



**THE DATASHEET OF  
ABM11W-16.0000MHZ-8-K1Z-T3**



# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL



ABM11W SERIES

2.0 x 1.6 x 0.5mm



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
- 0.5 mm max height ideally suited for height constrained designs
- Seam sealed for longterm reliability

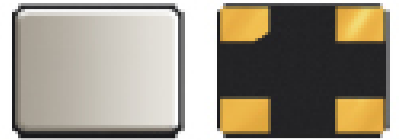
## APPLICATIONS

- 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	16.0000		50.0000	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 Operating Temperature Range) (CL=4pF)		< 150	200	Ω	16.0000 – 17.9999MHz
		< 80	120		18.0000 – 20.9999MHz
		< 60	100		21.0000 – 29.9999MHz
		< 50	80		30.0000 – 37.9999MHz
		< 30	60		38.0000 – 50.0000MHz
Equivalent series resistance "R1" (over Operating Temperature Range) (CL=6pF, 7pF, 8pF)		< 120	150	Ω	16.0000 – 17.9999MHz
		< 80	120		18.0000 – 20.9999MHz
		< 60	100		21.0000 – 23.9999MHz
		< 30	50		24.0000 – 29.9999MHz
		< 30	50		30.0000 – 37.9999MHz
		< 30	40		38.0000 – 50.0000MHz
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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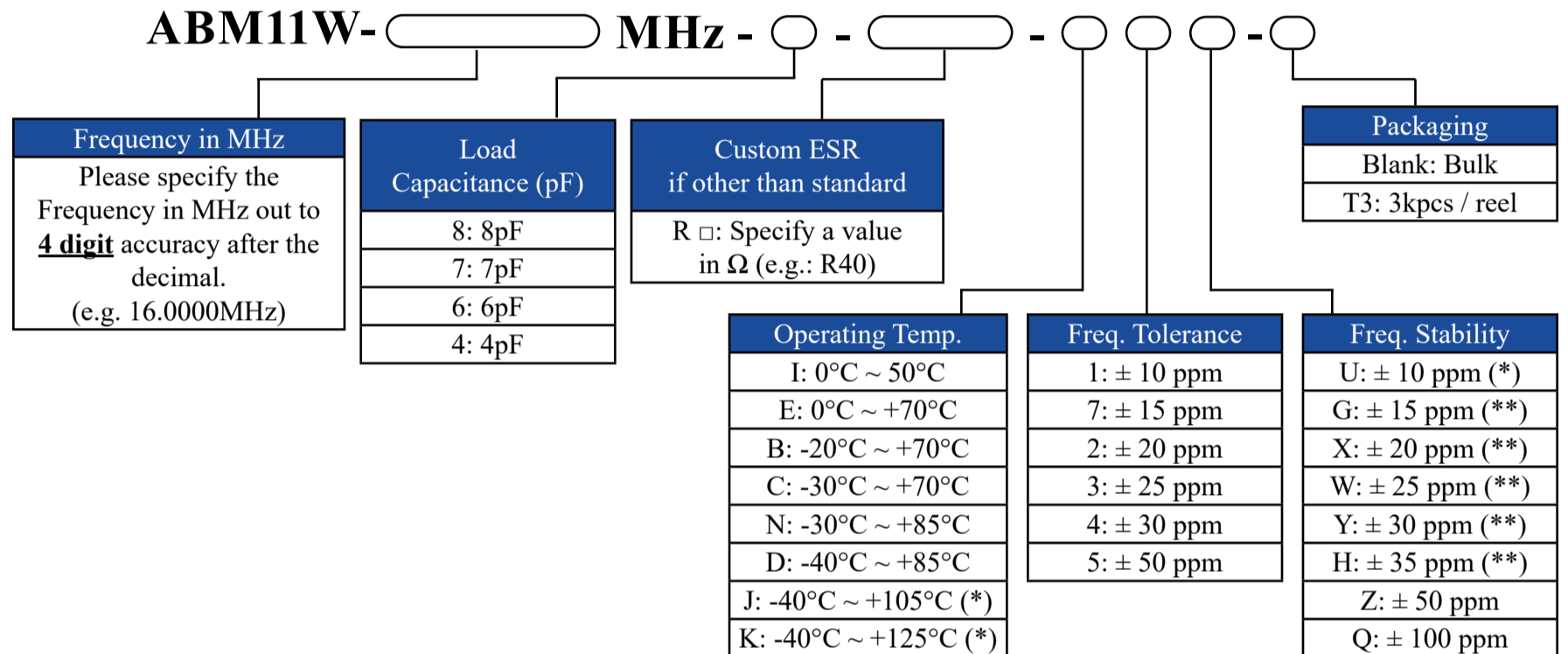


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## OPTIONS AND PART IDENTIFICATION (NOTE 1)

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.

