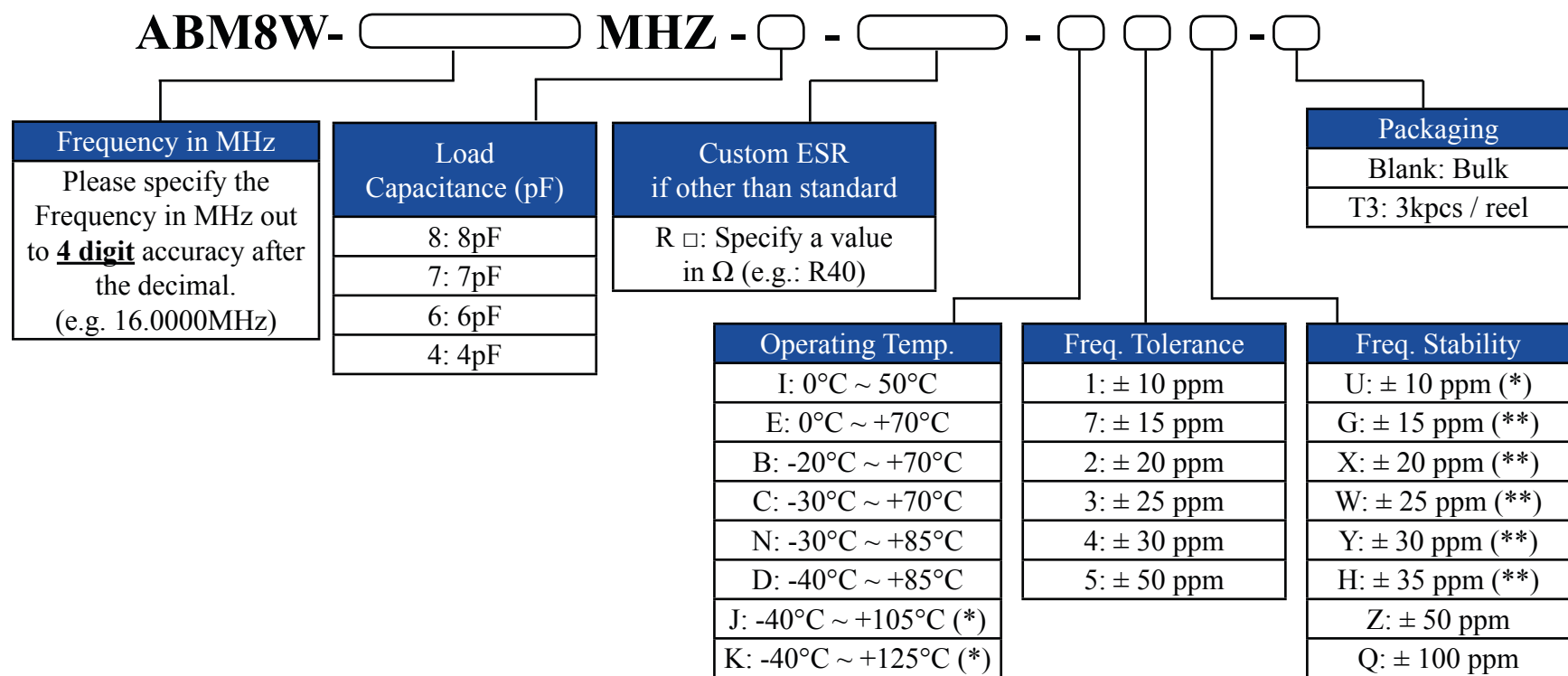


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OPTIONS AND PART IDENTIFICATION (NOTE 1)

Note 1: Contact Abracon for part number requests with carrier frequency callouts up to 5&6 digit accuracy after the decimal.



(\*) Only offered @ Freq. Stability options: Z & Q.

Contact ABRACON for tighter Frequency Stability.

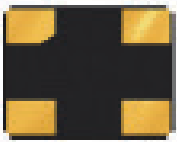
(\*) Only offered @ Operating Temp. Range options: I, E, & B

(\*\*) Only offered @ Operating Temp. Range options: I, E, B, C, N, & D

Contact ABRACON for wider Operating Temp. Range.

