



## MP49 Series HC-49/U Crystal

January 2009

- The Pletronics' MP49 Series is a thru-hole crystal
- Bulk packaging
- 3 MHz to 70 MHz
- AT Cut Crystal

**Pletronics Inc. certifies this device is in accordance with the RoHS 5/6 (2002/95/EC) and WEEE (2002/96/EC) directives.**

Pletronics Inc. guarantees the device does not contain the following:

Cadmium, Hexavalent Chromium, Lead (<1000 ppm), Mercury, PBB's, PBDE's

Weight of the Device: 1.00 grams

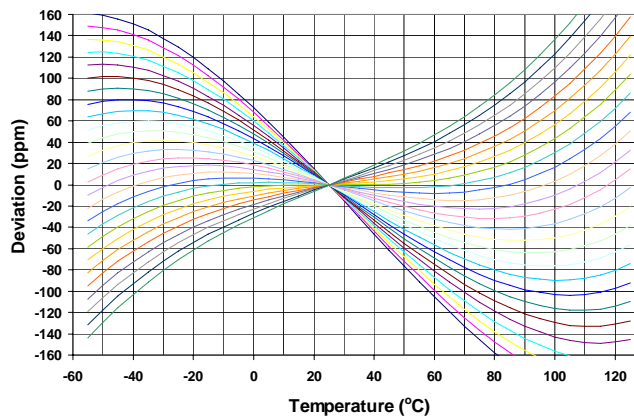
Moisture Sensitivity Level: 1 As defined in J-STD-020C

Second Level Interconnect code: e1 or e3

### Electrical Specification:

Item	Min	Max	Unit	Condition	
Frequency Range	1.8432	210	MHZ	AT cut	
Calibration Frequency Tolerance	-	-	ppm	at +25°C ± 3°C	see table on page 3 for available options
Frequency Stability over OTR	-	-	ppm		
Equivalent Series Resistance (ESR)	-	700	Ohms	1.8432 MHZ to 3 MHZ	Fundamental
	-	150	Ohms	3 MHZ to 4 MHZ	
	-	100	Ohms	4 MHZ to 7 MHZ	
	-	50	Ohms	7 MHZ to 10 MHZ	
	-	25	Ohms	10 MHZ to 37 MHZ	
	-	40	Ohms	21 MHZ to 90 MHZ	3 <sup>rd</sup> Overtone
	-	70	Ohms	60 MHZ to 150 MHZ	5 <sup>th</sup> Overtone
	-	100	Ohms	85 MHZ to 210 MHZ	7 <sup>th</sup> Overtone
Drive Level	-	1	mW	use 10 µW for testing	
Shunt Capacitance (C0)	-	7	pF	Pad to Pad capacitance	
Aging	-5	+5	ppm /Yr	at +25°C ± 3°C	
Specified Temperature Range	-40	+85	°C	see table on page 3 for available options	
Storage Temperature Range	-55	+125	°C		

**AT Cut Crystal Frequency  
versus Temperature  
Typical Performance:**



**Part Marking:**

**PLE**            or        **PLE**  
**MP49x**                    **SRMP49**  
**FFFFFFM**                    **FFFFFFM**  
**ymdz**                        **ymdz**

**Legend:**

x                    = Capacitance load code from below  
 FFFFFFFM        = Frequency in MHz  
 PLE = Pletronics  
 ymd = Date of Manufacture (year, month and day)  
 All other marking is internal factory codes

Specifications such as frequency tolerance and operating temperature range, etc. are not identified from the marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	T	U	V	W	X	Y
pF	10	12	13	8	15	18	20	22	24	26	28	30	32	34	36	27	33	50	19	16	17	14

**Codes for Date Code YMD**

Code	6	7	8	9	0	1	2
Year	2006	2007	2008	2009	2010	2011	2012

Code	A	B	C	D	E	F	G	H	J	K	L	M
Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Code	1	2	3	4	5	6	7	8	9	A	B	C
Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