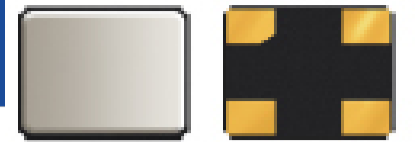
Contact ABRACON for tighter Frequency Stability.

(\*) 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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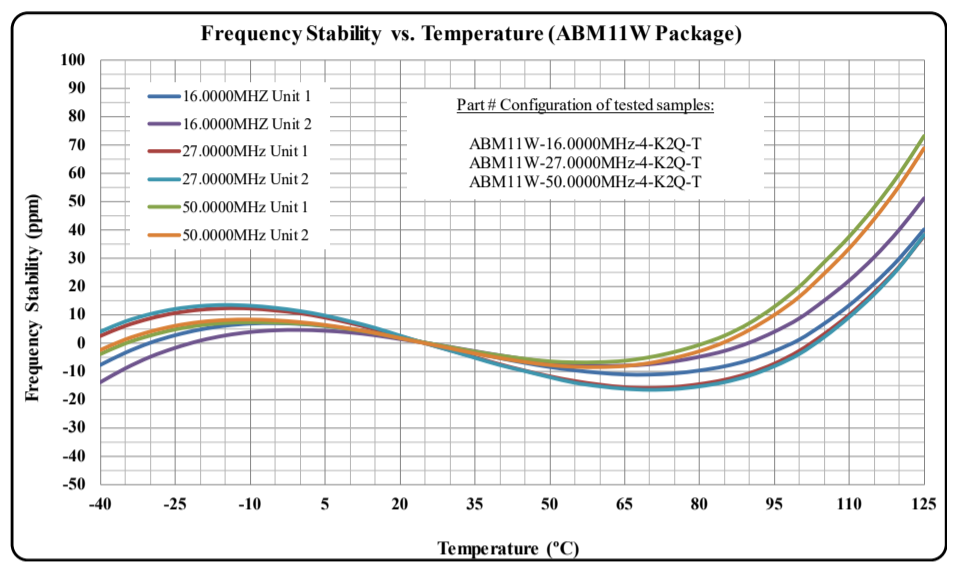
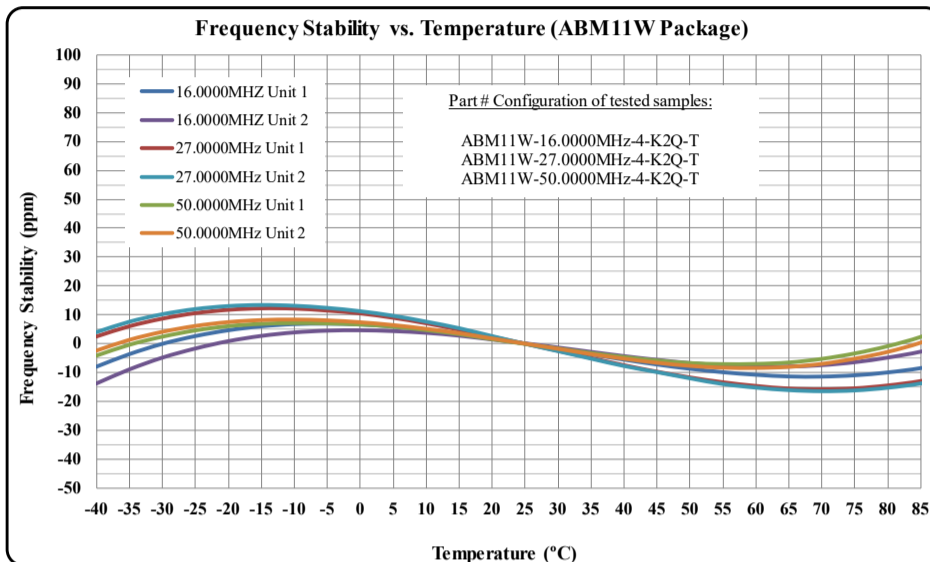