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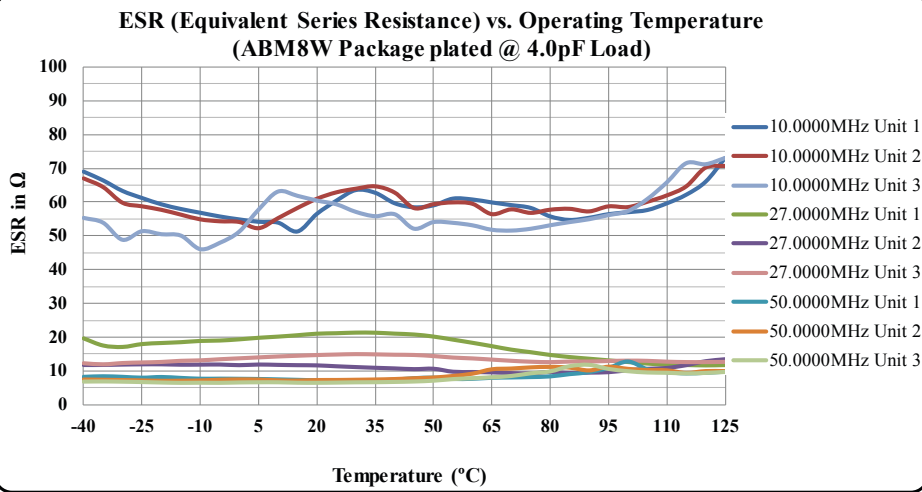
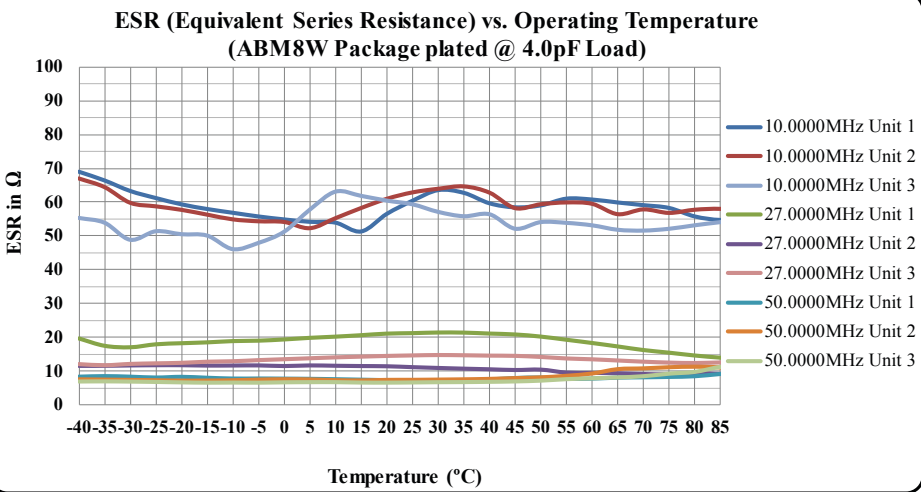
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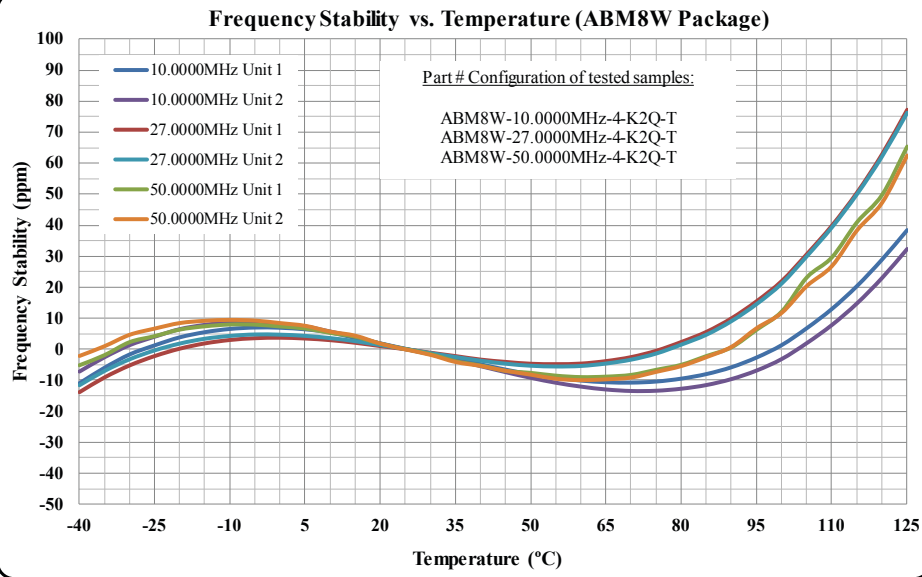
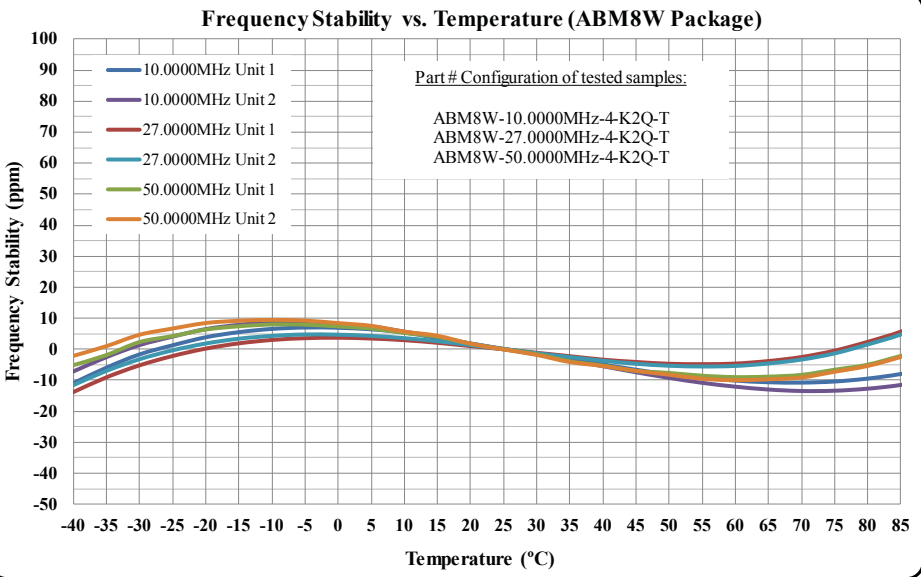
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### TYPICAL ESR (EQUIVALENT SERIES RESISTANCE) Vs. TEMPERATURE CHARACTERISTICS



