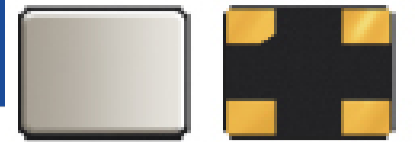




**THE DATASHEET OF  
ABM12W-32.0000MHZ-4-D1X-T3**



# 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

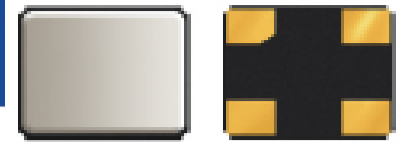
### APPLICATIONS

- 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 Operating Temperature Range) (CL=4pF)		< 90	150	Ω	24.0000 – 31.9999MHz
		< 80	100		32.0000 – 36.9999MHz
		< 60	80		37.0000 – 52.0000MHz
Equivalent series resistance "R1" (over Operating Temperature Range) (CL=6pF, 7pF, 8pF)		< 80	100	Ω	24.0000 – 31.9999MHz
		< 60	80		32.0000 – 36.9999MHz
		< 35	50		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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ABM12W SERIES

## 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  $\Omega$  (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: $\pm 10$ ppm
7: $\pm 15$ ppm
2: $\pm 20$ ppm
3: $\pm 25$ ppm
4: $\pm 30$ ppm
5: $\pm 50$ ppm

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

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

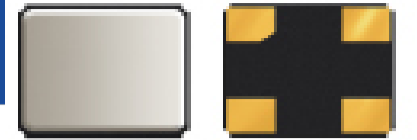
Contact ABRACON for tighter Frequency Stability.

(\*) 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.

# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL



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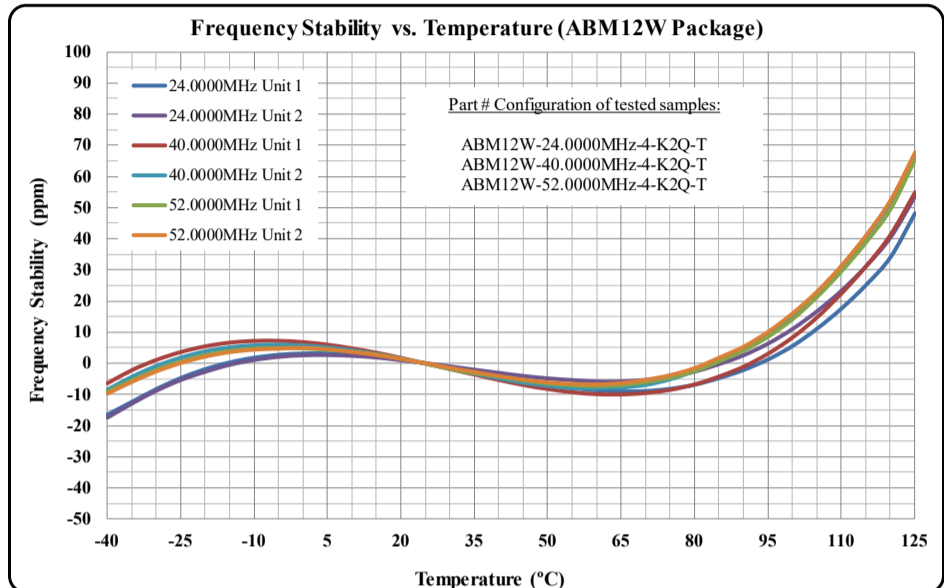
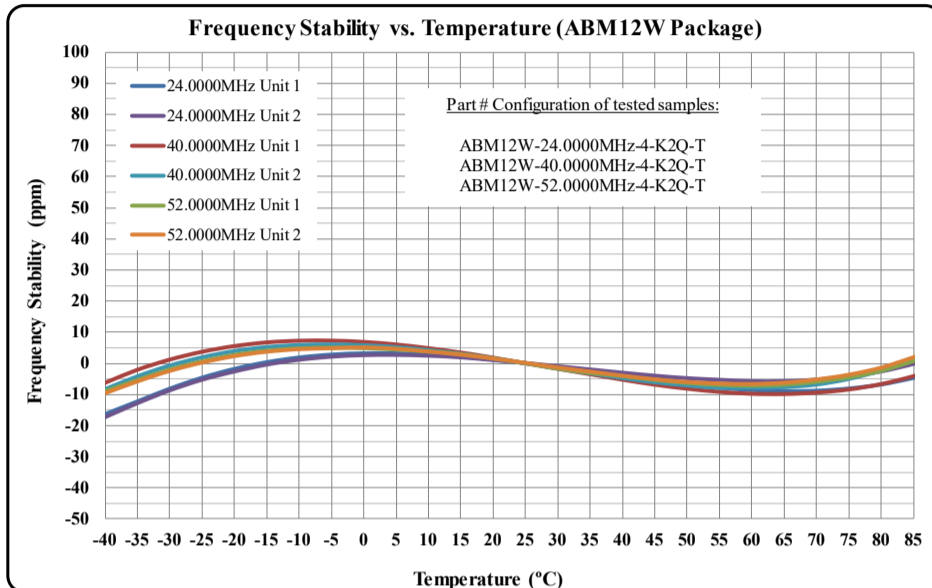
1.6 x 1.2 x 0.4mm



