



# HF PRODUCT FAMILY

## Surface Mount Microprocessor Crystal 6.0 x 3.5

### Features

- Low Profile
- High Accuracy and Stability
- Wide Frequency Range

### ❖ Specifications

Parameter		Value
Frequency Range		8.000 to 200.000 MHz
Mode of Oscillation	Fundamental	8.000 to 50.000 MHz
	Third Overtone	25.000 to 150.000 MHz
	Fifth Overtone	50.000 to 200.000 MHz
Frequency Tolerance at 25°C		±100 ppm Standard (±10, ±20, ±30 & ±50 ppm available)
Frequency Stability over Temperature		±100 ppm Standard (±10, ±20, ±30 & ±50 ppm available)
Operating Temperature Range		-10°C to +60°C Standard -40°C to +85°C Extended
Storage Temperature Range		-40°C to +85°C
Aging		±2 ppm per Year maximum
Load Capacitance		9 pF to 32 pF or Series
Equivalent Series Resistance		See Table 1
Shunt Capacitance		7.0 pF maximum
Drive Level		100 µW Typ., 500 µW Max
Shock Resistance		±5 ppm Maximum 75 cm Drop Test in 3 axes onto a hardwood surface

Table 1

Frequency (MHz)	Mode	MAX ESR (Ohms)
8.000 to 9.999	FUND	100
10.000 to 15.999	FUND	80
16.000 to 29.999	FUND	50
20.000 to 29.999	FUND	40
30.000 to 50.000	FUND	30
25.000 to 39.999	3OT	120
40.000 to 79.999	3OT	80
80.000 to 150.000	3OT	70
50.000 to 99.999	5OT	200
100.00 to 200.00	5OT	150

### ❖ Environmental

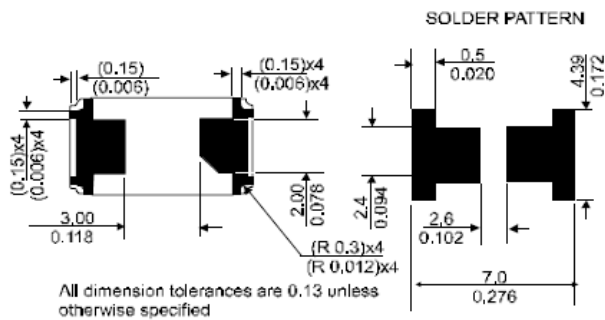
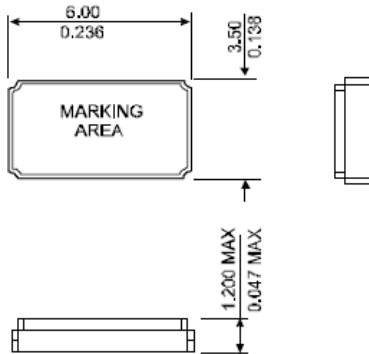
Parameter	Value
Moisture Sensitivity Level	1
RoHS	Compliant
REACH SVHC	Compliant
Halogen Free	Compliant
ESD Classification Level	N/A
Termination Finish	Au
Unit Weight (grams)	0.072

RS, Professionally Approved Products, gives you professional quality parts across all products categories. Our range has been testified by engineers as giving comparable quality to that of the leading brands without paying a premium price.

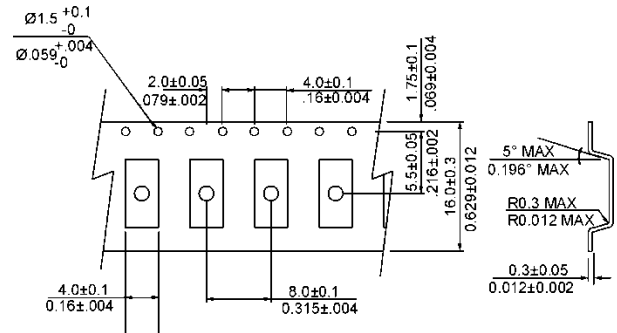


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## Mechanical Specification



## Carrier Tape Dimension



NOTE: REFER TO EIA-481 FOR DIMENSIONS

## Packaging

180 mm Reel Diameter  
16 mm Tape Width, 8 mm Pitch  
Quantity: 1000 pcs per Reel

In accordance with EIA-481

## Part Numbering

HF	-	24.000	-	18	-	XXXX
Product Family		Frequency (MHz)		Load Capacitance (pF) 9 to 32 pF or S for Series		1) Tolerance, 2) Stability, 3) Mode, 4) Temperature  Tolerance: E=±10 ppm, D=±20ppm, F=±30 ppm, B=±50 ppm, C=±100 ppm  Stability: E=±10 ppm, D=±20ppm, F=±30 ppm, B=±50 ppm, C=±100 ppm  Mode: blank = Fundamental, 3=3 <sup>rd</sup> Overtone  Temperature range: blank standard, E=Extended