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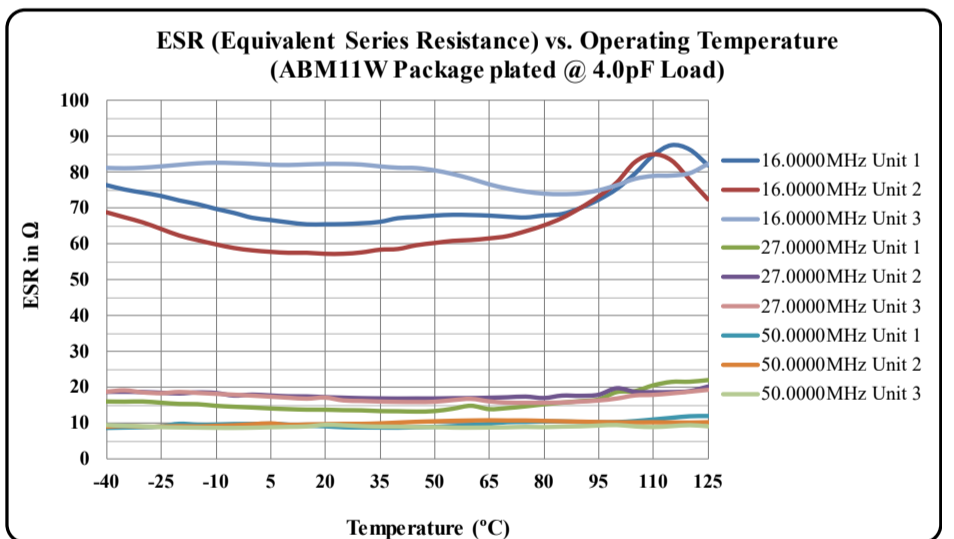
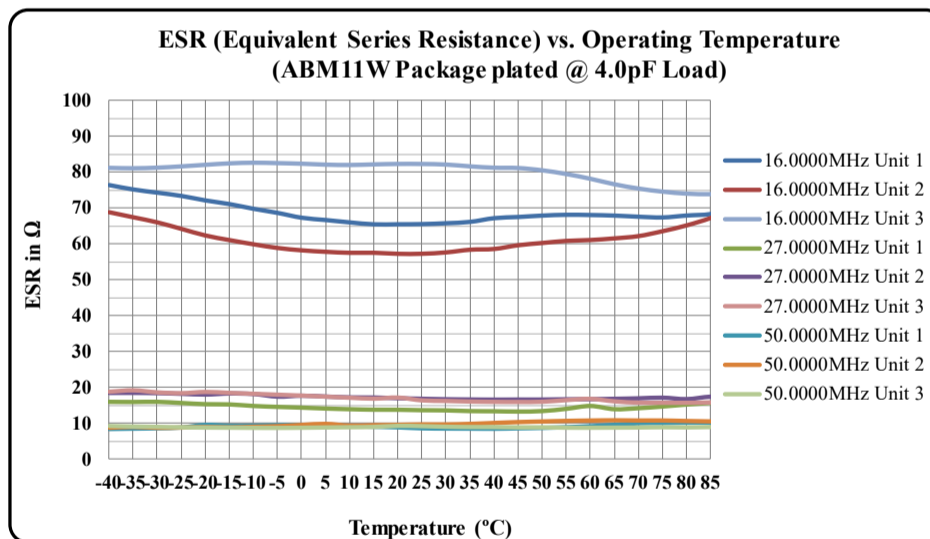
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## TYPICAL FREQUENCY Vs. TEMPERATURE CHARACTERISTICS