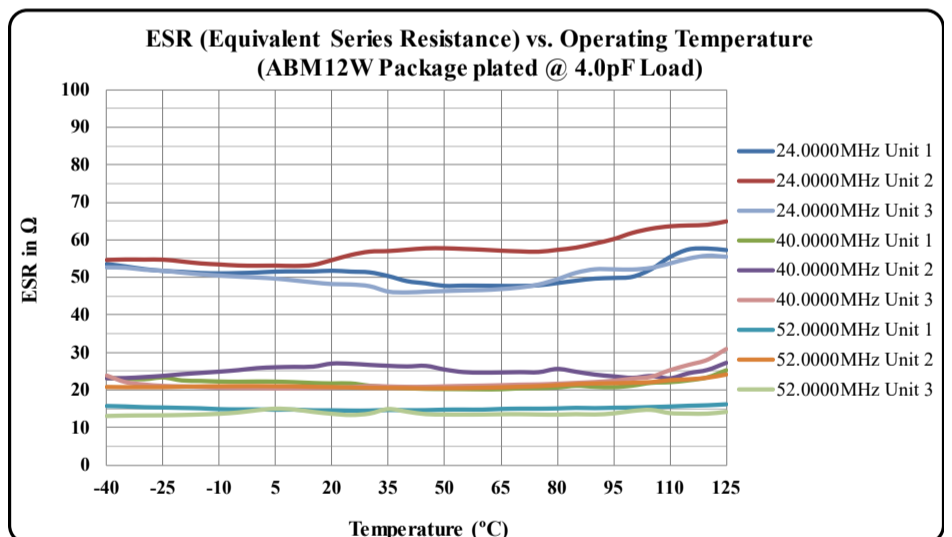
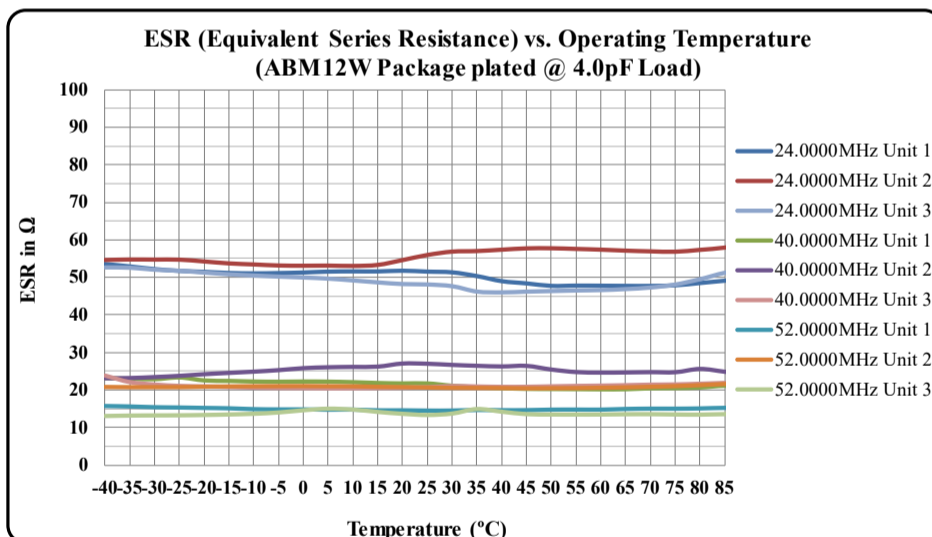
RoHS/RoHS II Compliant