### TYPICAL FREQUENCY Vs. TEMPERATURE CHARACTERISTICS



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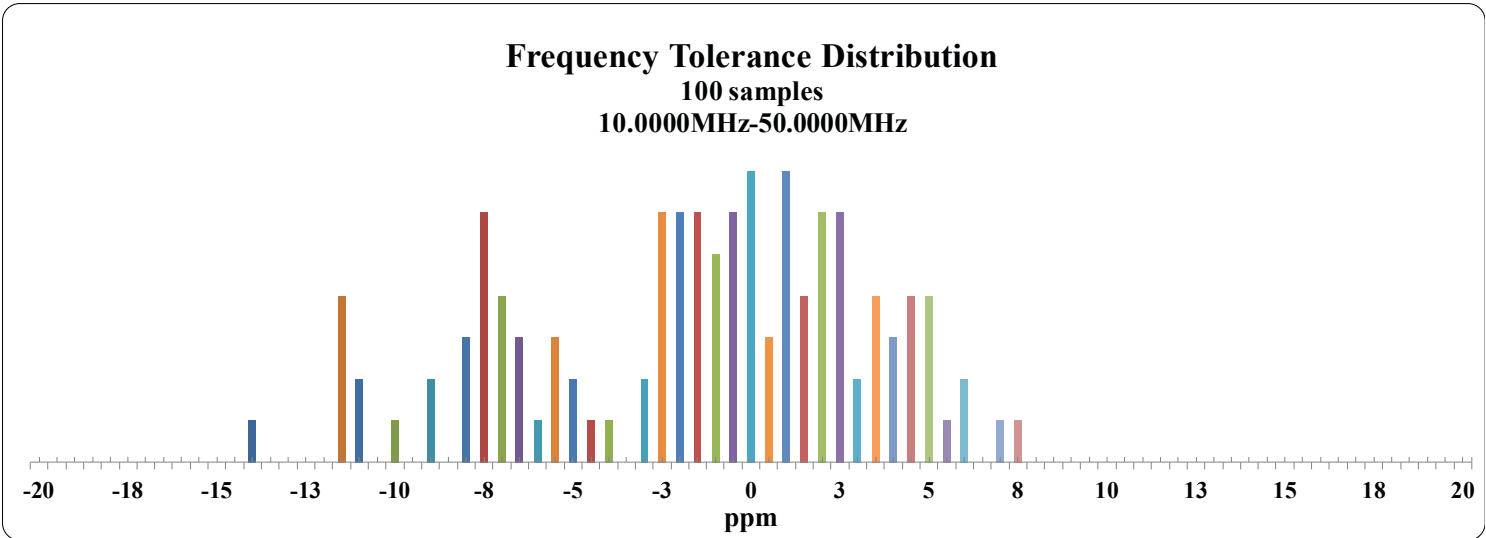
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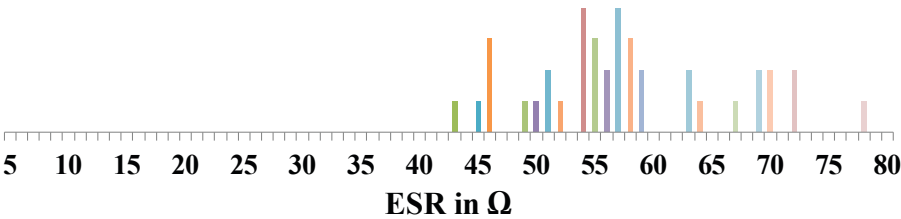
## TYPICAL FREQUENCY TOLERANCE DISTRIBUTION (AT 25°C ± 3°C)