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



(\* ) Plating Load = Load Capacitance (CL)

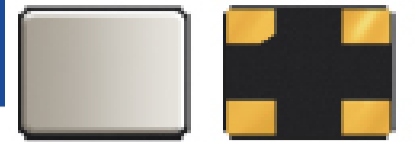


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REVISED: 10.06.2020

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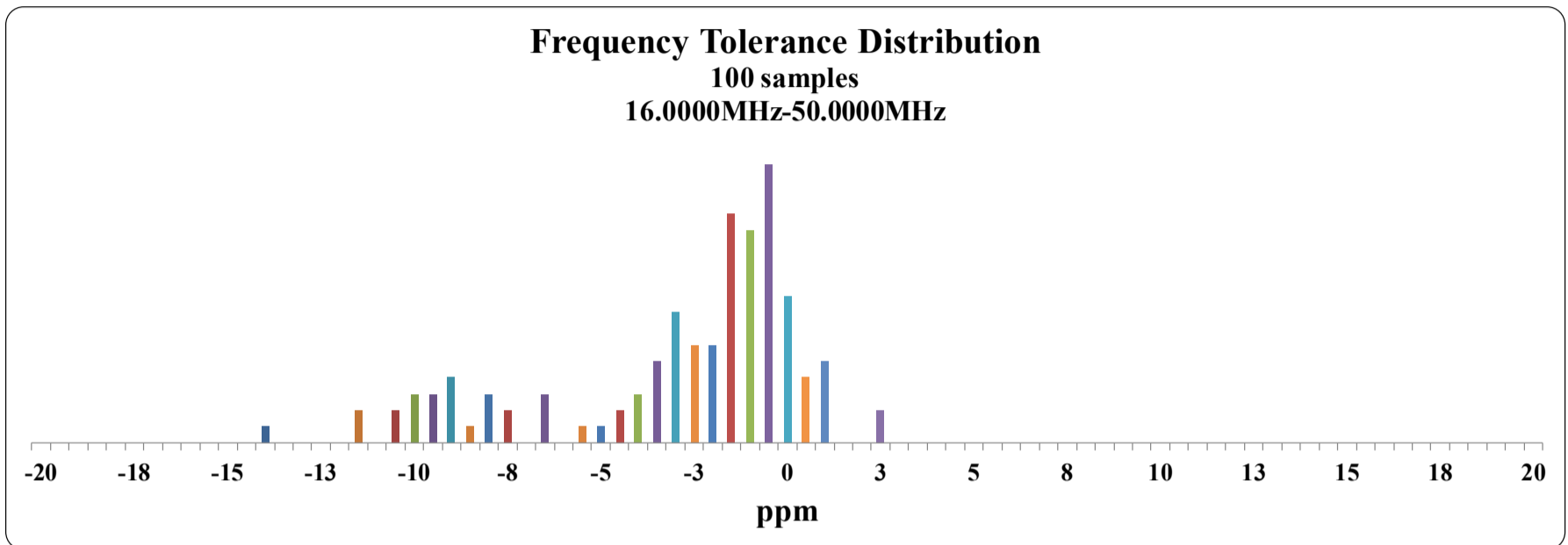
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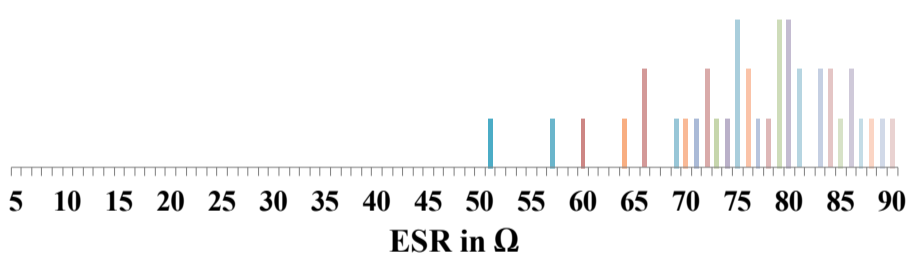
## TYPICAL FREQUENCY TOLERANCE DISTRIBUTION (AT 25°C ± 3°C)