MSL = N/A: NOT APPLICABLE

## TYPICAL FREQUENCY Vs. TEMPERATURE CHARACTERISTICS



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



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

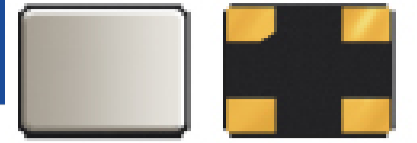


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REVISED: 10.05.2020

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# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL



ABM12W SERIES

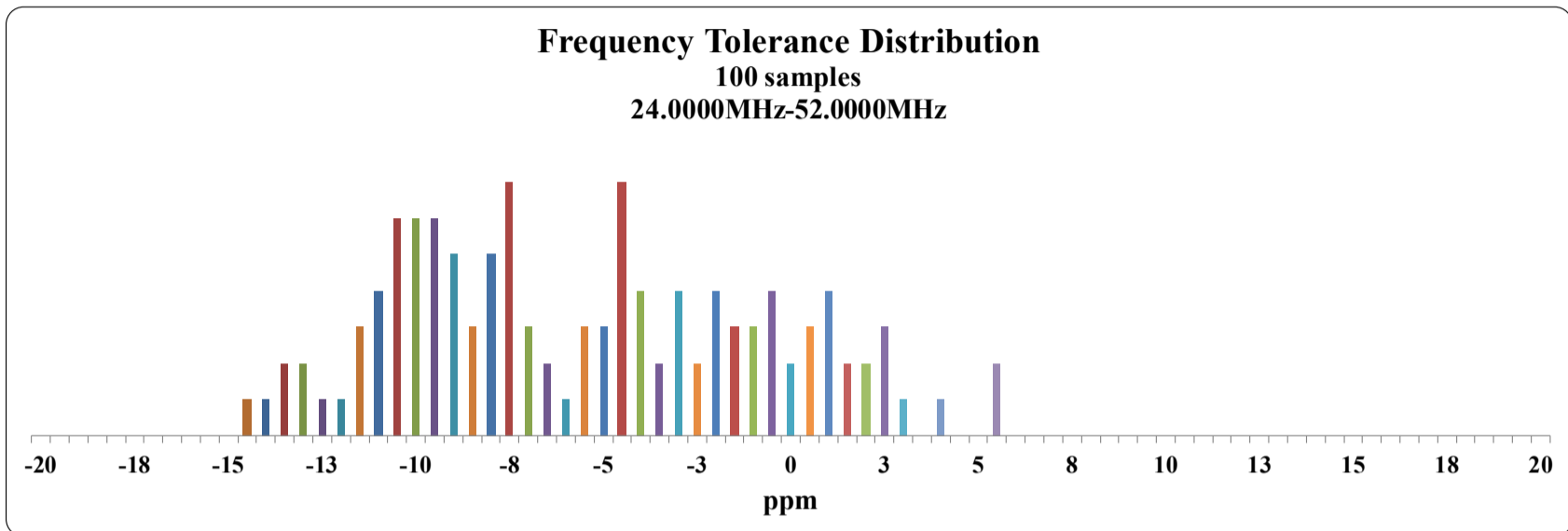
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MSL = N/A: NOT APPLICABLE

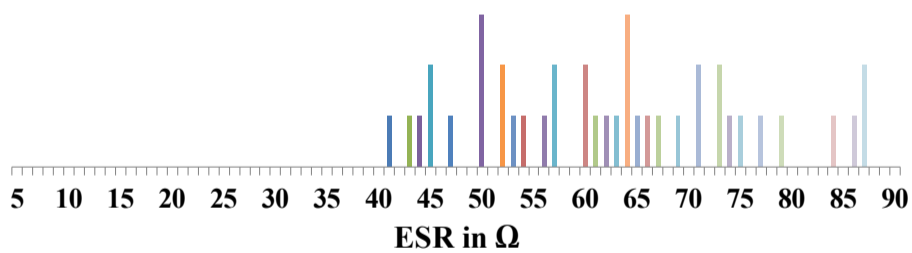
## TYPICAL FREQUENCY TOLERANCE DISTRIBUTION (AT 25°C ± 3°C)



