

 ABRACON	ABLS Series HC49/US (AT49) SMD MICROPROCESSOR CRYSTAL	 RoHS Compliant
Date of Issue: Sept. 7 th , 2022	11.4 x 4.7 x 4.2mm	
<i>Page (1) of (5)</i>	Abracon Drawing # 450669	Revision #: AD

1.0 Key Electrical Specifications

Parameters	Minimum	Typical	Maximum	Units	Notes
Frequency Range	3.579545		24.00	MHz	Fundamental AT (Standard)
	24.01		75.00		3 rd Overtone (Standard)
	24.01		50.00		Fundamental AT or BT (See options)
Operation Mode	Fundamental or 3 rd Overtone				
Operating Temperature	0		+70	°C	See options
Storage Temperature	-55		+125	°C	
Frequency Tolerance @+25°C	-50		+50	ppm	See options
Frequency Stability over the Operating Temperature (ref. to +25°C)	-50		+50	ppm	See options (For BT cut, ±100ppm max.at -10° C to +60° C only)
Equivalent series resistance (R1)	See TABLE 1 below			Ω	
Shunt capacitance (C0)			7	pF	
Load capacitance (CL)	18			pF	Standard (See options if other than STD)
Drive Level		100	1000	μW	
Aging	-5		+5	ppm	@25°C±3°C First year
Insulation Resistance	500			MΩ	@ 100Vdc ± 15V
Drive level dependency (DLD)	Minimum 7 points tested: from 1μW to 500μW. Change in frequency (Maximum - Minimum) over DLD range < ±10ppm Change in ESR (Maximum - Minimum) over DLD range < 25% of Max ESR value. Maximum ESR over DLD range < Max ESR value.				

TABLE 1: ESR

FREQUENCY (MHz)	ESR (Ω)
3.579545 - 4.999 (Fund.)	180
5.000 - 5.999 (Fund.)	120
6.000 - 7.999 (Fund.)	100
8.000 - 8.999 (Fund.)	80
9.000 - 9.999 (Fund.)	60
10.000 - 15.999 (Fund.)	50
16.000 - 50.000 (Fund.)	40
24.01 - 31.999 (3rd O/T)	100
32.000 - 75.00 (3rd O/T)	80

NOTE: Please contact Abracon for the availability of non-standard ESR specifications



