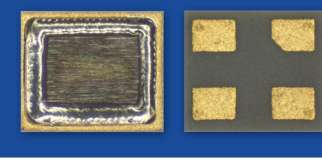
IoT Optimized Ultra-Miniature Quartz Crystal



ABM13W SERIES

1.20 x 1.00 x 0.33mm

RoHS/RoHS II Complaint

MSL = N/A: Not Applicable

FEATURES

- World's smallest At-Cut MHz Crystal (1.20 x 1.00 x 0.33 mm package)
- Ideally suited for space constraint IoT, Wearables & Wireless applications
- Simultaneously optimized for low plating load & ESR over extended temperature range
- Enhanced performance for start-up time and power savings with Low Energy SoC's
- Low profile ideal for height constraint designs
- Available with ±10 ppm set-tolerance

APPLICATIONS

- Wearables
- Wireless Modules
- Internet of Things (IoT)
- Bluetooth / Bluetooth Low Energy (BLE)
- Machine-to-Machine (M2M) Connectivity
- Ultra-Low Power MCU's, SoC's, Transceivers
- Near Field Communication
- ISM Band Applications

Electrical Specifications

Parameters	Min.	Typ.	Max.	Units	Note
Frequency Range	32.0000		80.0000	MHz	
Standard Available Frequencies	32.0000, 37.4000, 38.4000, 40.0000, 45.0000, 48.0000, 52.0000, 60.0000, 76.8000, 80.0000			MHz	Contact Abracon for Nonstandard Frequencies
Operation Mode	Fundamental				
Operating Temperature Range	-40		+85	°C	See Options
Storage Temperature	-40		+125	°C	
Frequency Tolerance @ +25°C	-10		+10	ppm	See options
Frequency Stability over the Operating Temperature (ref. to +25°C)	-15		+15	ppm	See options
Equivalent series resistance (R1) (over -40°C to +125°C)		< 45	100	Ω	32.0000-32.9999MHz
		< 35	80		33.0000-36.9999MHz
		< 25	50		37.0000-80.0000MHz
Shunt capacitance (C0)			1.0	pF	
Load capacitance (CL)		5.0		pF	See options
Drive Level		10	100	µW	
Aging (1 year)	-2		+2	ppm	@25°C± 3°C
Insulation Resistance	500			MΩ	@100 Vdc ± 15V

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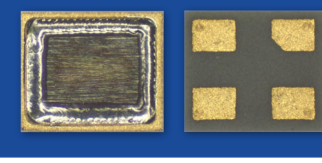

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Options and Part Identification [Note 1]

ABM13W- ☐☐☐☐☐ MHz - ☐ - ☐☐☐☐☐ - ☐ ☐ ☐ - ☐

Frequency in MHz
Please specify the Frequency in MHz out to 4 digit accuracy after the decimal. (e.g. 32.0000MHz)

Load Capacitance (pF)
8: 8pF
7: 7pF
6: 6pF
5: 5pF

Custom ESR if other than standard
R ☐☐: Specify a value in Ω (e.g.: R40)

Operating Temp.
B: -20°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
H7: ± 7 ppm
1: ± 10 ppm
7: ± 15 ppm
2: ± 20 ppm

Freq. Stability
U: ± 10 ppm (*)
G: ± 15 ppm (**)
X: ± 20 ppm (**)
Y: ± 30 ppm (***)
Z: ± 50 ppm

Packaging
Blank: Bulk
T5: 5kpcs / reel

(*) Only offered @ Operating Temp. Range options: B & N

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

(***) Only offered @ Operating Temp. Range options: B, N, D, & J

Contact ABRACON for tighter Frequency Stability options.

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

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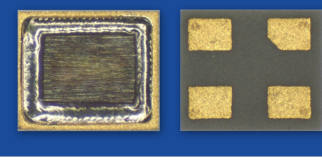

