

# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL



1.6 x 1.2 x 0.4mm



RoHS/RoHS II Compliant

MSL = N/A: NOT APPLICABLE

## ABM12W SERIES

### FEATURES

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

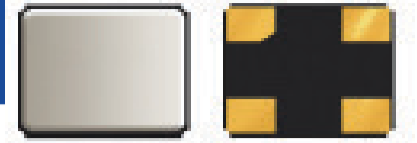
### APPLICATIONS

- 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	24.0000		52.0000	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) (over -40°C to +125°C)		< 90	150	Ω	24.0000 – 31.9999MHz
		< 80	100		32.0000 – 36.9999MHz
		< 60	80		37.0000 – 52.0000MHz
Shunt capacitance (C0)		< 1.0	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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## 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.

ABM12W- [ ] MHz - [ ] - [ ] - [ ] - [ ] - [ ]

**Frequency in MHz**  
Please specify the Frequency in MHz out to **4 digit** accuracy after the decimal.  
(e.g. 16.0000MHz)

Load Capacitance (pF)
8: 8pF
7: 7pF
6: 6pF
4: 4pF

**Custom ESR if other than standard**  
R □: Specify a value in Ω (e.g.: R70)

Packaging
Blank: Bulk
T3: 3kpcs / reel

Operating Temp.
I: 0°C ~ 50°C
E: 0°C ~ +70°C
B: -20°C ~ +70°C
C: -30°C ~ +70°C
N: -30°C ~ +85°C
D: -40°C ~ +85°C
J: -40°C ~ +105°C (*)
K: -40°C ~ +125°C (*)

Freq. Tolerance
1: ± 10 ppm
7: ± 15 ppm
2: ± 20 ppm
3: ± 25 ppm
4: ± 30 ppm
5: ± 50 ppm

Freq. Stability
U: ± 10 ppm (*)
G: ± 15 ppm (**)
X: ± 20 ppm (**)
W: ± 25 ppm (**)
Y: ± 30 ppm (**)
H: ± 35 ppm (**)
Z: ± 50 ppm
Q: ± 100 ppm