## TYPICAL ESR DISTRIBUTION (AT 25°C ± 3°C)

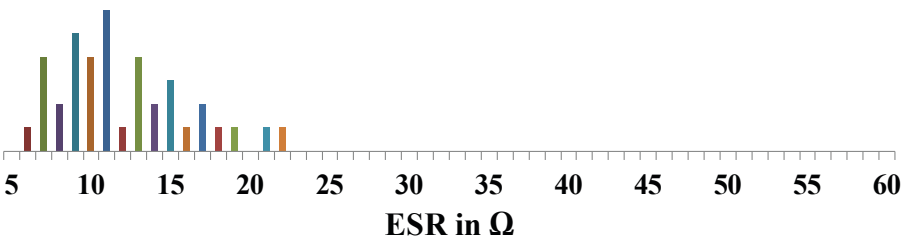
### ESR Distribution @ 10.0000MHz

100 samples  
MAX ESR = 77.7 Ω



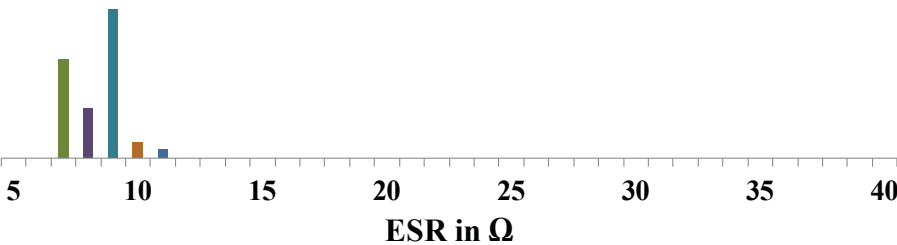
### ESR Distribution @ 27.0000MHz

100 samples  
MAX ESR = 21.6 Ω



### ESR Distribution @ 50.0000MHz

100 samples  
MAX ESR = 10.23 Ω



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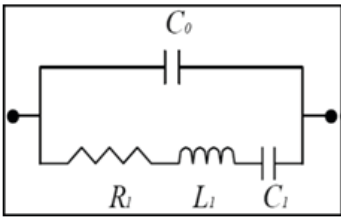
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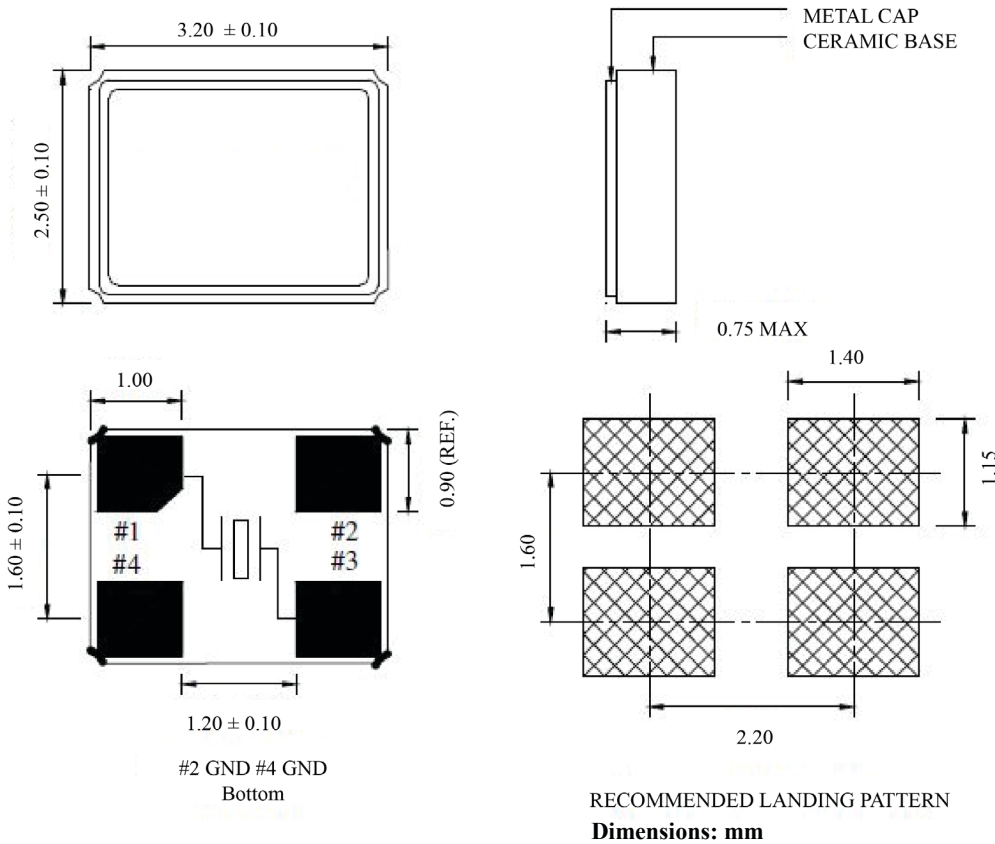
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SPICE MODELS (BASED ON TYPICAL VALUES AT 25°C ± 3°C)



| Frequency: 10.0000MHz<br>Plating Load: 4pF |   |        |    | Frequency: 10.0000MHz<br>Plating Load: 6pF |   |        |    |
|--------------------------------------------|---|--------|----|--------------------------------------------|---|--------|----|
| C0                                         | = | 0.88   | pF | C0                                         | = | 0.86   | pF |
| R1                                         | = | 53.82  | Ω  | R1                                         | = | 60.62  | Ω  |
| L1                                         | = | 162.02 | mH | L1                                         | = | 164.96 | mH |
| C1                                         | = | 1.56   | fF | C1                                         | = | 1.54   | fF |
| Frequency: 27.0000MHz<br>Plating Load: 4pF |   |        |    | Frequency: 27.0000MHz<br>Plating Load: 6pF |   |        |    |
| C0                                         | = | 1.16   | pF | C0                                         | = | 1.16   | pF |
| R1                                         | = | 11.83  | Ω  | R1                                         | = | 11.06  | Ω  |
| L1                                         | = | 9.16   | mH | L1                                         | = | 9.10   | mH |
| C1                                         | = | 3.80   | fF | C1                                         | = | 3.82   | fF |
| Frequency: 50.0000MHz<br>Plating Load: 4pF |   |        |    | Frequency: 50.0000MHz<br>Plating Load: 6pF |   |        |    |
| C0                                         | = | 1.16   | pF | C0                                         | = | 1.15   | pF |
| R1                                         | = | 7.61   | Ω  | R1                                         | = | 8.06   | Ω  |
| L1                                         | = | 2.45   | mH | L1                                         | = | 2.49   | mH |
| C1                                         | = | 4.14   | fF | C1                                         | = | 4.07   | fF |

MECHANICAL DIMENSIONS



Note:  
Due to material availability the Chamfer could be located on pin #1, 2 or 4. Be advised that the Chamfer location has no impact on the electrical performance of the device.