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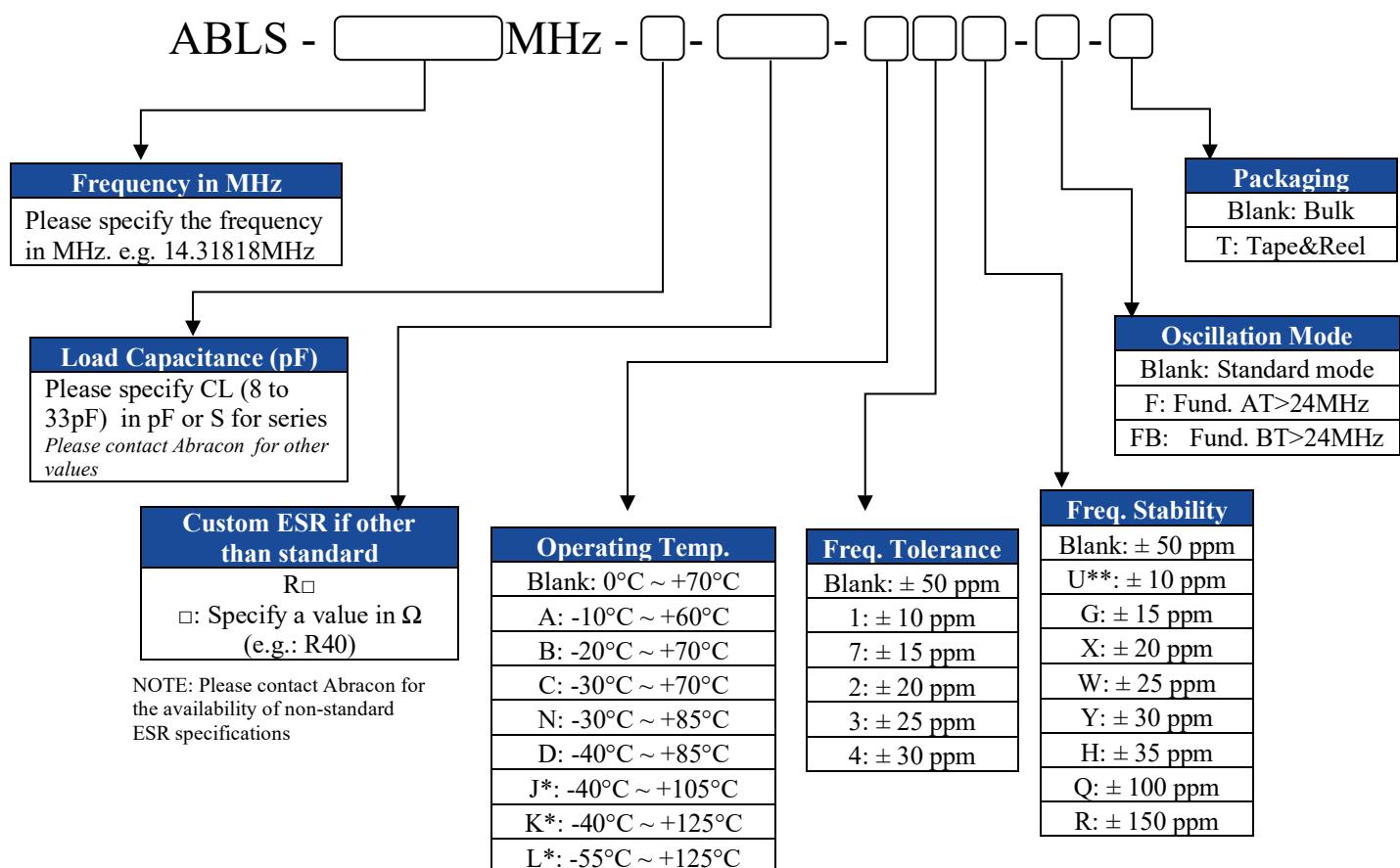
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2.0 ABLS series is RoHS/RoHS II Compliant and Pb free

3.0 Moisture Sensitivity Level (MSL) – This product is Hermetically Sealed and not Moisture Sensitive - MSL = N/A: Not Applicable

4.0 Options and Part Identification (left blank if standard)



NOTE: Please contact Abracan for the availability of non-standard ESR specifications

NOTE: Fundamental BT frequency stability ± 100ppm max.
at -10° C to +60° C only.

* Frequency stability ±50ppm, ±100ppm, ±150ppm only.
Contact ABRACON for tighter frequency stability.

** For -10 to +60C only.



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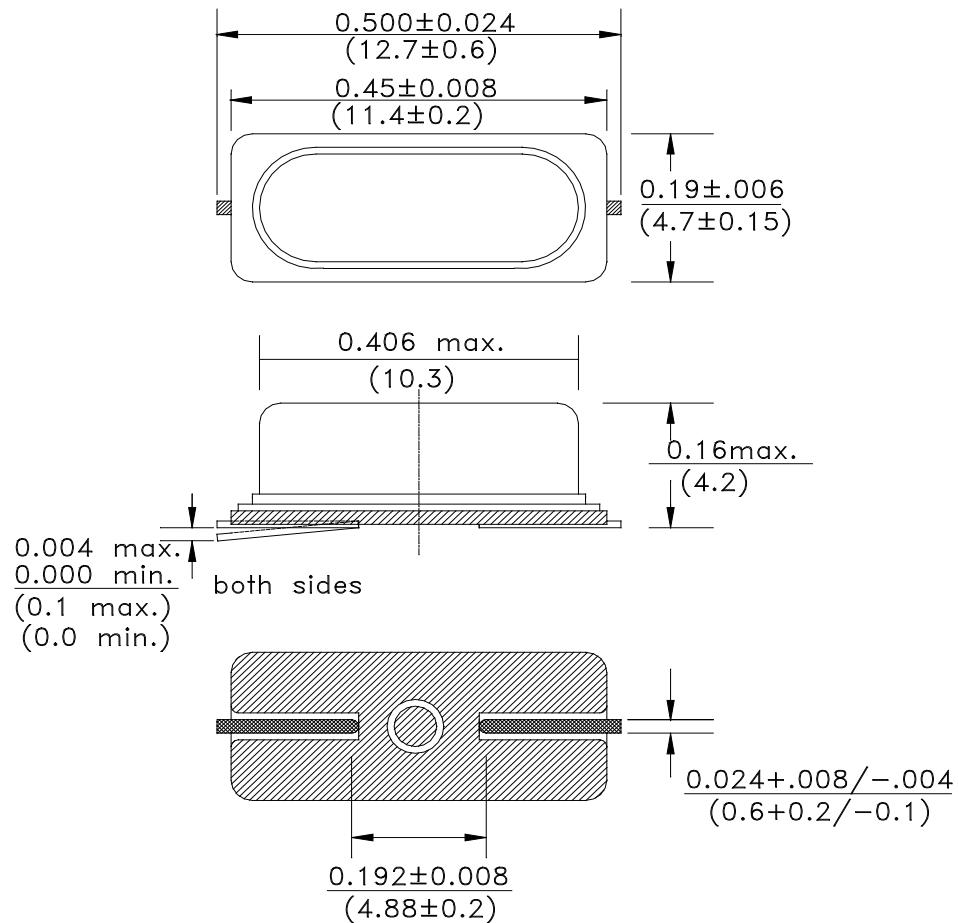
11.4 x 4.7 x 4.2mm