(\*) 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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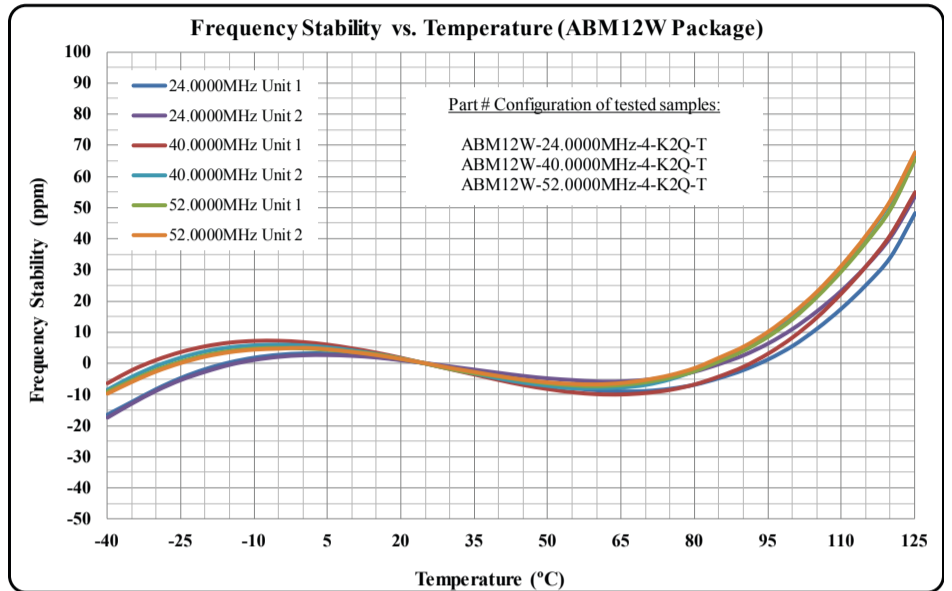
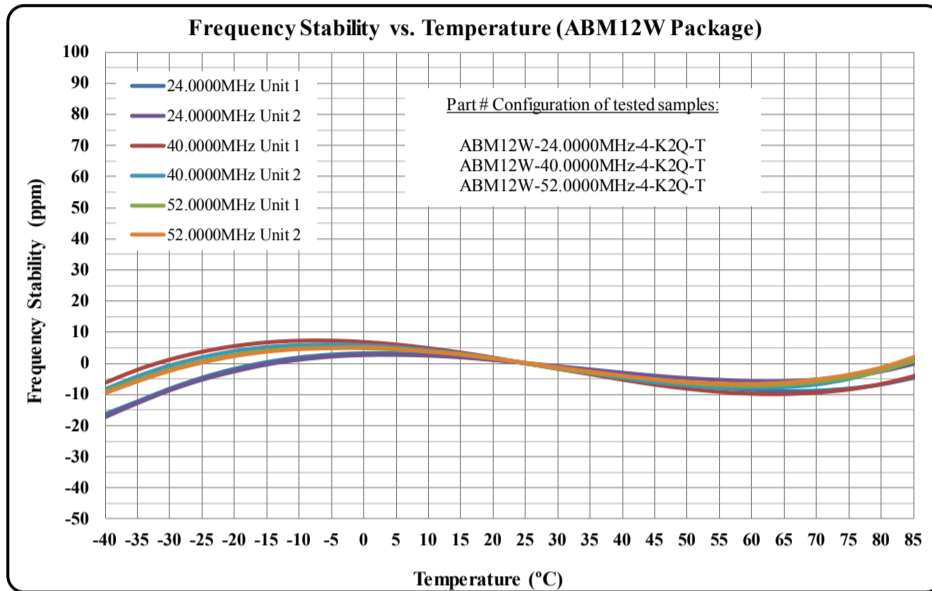