**Part Number:**

MP49	-18	-14.31818M	-50	H	1	G	G	-XX	See chart below for available options
Internal code or blank									
<b>Highest Specified Operating Temperature</b>									
A = 40°C			G = 70°C						
B = 45°C			H = 75°C						
C = 50°C			J = 80°C						
D = 55°C			K = 85°C						
E = 60°C									
F = 65°C									
<b>Lowest Specified Operating Temperature</b>									
A = +10°C			F = -15°C			L = -40°C			
B = +5°C			G = -20°C						
C = 0°C			H = -25°C						
D = -5°C			J = -30°C						
E = -10°C			K = -35°C						
<b>Mode: 1 = Fundamental    3 = 3rd Overtone</b>									
<b>Frequency Stability</b> See chart below									
<b>Calibration Frequency Tolerance (Typ. Values shown)</b>									
15 = ± 15 ppm at 25°C ± 3°C									
20 = ± 20 ppm at 25°C ± 3°C									
30 = ± 30 ppm at 25°C ± 3°C (Standard)									
<b>Frequency in MHZ</b>									
<b>Load in pF</b>									
Parallel Resonance from 09 to 44 pF or									
SR = Series Resonance									
<b>Series Model</b>									

Operating Temperature Range	CODE	D	E	F	G	H	J
		± 10	± 15	± 20	± 30	± 50	± 100
0 to +45°C	CB	•	•	•	•	•	•
0 to +50°C	CC	•	•	•	•	•	•
0 to +60°C	CE	•	•	•	•	•	•
0 to +70°C	CG	•	•	•	•	STD	•
-10 to +50°C	EC	•	•	•	•	•	•
-10 to +60°C	EE	•	•	•	•	•	•
-10 to +75°C	EH	•	•	•	•	•	•
-20 to +70°C	GG	•	•	•	•	•	•
-20 to +75°C	GH	•	•	•	•	•	•
-30 to +75°C	JH	•	•	•	•	•	•
-30 to +80°C	JJ	•	•	•	•	•	•
-30 to +85°C	JK	•	•	•	•	•	•
-35 to +80°C	KJ		•	•	•	•	•
-40 to +85°C	LK		•	•	•	•	•

## Legacy Part Number (not for new designs):

MP49	B	E	-18	-11.0592M	-XX	
						<b>Internal code or blank</b>
						<b>Frequency in MHz</b>
						<b>Load in pF</b> Parallel Resonance in pF or <b>SR</b> = Series Resonance
						<b>Operating Temperature Range</b> Blank = 0 to + 70°C (STD) <b>E</b> = -40 to +85°C
						<b>Calibration Tolerance / Frequency Stability</b> Blank = 30/50 (STD) <b>B</b> = 30/30 <b>C</b> = 15/30 <b>D</b> = 10/20 (not all frequencies)
						<b>Series Model</b>






## Reliability: Environmental Compliance

Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

## Package Labeling

Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Courier New  
 Bar code is 39-Full ASCII

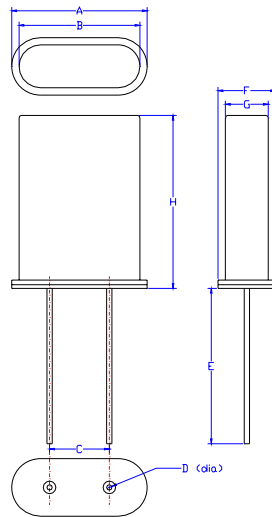
Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Arial

<b>P/N:</b>  MP49-18-10.0M	
<b>Customer P/N:</b>  12345678	
<b>Qty:</b>  1000 <b>D/C</b>  0632-WYLF	

<b>RoHS Compliant</b> 2nd LvL Interconnect Category=e1 Max Safe Temp=260C for 10s 2X Max
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<b>RoHS Compliant</b> 2nd LvL Interconnect Category=e3 Max Safe Temp=260C for 10s 2X Max
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## Mechanical:



	Inches	mm
A	0.425 max	10.80 max
B	0.404	10.26
C	0.192	4.88
D	0.017 dia	0.43 dia
E	0.500 min	12.7 min
F	0.176 max	4.47 max
G	0.145	3.68
H	0.52 max	13.21 max

Contacts (3 types of lead plating used):

Matte Tin (Sn)

Tin over Copper (SnCu)

SAC (SnAgCu)

**Not to Scale**

<sup>1</sup> Typical dimensions

## Layout and application information

- Trace lengths to the crystal should be kept as short as possible.
- The crystal connections are sensitive to noise.
- The package should be grounded for optimum performance.

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### Contacting Pletronics Inc.

Pletronics Inc.  
19013 36<sup>th</sup> Ave. West  
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880  
Fax: 425-776-2760  
E-mail: [ple-sales@pletronics.com](mailto:ple-sales@pletronics.com)  
URL: [www.pletronics.com](http://www.pletronics.com)

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