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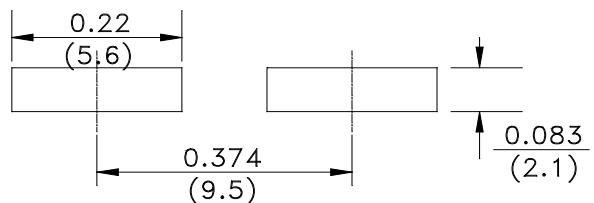
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5.0 Mechanical Dimensions



Recommended land pattern



Dimensions: inches (mm)

6.1 Sealing Method = Resistance Weld Sealing

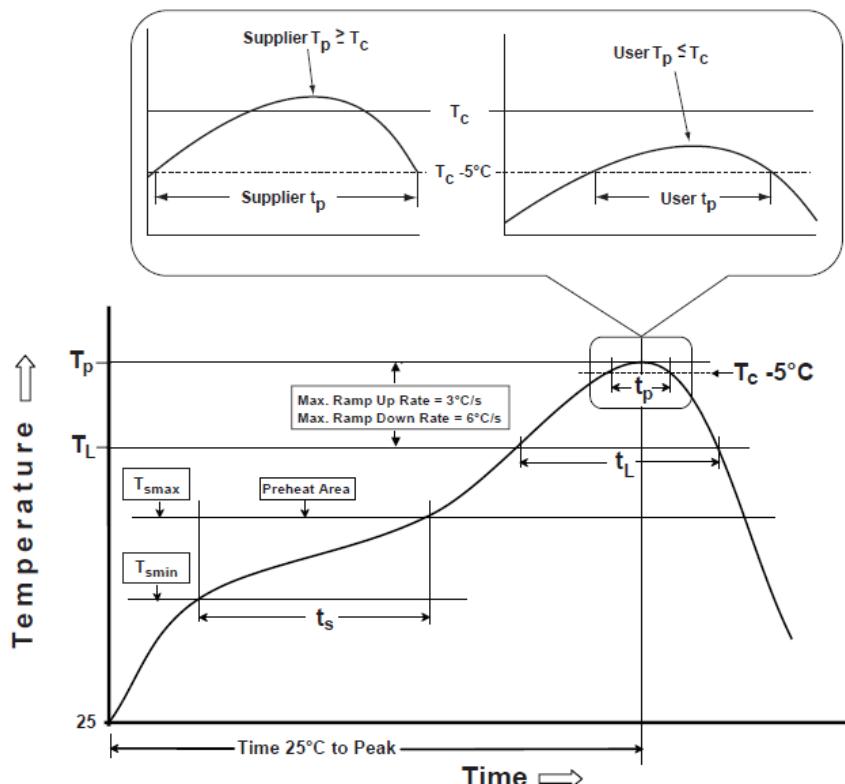
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7.1 Reflow Profile [JEDEC J-STD-020]

**Table 1**
**SnPb Eutectic Process
Classification Temperatures (T_c)**

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2
**Pb-Free Process
Classification Temperatures (T_c)**

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Profile Feature

	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T_p)*	see Table 1	see Table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.



