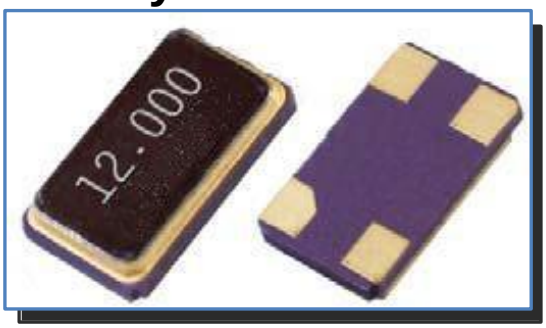
HE PRODUCT FAMILY

Surface Mount Microprocessor Crystal 5.0 x 3.2



Features

- **Small Package of 5.0 x 3.2 x 1.2 mm**
- **Excellent tolerance and stability**

❖ Specifications

Parameter		Value
Frequency Range		8.000 to 120.000 MHz
Mode of Oscillation	Fundamental	8.000 to 50.000 MHz
	Third Overtone	40.000 to 120.000 MHz
Frequency Tolerance at 25°C		±50 ppm Standard (±10, ±20 & ±30 ppm available)
Frequency Stability over Temperature		±50 ppm Standard (±10, ±20 & ±30 ppm available)
Operating Temperature Range		-20°C to +70°C Standard[1] -40°C to +85°C Extended[1]
Storage Temperature Range		-40°C to +90°C
Aging		±3 ppm per Year maximum
Load Capacitance		8 pF to 32 pF or Series
Equivalent Series Resistance		See Table 1
Shunt Capacitance		5.0 pF maximum
Drive Level		100 µW Typ., 300 µW Max
Shock Resistance		±5 ppm Maximum 75 cm Drop Test in 3 axes onto a hardwood surface

[1] NOTE: NOT ALL STABILITIES ARE AVAILABLE FOR ALL OPERATING TEMPERATURE RANGES.

Table 1

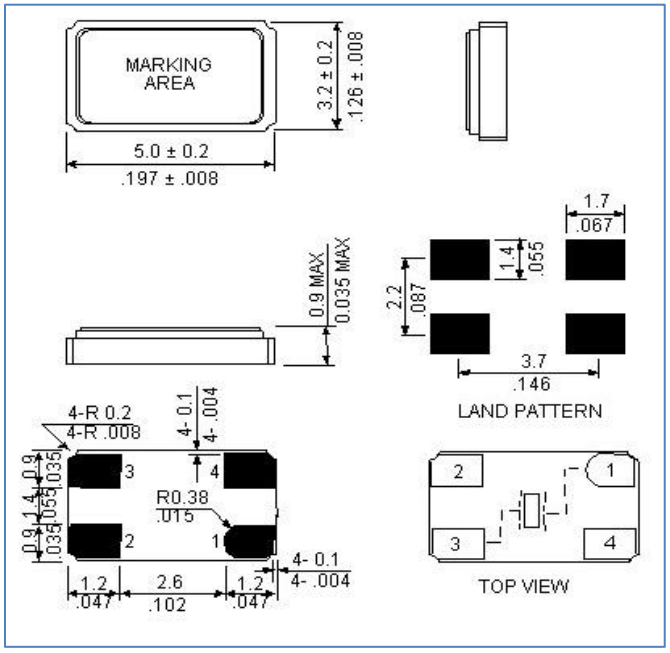
Frequency (MHz)	Mode	MAX ESR (Ohms)
8.000 to 11.999	FUND	100
12.000 to 19.999	FUND	60
20.000 to 39.999	FUND	50
40.000 to 59.999	3OT	70
60.000 to 120.000	3OT	60