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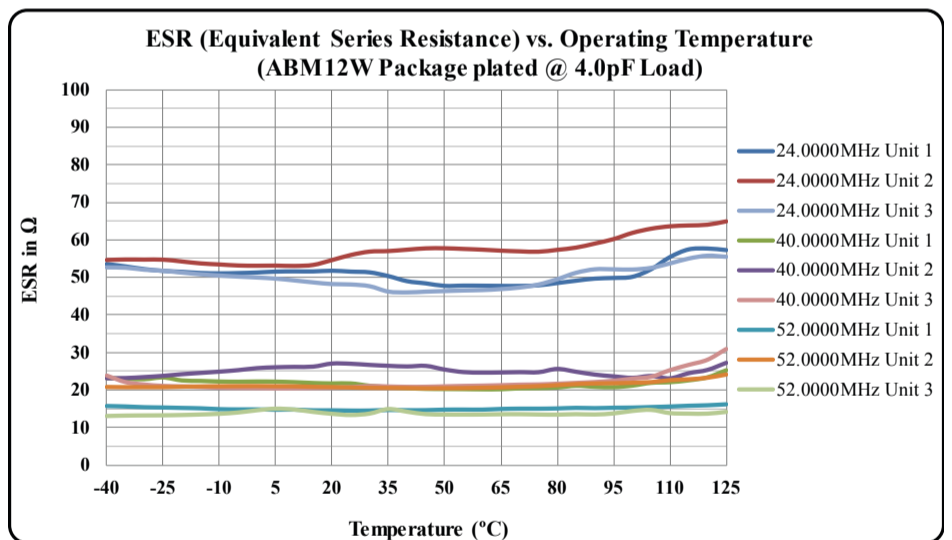
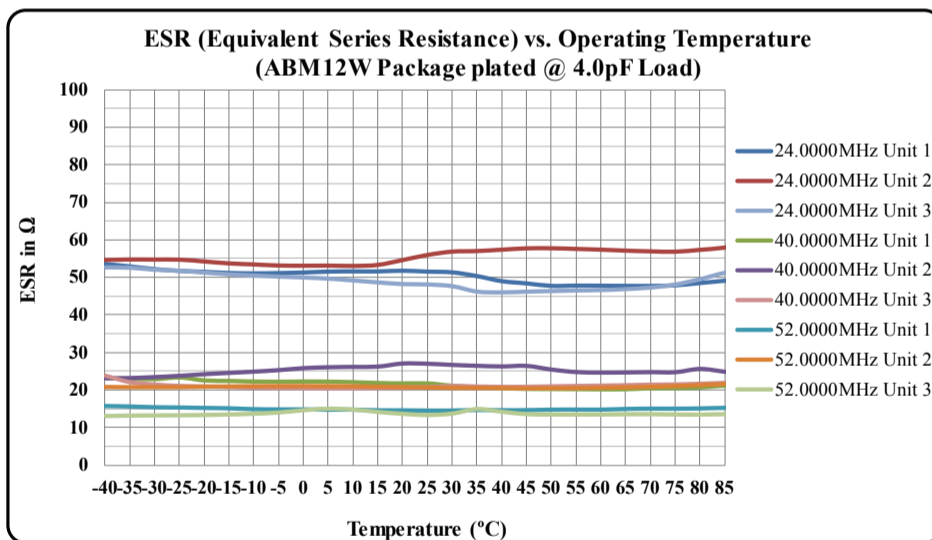
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## ABM12W SERIES