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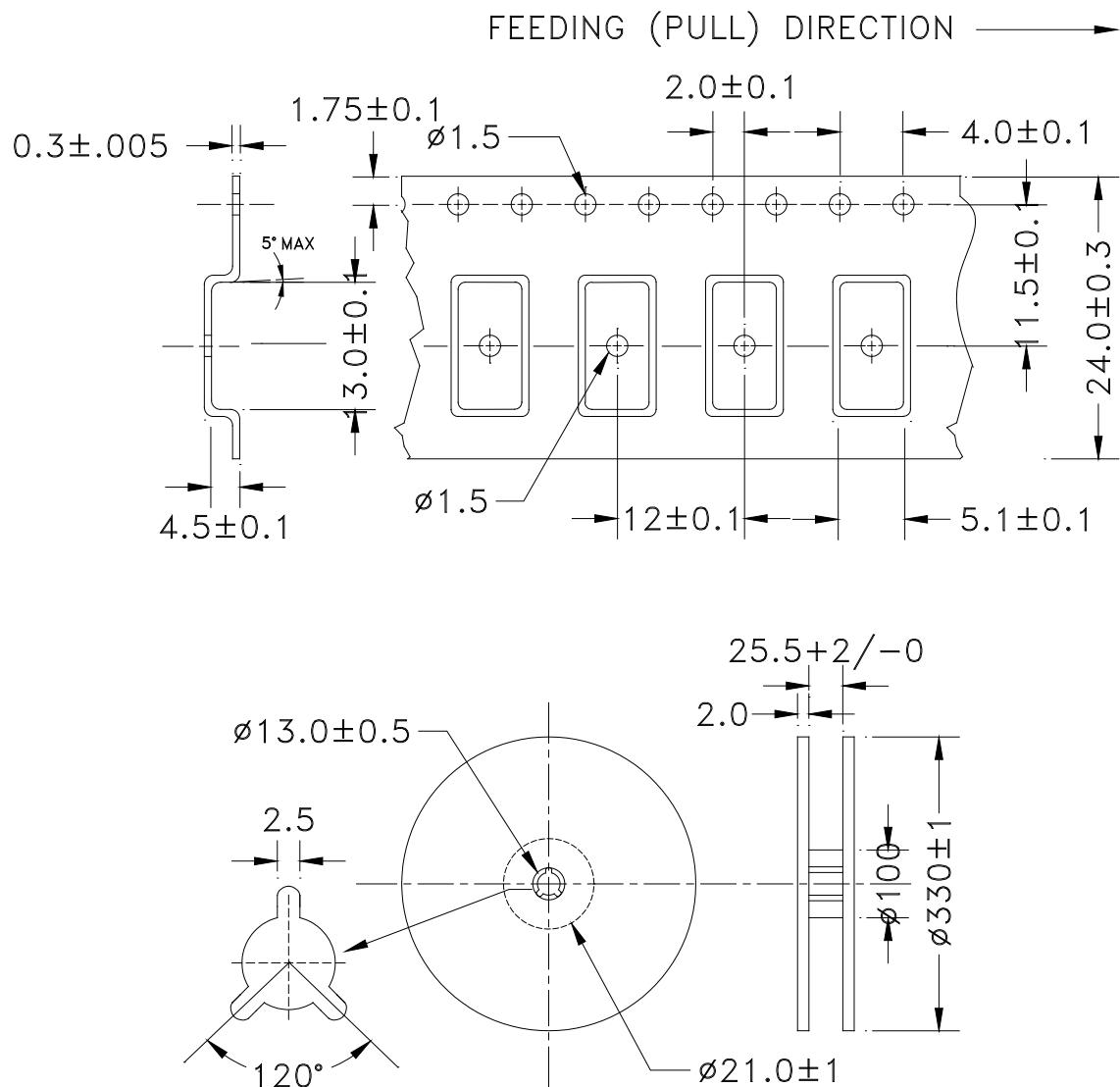
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8.0 Packing

T = Tape and Reel (1000pcs/reel)



Dimensions: mm