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

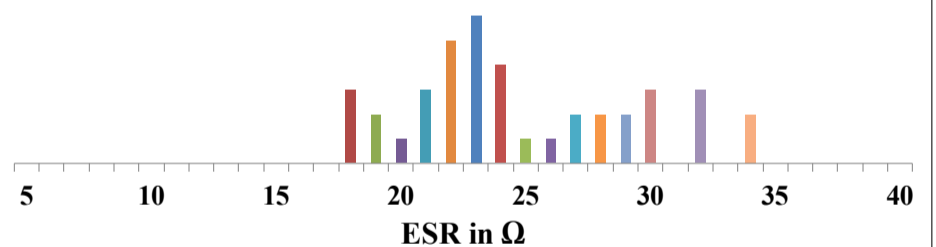
### ESR Distribution @ 24.0000MHz

100 samples  
MAX ESR = 86.4 Ω



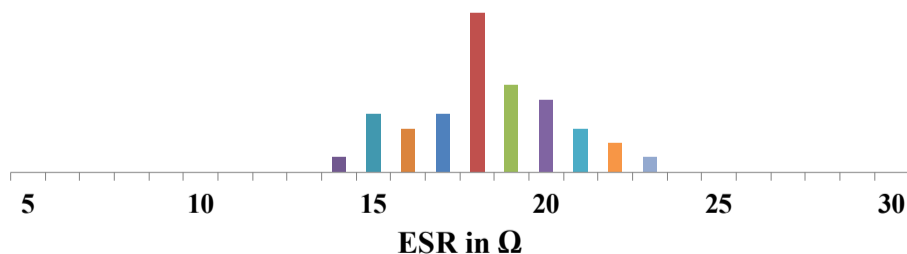
### ESR Distribution @ 40.0000MHz

100 samples  
MAX ESR = 33.7 Ω

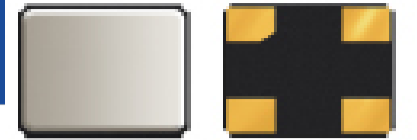


### ESR Distribution @ 52.0000MHz

100 samples  
MAX ESR = 22.6 Ω



# IoT OPTIMIZED LOW PROFILE QUARTZ CRYSTAL



ABM12W SERIES

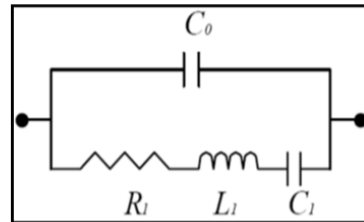
1.6 x 1.2 x 0.4mm



RoHS/RoHS II Compliant

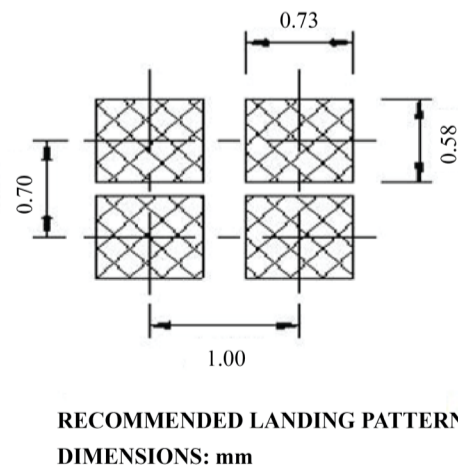
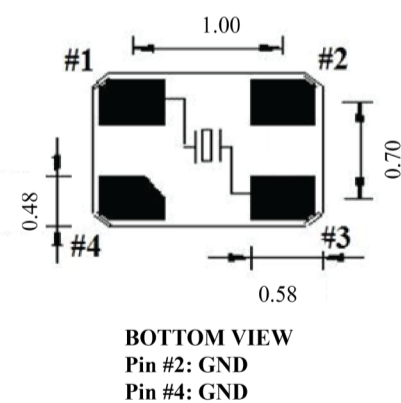
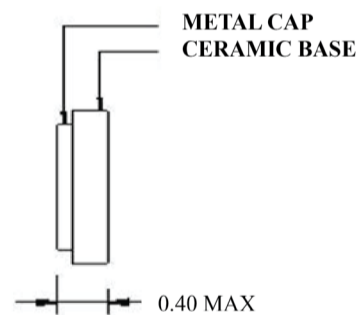
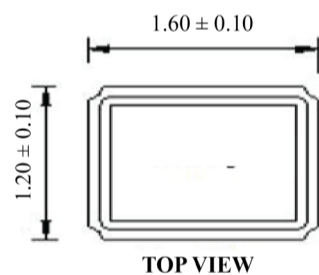
MSL = N/A: NOT APPLICABLE