### TYPICAL FREQUENCY Vs. TEMPERATURE CHARACTERISTICS



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



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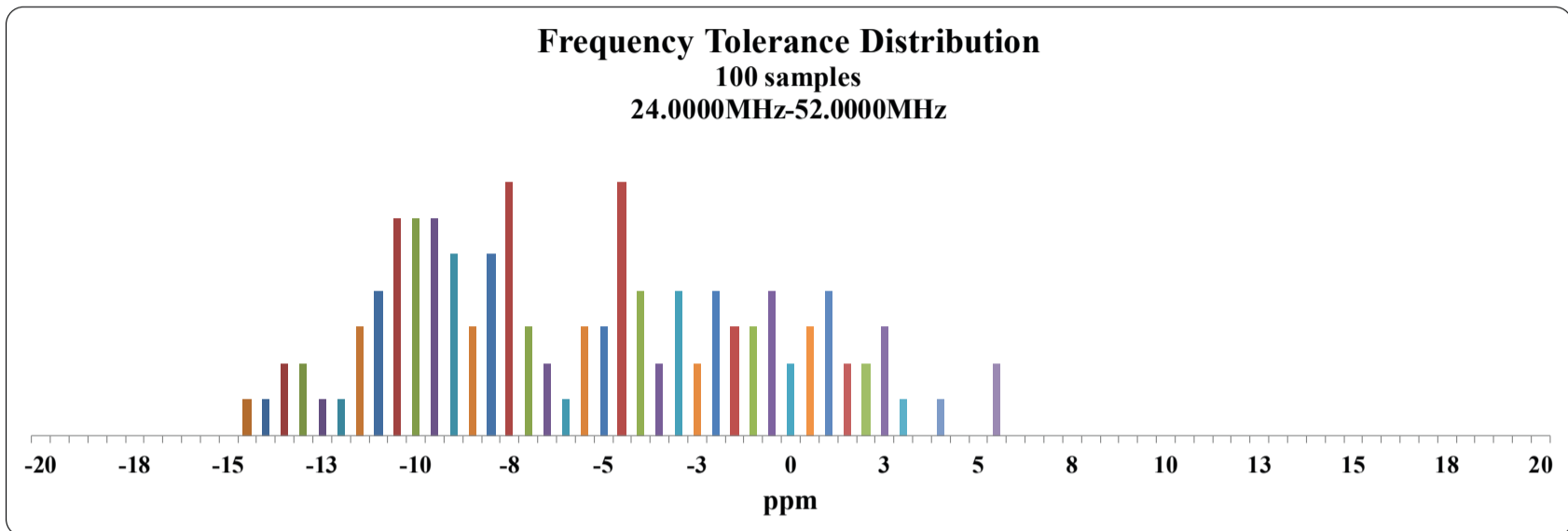
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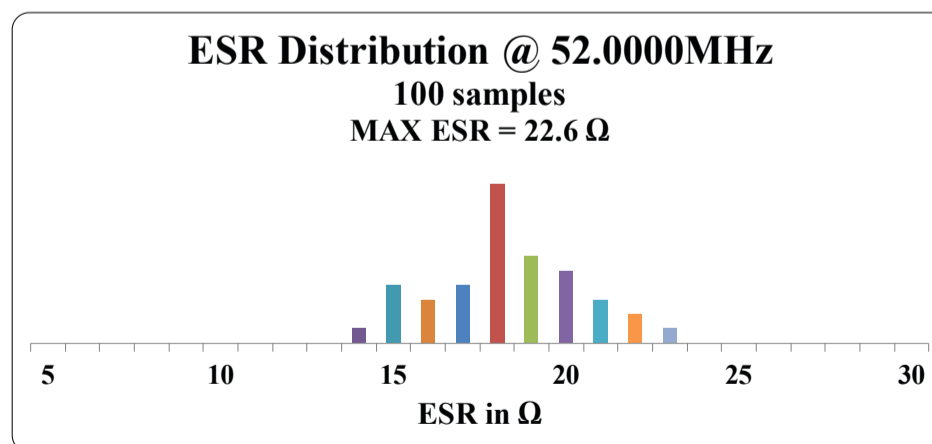
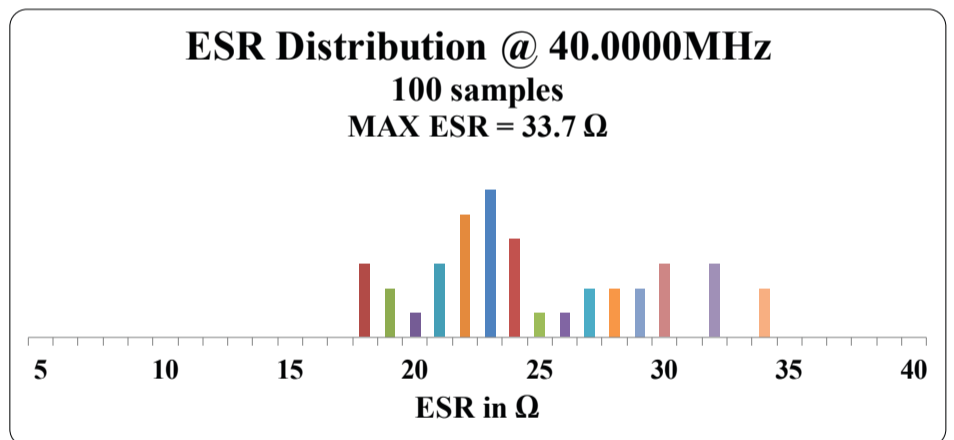
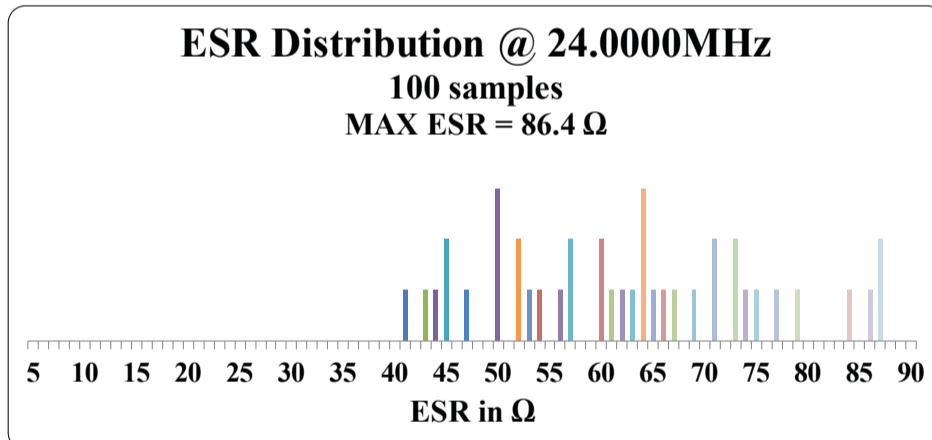
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## TYPICAL FREQUENCY TOLERANCE DISTRIBUTION (AT 25°C ± 3°C)