ABM13W SERIES

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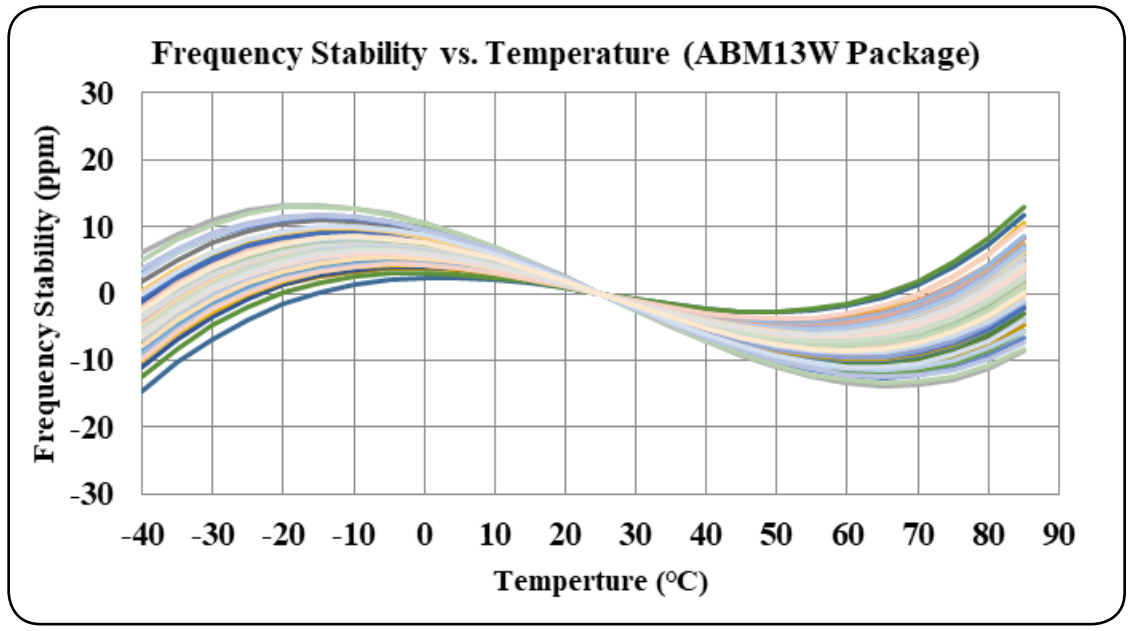
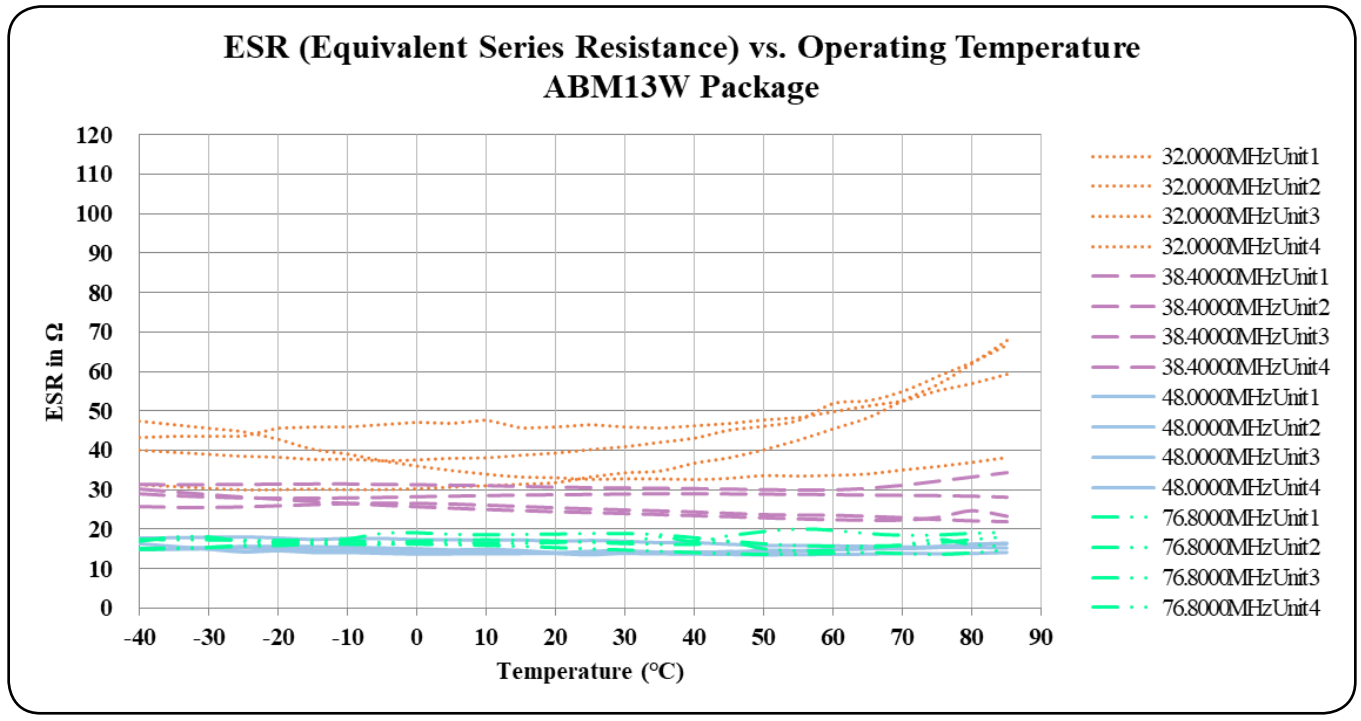
RoHS/RoHS II Complaint