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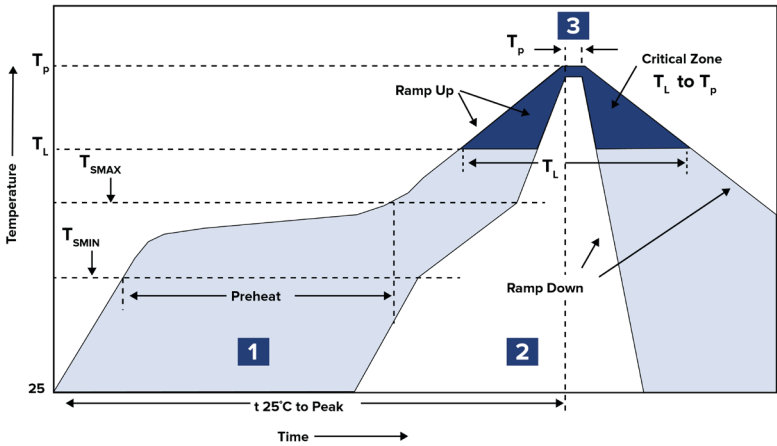
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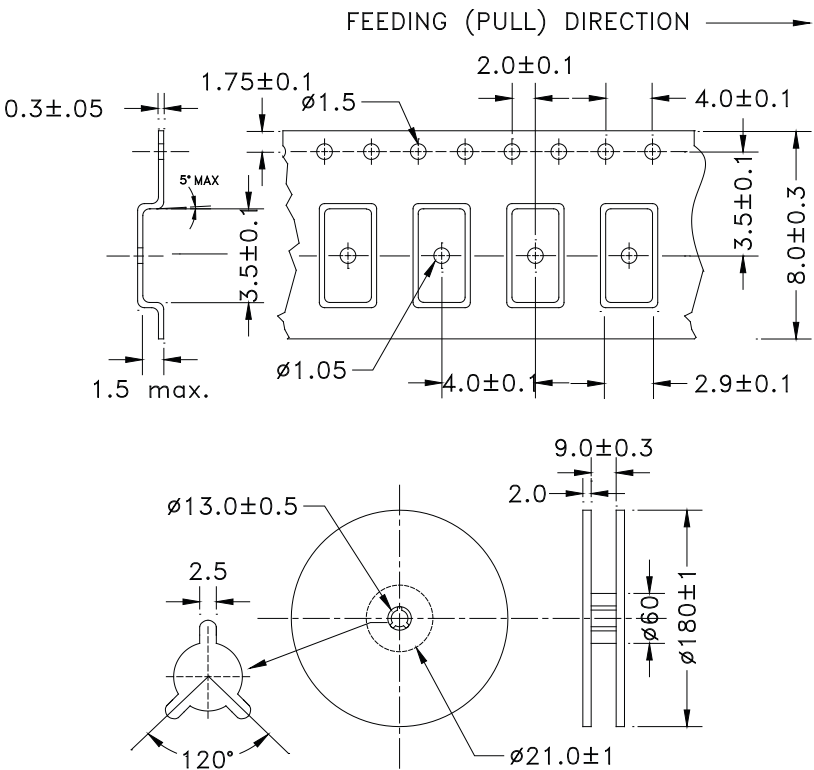
## REFLOW PROFILE



| Zone | Description | Temperature                               | Time          |
|------|-------------|-------------------------------------------|---------------|
| 1    | Preheat     | $T_{SMIN} \sim T_{SMAX}$<br>150°C ~ 180°C | 60 ~ 120 sec. |
| 2    | Reflow      | $T_L$<br>217°C                            | 45 ~ 90 sec.  |
| 3    | Peak Heat   | $T_P$<br>260°C MAX                        | 10 sec.       |

## PACKAGING

T3: Tape and reel (3,000 pcs/reel)



DIMENSIONS: mm