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



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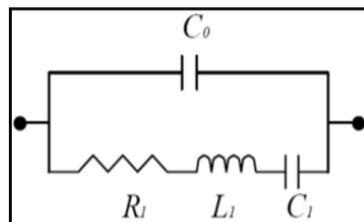
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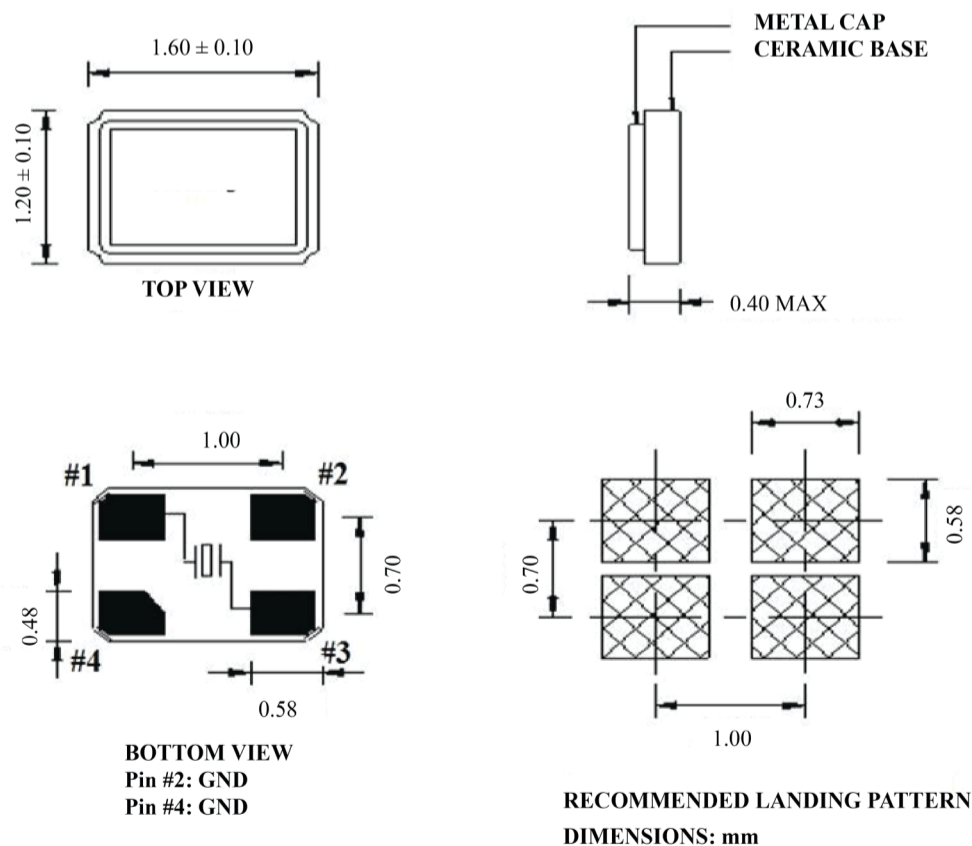
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## SPICE MODELS (BASED ON TYPICAL VALUES AT 25°C ± 3°C)