MSL = N/A: Not Applicable

Typical Frequency vs. Temperature Characteristics (ref. to +25°C):



Typical ESR (Equivalent Series Resistance) vs. Temperature Characteristics:



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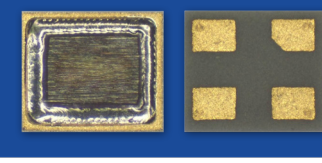

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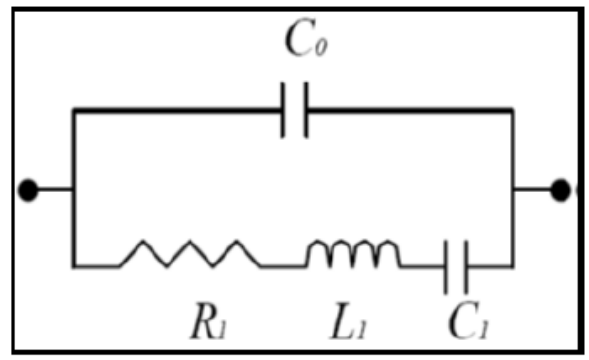
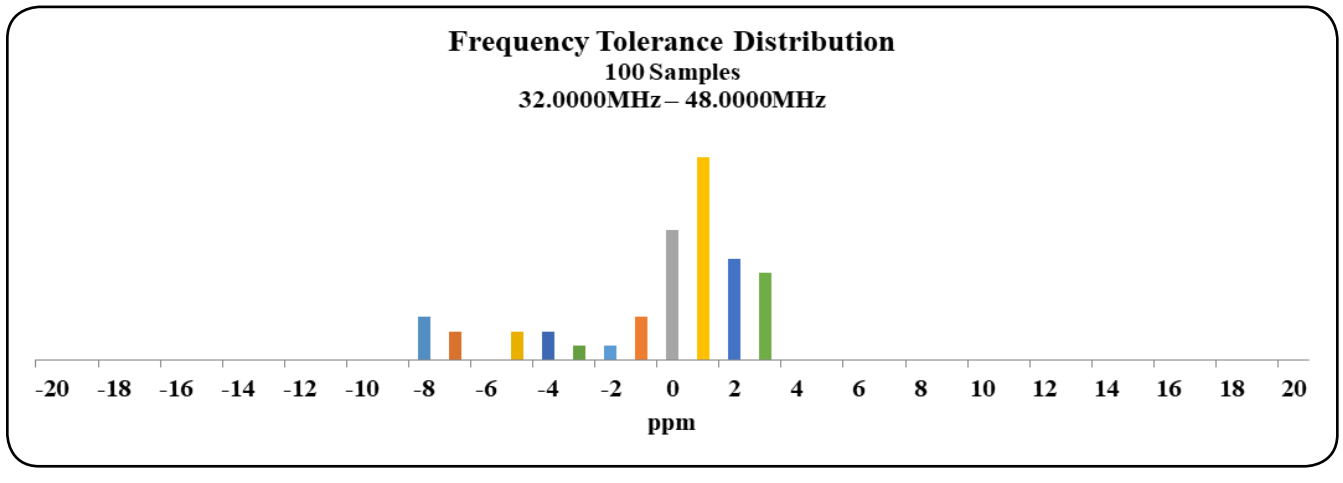
SPICE Models (based on typical values at 25ºC ± 3ºC):