## 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

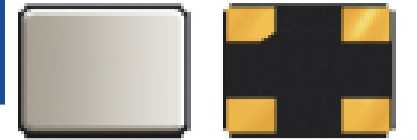
## MECHANICAL DIMENSIONS



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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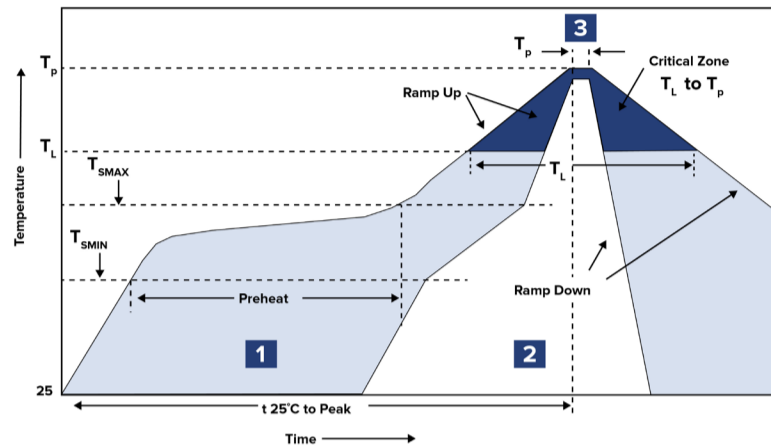
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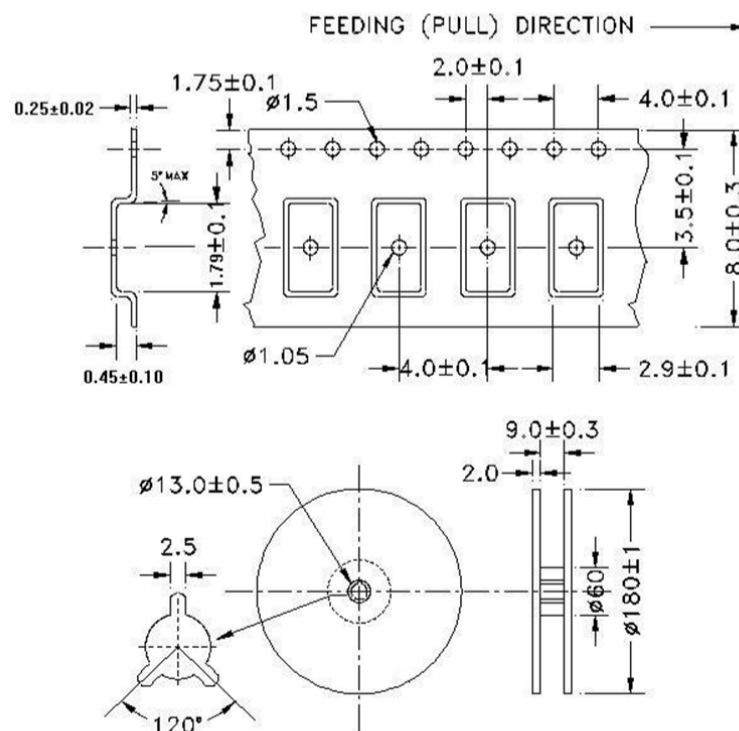
## REFLOW PROFILE



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



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