<b>Frequency: 24.0000MHz</b> <b>Plating Load: 4pF</b>		<b>Frequency: 24.0000MHz</b> <b>Plating Load: 6pF</b>	
C0	= 0.58 pF	C0	= 0.49 pF
R1	= 54.20 Ω	R1	= 67.91 Ω
L1	= 52.83 mH	L1	= 50.66 mH
C1	= 0.83 fF	C1	= 0.87 fF
<b>Frequency: 40.0000MHz</b> <b>Plating Load: 4pF</b>		<b>Frequency: 40.0000MHz</b> <b>Plating Load: 6pF</b>	
C0	= 0.65 pF	C0	= 0.63 pF
R1	= 27.21 Ω	R1	= 22.99 Ω
L1	= 10.55 mH	L1	= 10.47 mH
C1	= 1.50 fF	C1	= 1.51 fF
<b>Frequency: 52.0000MHz</b> <b>Plating Load: 4pF</b>		<b>Frequency: 52.0000MHz</b> <b>Plating Load: 6pF</b>	
C0	= 0.63 pF	C0	= 0.64 pF
R1	= 18.03 Ω	R1	= 18.27 Ω
L1	= 5.74 mH	L1	= 5.50 mH
C1	= 1.63 fF	C1	= 1.70 fF

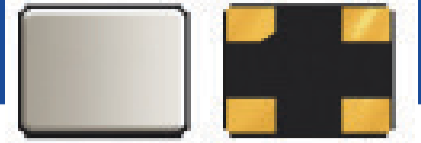
## MECHANICAL DIMENSIONS



**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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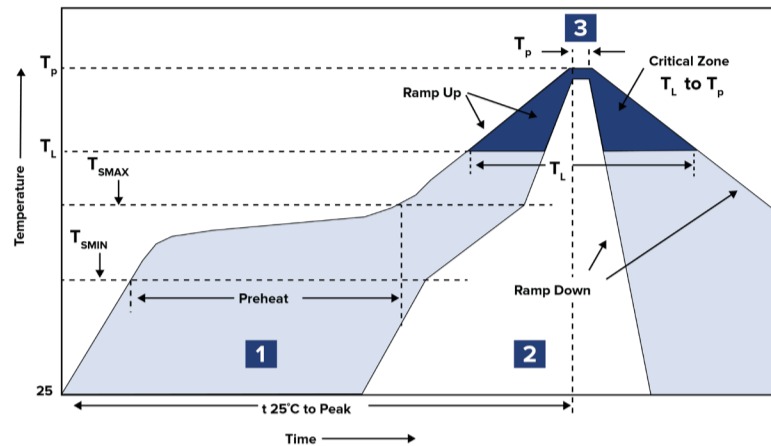
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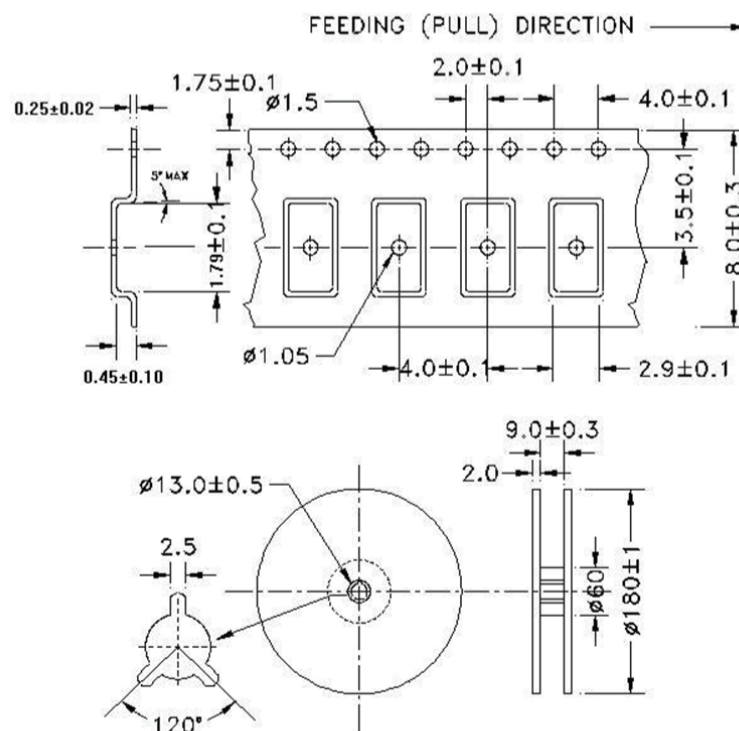
## REFLOW PROFILE



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

## PACKAGING

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



DIMENSIONS: mm