Frequency: 32.0000MHz Plating Load: 8pF				Frequency: 38.4000MHz Plating Load: 6pF			
C0	=	0.46	pF	C0	=	0.48	pF
R1	=	41.19	Ω	R1	=	22.48	Ω
L1	=	16.91	mH	L1	=	10.99	mH
C1	=	1.46	fF	C1	=	1.57	fF
Frequency: 48.0000MHz **Plating Load: 6pF**				**Frequency: 76.8000MHz** **Plating Load: 6pF**			
C0	=	0.86	pF	C0	=	0.77	pF
R1	=	19.50	Ω	R1	=	16.97	Ω
L1	=	5.73	mH	L1	=	1.58	mH
C1	=	1.92	fF	C1	=	2.74	fF

Typical Frequency Tolerance Distribution (at 25ºC ± 3ºC):



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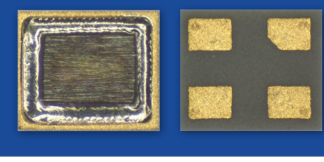

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RoHS/RoHS II Complaint

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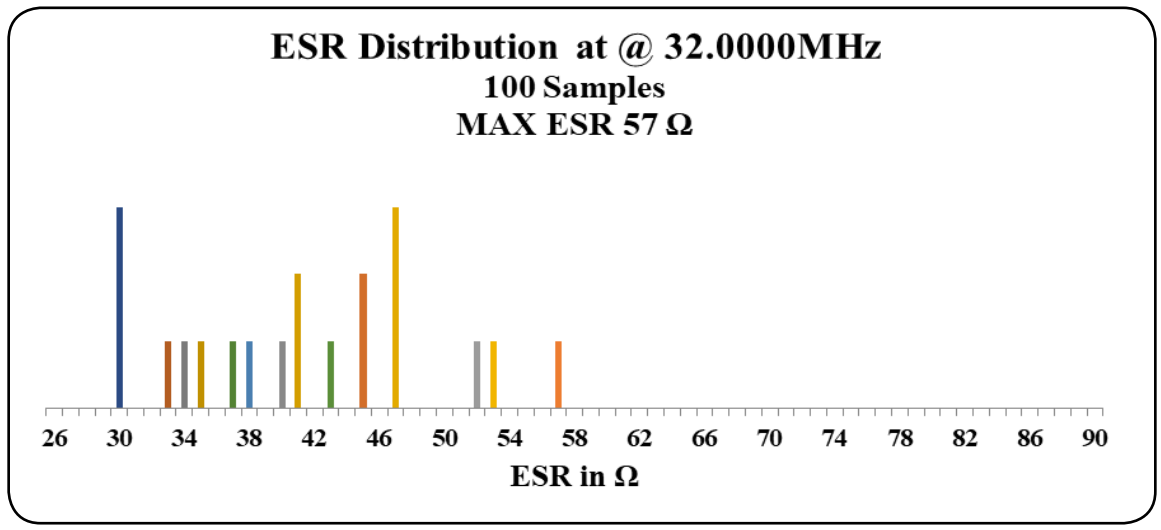
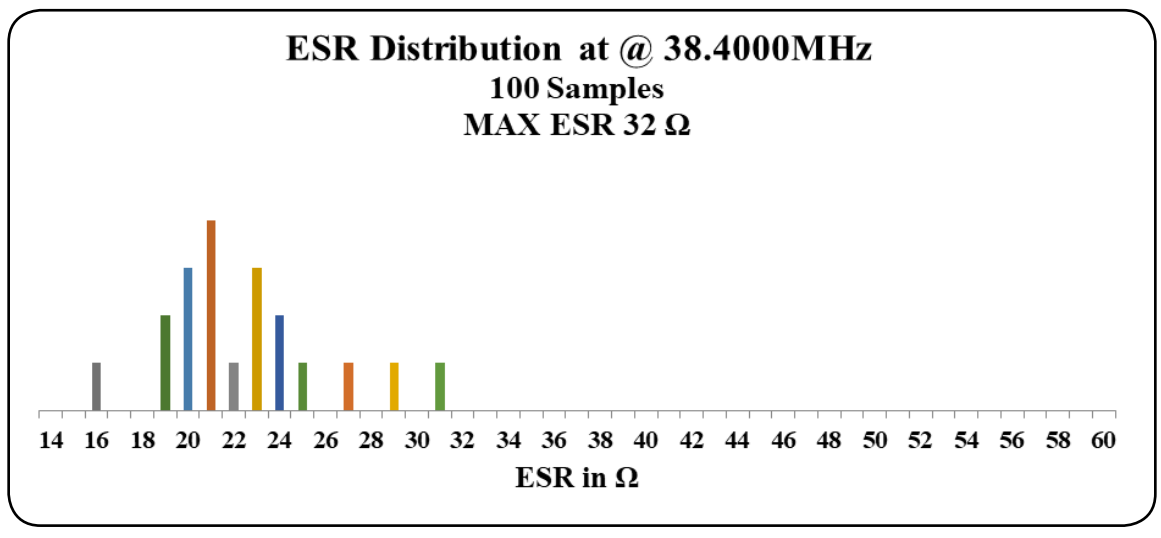
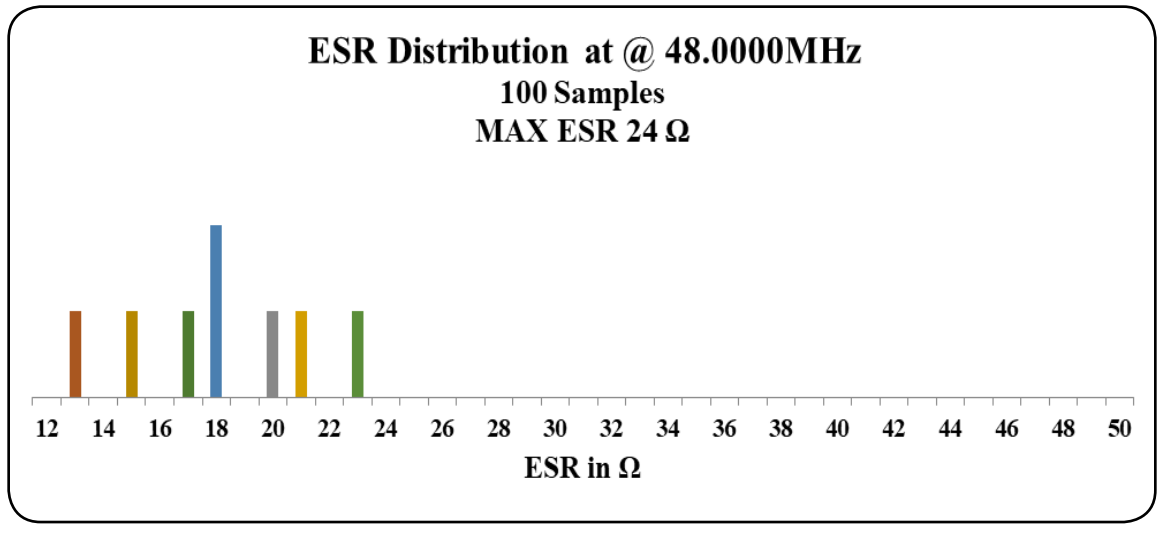
Typical ESR Distribution (at 25ºC ± 3ºC):