### EXAMPLE: HA-24.000-12-CC

Surface Mount Microprocessor Crystal, 6.0 x 3.5, 24.000 MHz, 18 pF load Capacitance, standard tolerance (±100 ppm) and stability (±100 ppm), Fundamental mode, standard Temperature range -10°C to +60°C

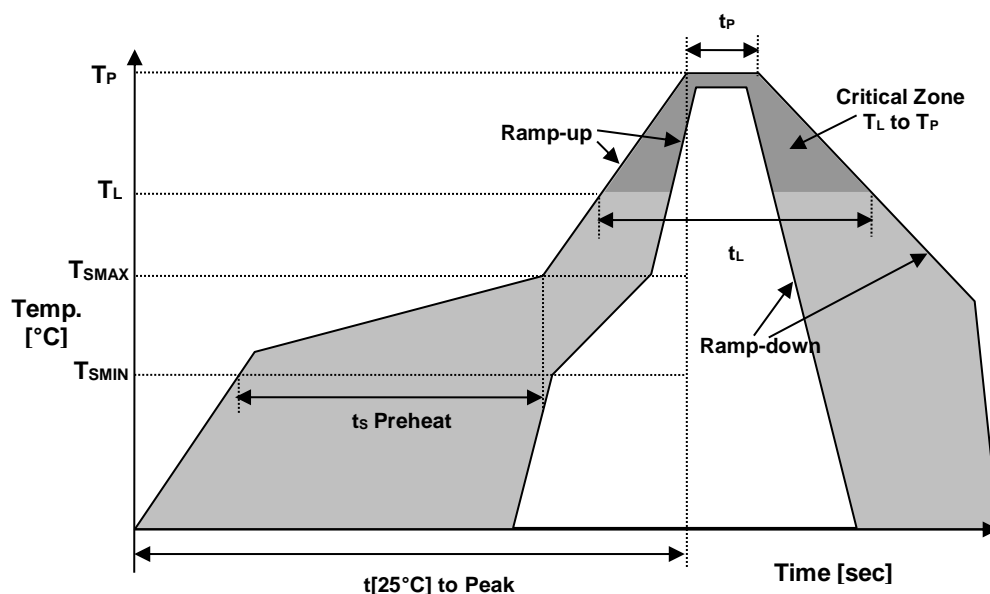
### EXAMPLE: HA-8.000-10-BBE

Surface Mount Microprocessor Crystal, 6.0 x 3.5, 8.000 MHz, 10 pF load Capacitance, tolerance (±50 ppm), stability (±50 ppm), Fundamental mode, Extended Temperature range -40°C to +85°C



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## Reflow Profile



Reflow Profile (Reference IPC/JEDEC J-STD-020)		
Temperature Min Preheat	$T_{SMIN}$	150°C
Temperature Max Preheat	$T_{SMAX}$	200°C
Time ( $T_{SMIN}$ to $T_{SMAX}$ )	$t_s$	60 – 180 sec.
Temperature	$T_L$	217°C
Peak Temperature	$T_P$	260°C
Ramp-Up Rate	$R_{UP}$	3°C / sec. max
Ramp-Down Rate	$R_{DOWN}$	6°C / sec. max
Time within 5°C of Peak Temperature	$T_P$	10 sec.
Time $t[25^\circ\text{C}]$ to Peak Temperature	$t[25^\circ\text{C}]$ to Peak	480 sec.
Time	$T_L$	60 – 150 sec.

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## ● MARKING

RFF.FF  
xxLTyw

FF.FF – Frequency in MHz  
 x – Internal Production ID code  
 L – Load Capacitance Code  
 T – Tolerance Code  
 y – Year code  
 w – Week code

LOAD CAPACITANCE CODE			
CODE	C <sub>L</sub> (pF)	CODE	C <sub>L</sub> (pF)
A	20	J	12
B	18	K	10
C	16	M	14
D	30	N	15
F	12.5	P	13
G	32	8	8
H	22	9	9

TOLERANCE CODE	
CODE	TOL (ppm)
C	±100
B	±50
F	±30
D	±20
E	± 10

YEAR CODE	
Year	Code
2011	1
2012	2
2013	3
2014	4
2015	5
2016	6
2017	7
2018	8
2019	9
2020	0

ALPHA WEEK CODE					
Week	Code	Week	Code	Week	Code
1	a	19	s	37	K
2	b	20	t	38	L
3	c	21	u	39	M
4	d	22	v	40	N
5	e	23	w	41	O
6	f	24	x	42	P
7	g	25	y	43	Q
8	h	26	z	44	R
9	i	27	A	45	S
10	j	28	B	46	T
11	k	29	C	47	U
12	l	30	D	48	V
13	m	31	E	49	W
14	n	32	F	50	X
15	o	33	G	51	Y
16	p	34	H	52	Z
17	q	35	I		
18	r	36	J		

## ● APPROVAL

DRAWN BY	KJ, 7 August 2017
APPROVED BY	KJ, 7 August 2017
REVISION	A, Initial Release