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

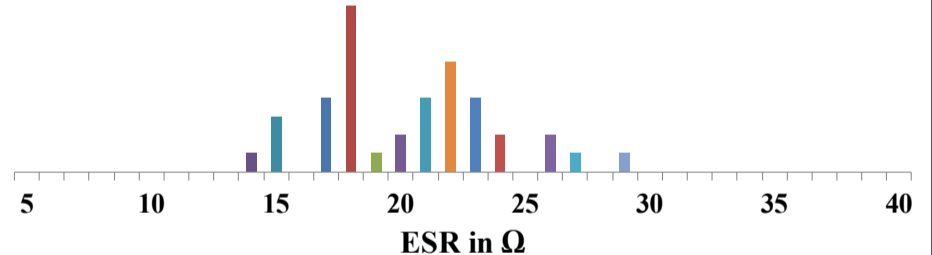
### ESR Distribution @ 16.0000MHz

100 samples  
MAX ESR = 89.5 Ω



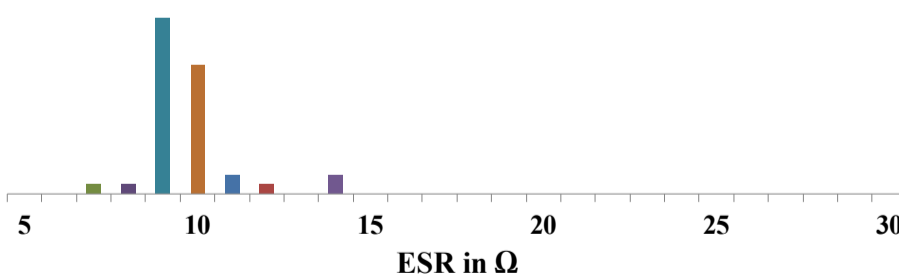
### ESR Distribution @ 27.0000MHz

100 samples  
MAX ESR = 28.3 Ω

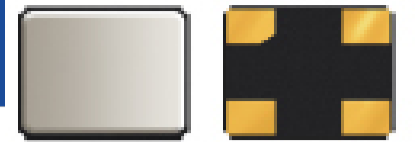


### ESR Distribution @ 50.0000MHz

100 samples  
MAX ESR = 13.4 Ω



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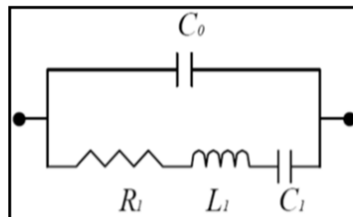
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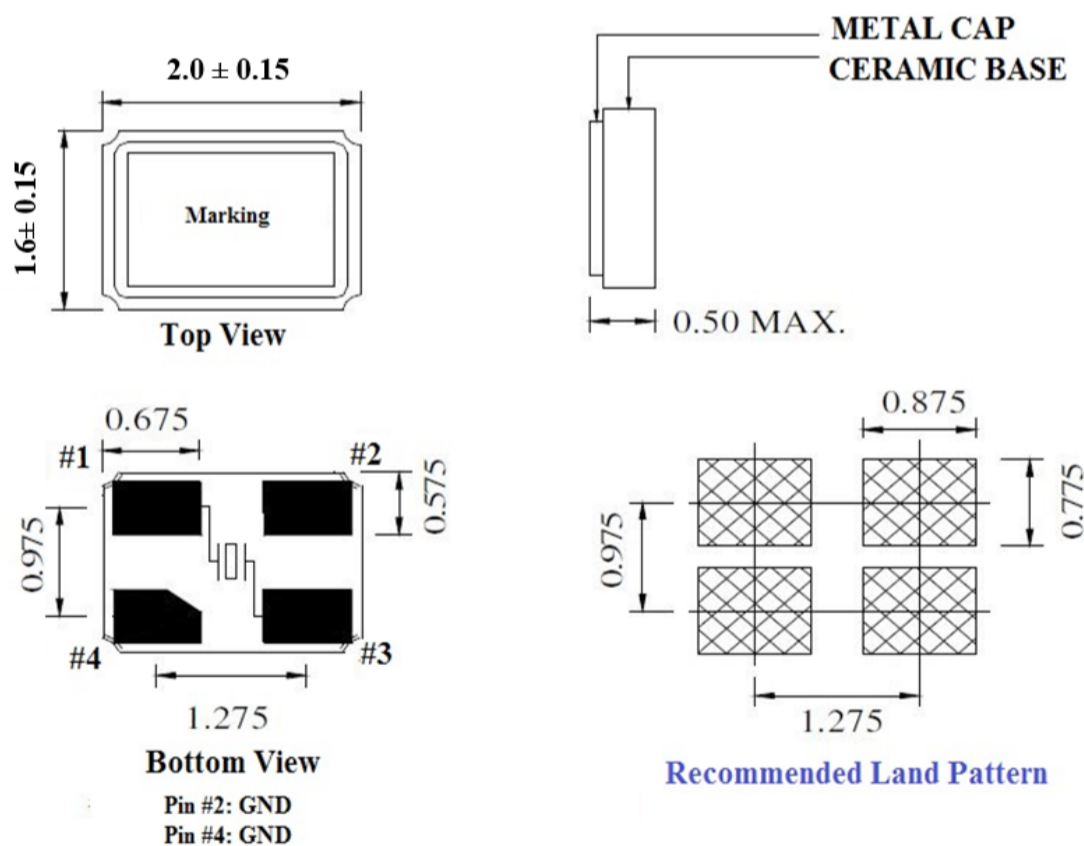
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## SPICE MODELS (BASED ON TYPICAL VALUES AT 25°C ± 3°C)