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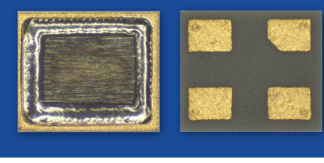

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RoHS/RoHS II Complaint

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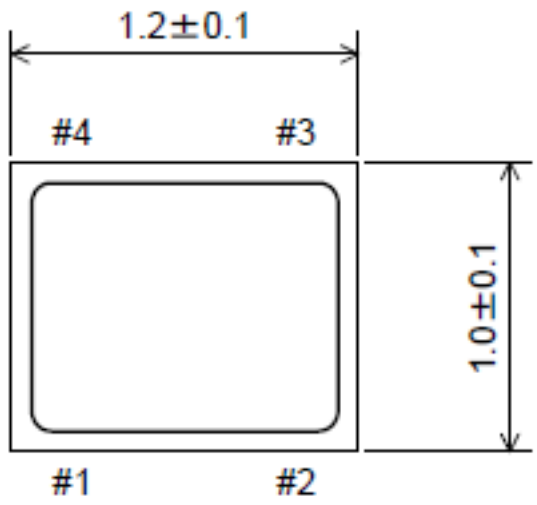
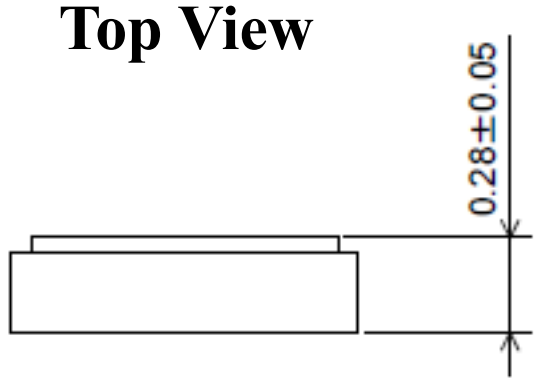
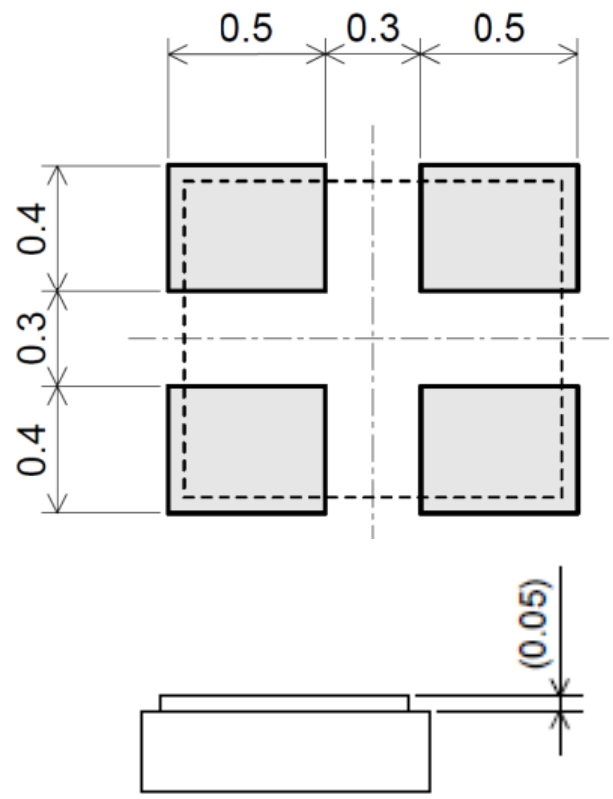
Mechanical Dimensions

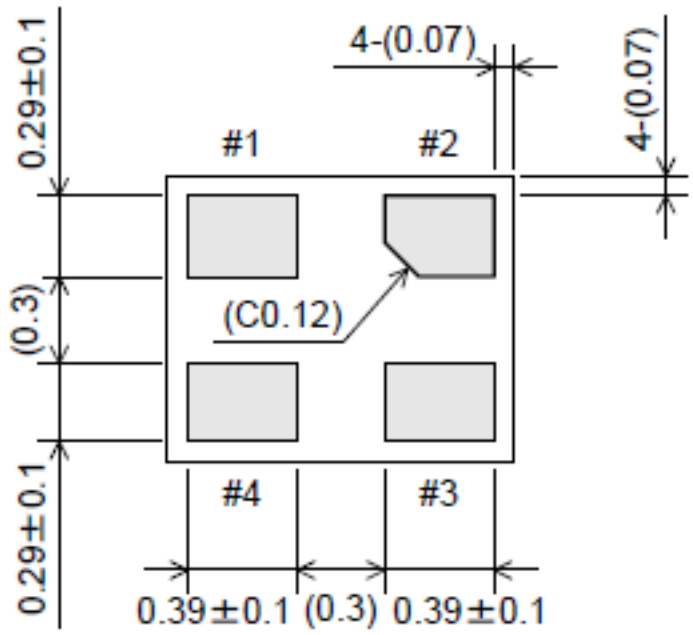


Top View



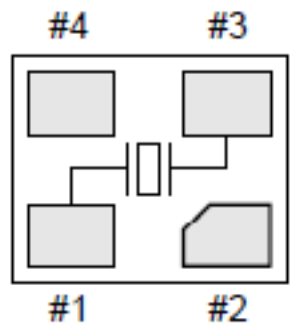
Recommended Land Pattern





Bottom View

Internal connection



Pin #2: GND
Pin #4: NC

Dimensions: mm

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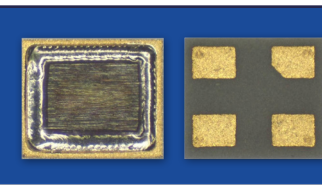