❖ Environmental

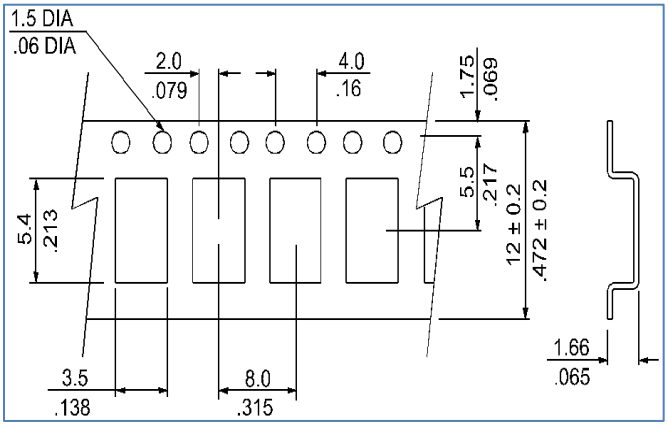
Parameter	Value
Moisture Sensitivity Level	1
RoHS	6/6 Complaint & Lead Free
REACH SVHC	Compliant
Halogen Free	Compliant
ESD Classification Level	N/A
Termination Finish	Au
Unit Weight (grams)	0.048

HE PRODUCT FAMILY

❖ Mechanical Specification



❖ Carrier Tape Dimension



NOTE: REFER TO EIA-481 FOR DIMENSIONS

❖ Packaging

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

In accordance with EIA-481

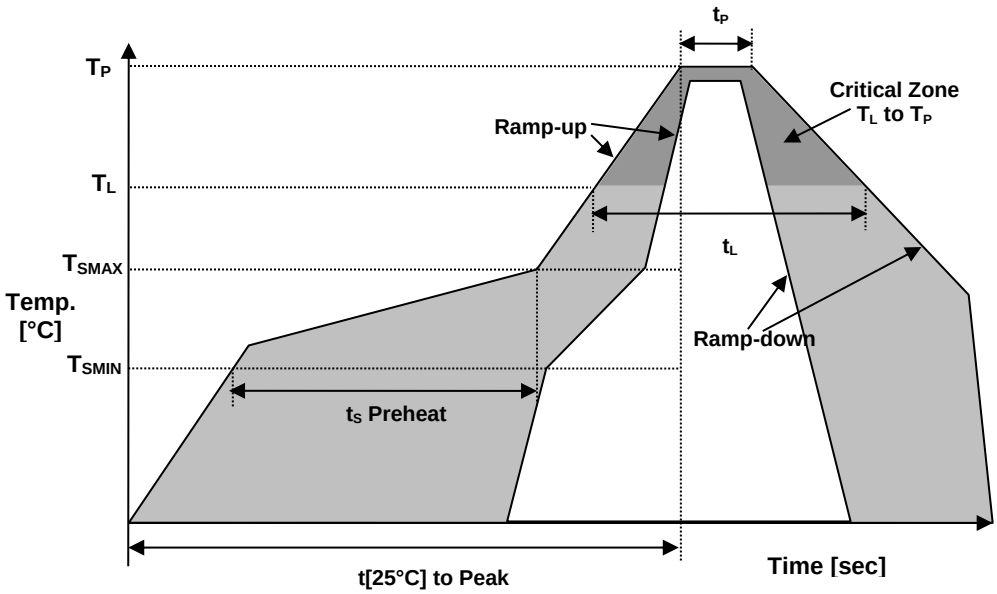
❖ Part Numbering

HE	-	12.000	-	18	-	XXXX
Product Family		Frequency (MHz)		Load Capacitance (pF) 8 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 Stability: E=±10 ppm, D=±20ppm, F=±30 ppm, B=±50 ppm Mode: blank = Fundamental, 3=3rd Overtone Temperature range: blank standard, E=Extended

EXAMPLE: HE-12.000-18-BB
Surface Mount Microprocessor Crystal, 5.0 x 3.2 mm, 12.000 MHz, 18 pF load Capacitance, standard tolerance (±50 ppm) and stability (±50 ppm), Fundamental mode, standard Temperature range -20°C to +70°C

EXAMPLE: HE-8.000-10-BBE
Surface Mount Microprocessor Crystal, 5.0 x 3.2 mm, 8.000 MHz, 10 pF load Capacitance, standard tolerance (±50 ppm), stability (±50 ppm), Fundamental mode, Extended Temperature range -40°C to +85°C

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°C] to Peak Temperature	t[25°C] to Peak	480 sec.
Time	T_L	60 – 150 sec.

HE PRODUCT FAMILY

MARKING

RFF.FFF
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_L (pF)	CODE	C_L (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)
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	FP, 28 March 2017
APPROVED BY	FP, 28 March 2017
REVISION	A, Initial Release