<b>Frequency: 16.0000MHz</b>				<b>Frequency: 16.0000MHz</b>			
<b>Plating Load: 4pF</b>				<b>Plating Load: 6pF</b>			
C0	=	0.73	pF	C0	=	0.71	pF
R1	=	73.02	Ω	R1	=	81.42	Ω
L1	=	84.25	mH	L1	=	81.33	mH
C1	=	1.18	fF	C1	=	1.22	fF
<b>Frequency: 27.0000MHz</b>				<b>Frequency: 27.0000MHz</b>			
<b>Plating Load: 4pF</b>				<b>Plating Load: 6pF</b>			
C0	=	0.78	pF	C0	=	0.76	pF
R1	=	18.71	Ω	R1	=	20.45	Ω
L1	=	18.08	mH	L1	=	18.44	mH
C1	=	1.92	fF	C1	=	1.89	fF
<b>Frequency: 50.0000MHz</b>				<b>Frequency: 50.0000MHz</b>			
<b>Plating Load: 4pF</b>				<b>Plating Load: 6pF</b>			
C0	=	0.92	pF	C0	=	0.97	pF
R1	=	9.02	Ω	R1	=	8.49	Ω
L1	=	3.53	mH	L1	=	3.21	mH
C1	=	2.88	fF	C1	=	3.15	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.

**DIMENSIONS: MM**

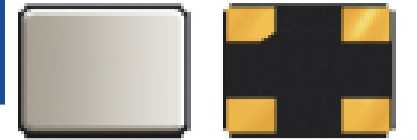


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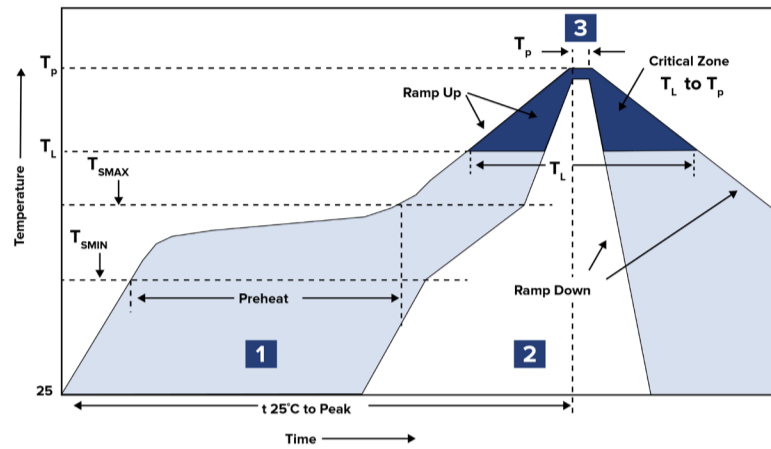
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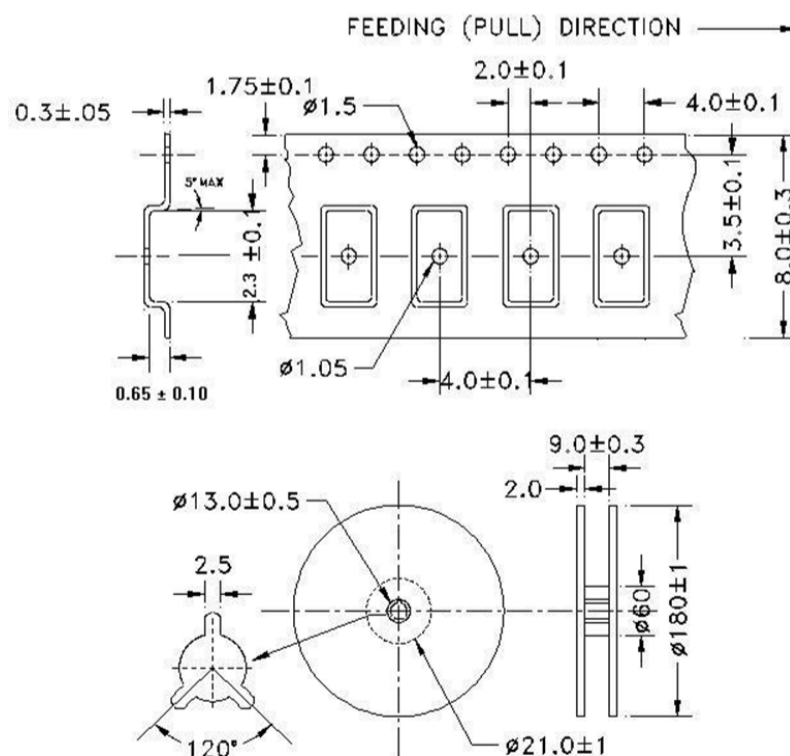
## REFLOW PROFILE



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



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