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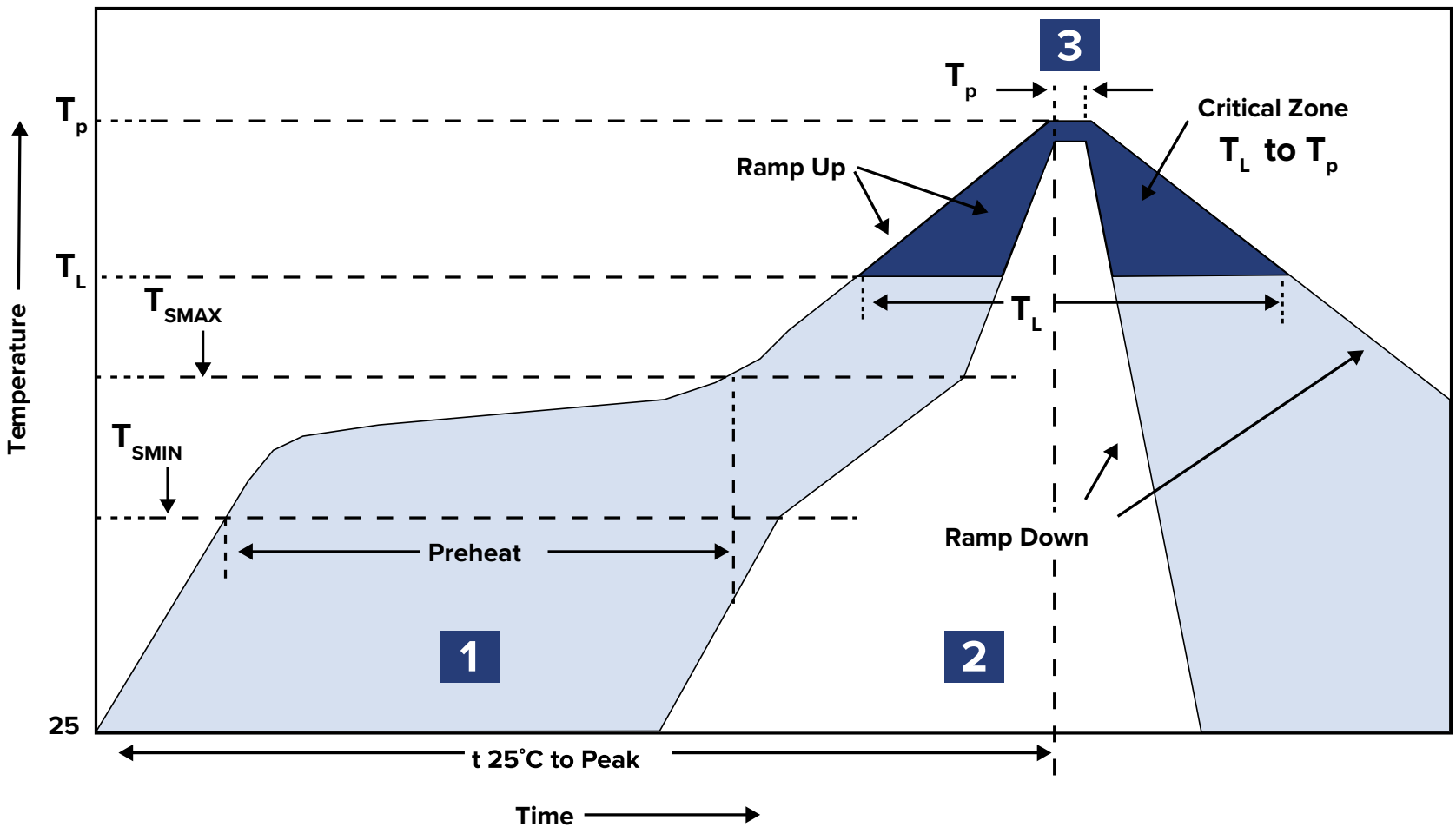
RoHS/RoHS II Complaint

MSL = N/A: Not Applicable

Reflow Profile



Zone	Description	Temperature	Time
1	Preheat / Soak	T_{SMIN} ~ T_{SMAX} 160±10°C	80 ~ 100 sec.
2	Reflow	T_L 220°C	50 ~ 70 sec.
3	Peak heat	T_P 260±5°C	5 sec. MAX.

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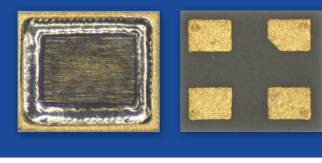

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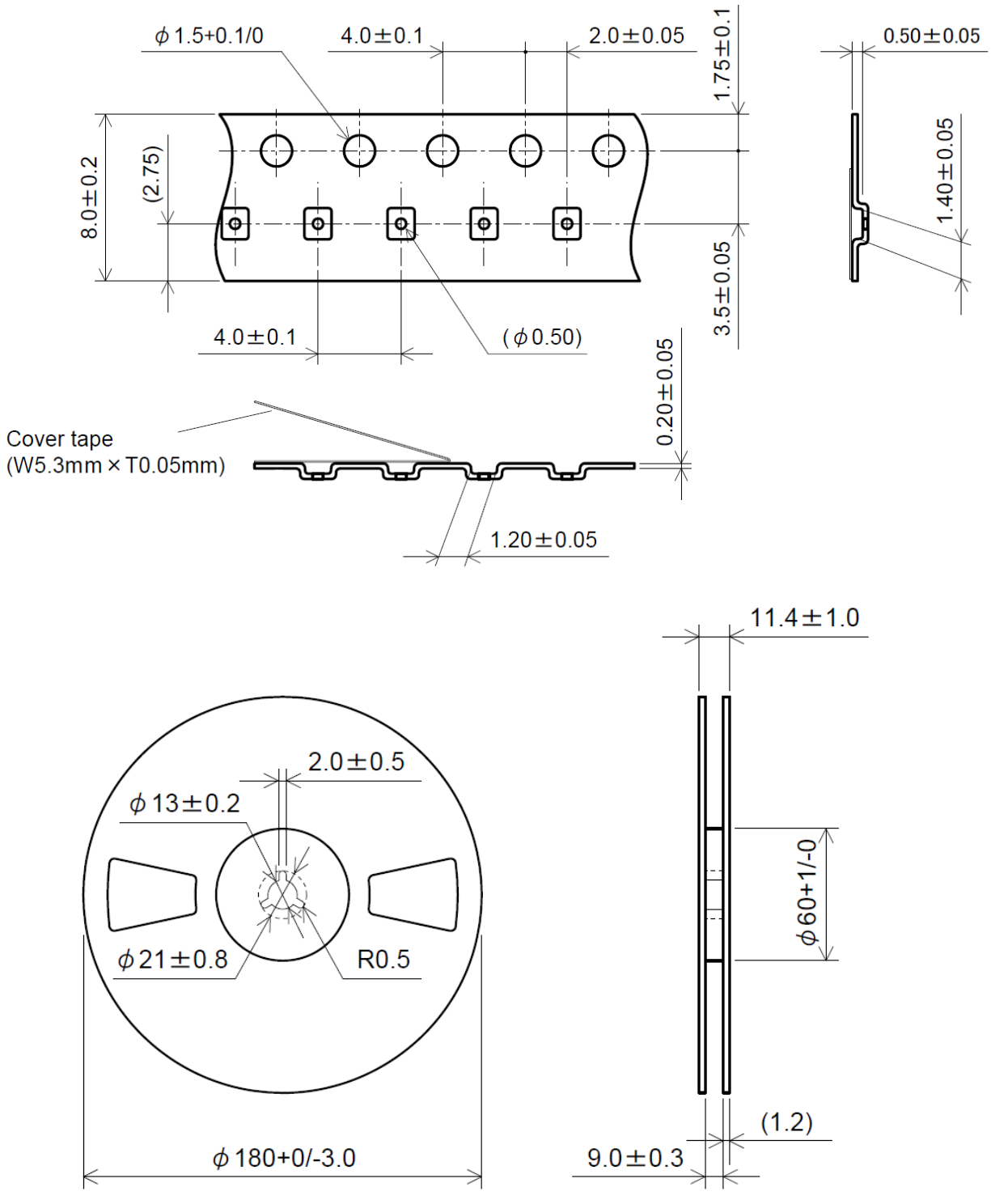
Packaging:

T5: Tape and reel (5,000pcs/reel)



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