



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

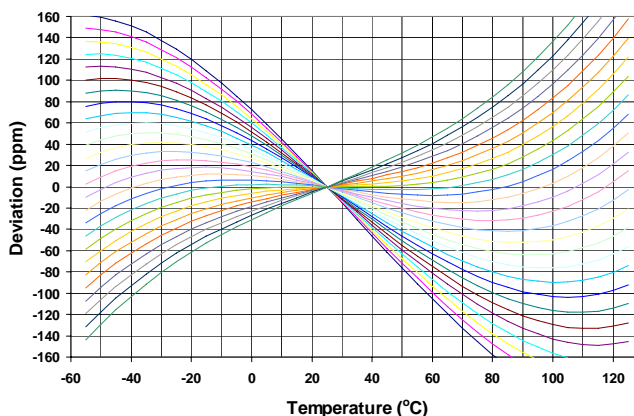
Moisture Sensitivity Level: 1 As defined in J-STD-020C

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 |
| Frequency Stability over OTR | - | - | ppm | see table on page 3 for available options |
| Equivalent Series Resistance (ESR) | - | 700 | Ohms | 1.8432 MHZ to 3 MHZ |
| | - | 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 |
| | - | 70 | Ohms | 60 MHZ to 150 MHZ |
| | - | 100 | Ohms | 85 MHZ to 210 MHZ |
| 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
FFFFFM FFFFFM
ymdz ymdz

Legend:

x = Capacitance load code from below
FFFFFM = 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 |
| | | | | | | | | | Highest Specified Operating Temperature 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 |
| | | | | | | | | | Lowest Specified Operating Temperature 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 |
| | | | | | | | | | Mode: 1 = Fundamental 3 = 3rd Overtone |
| | | | | | | | | | Frequency Stability See chart below |
| | | | | | | | | | Calibration Frequency Tolerance (Typ. Values shown) 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) |
| | | | | | | | | | Frequency in MHZ |
| | | | | | | | | | Clload in pF Parallel Resonance from 09 to 44 pF or SR = Series Resonance |
| | | | | | | | | | Series Model |

| | | Available Frequency Stability versus Temperature in ppm | | | | | |
|-----------------------------|------|---|------|------|------|------|-------|
| 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 | |
| | | | | | | Internal code or blank |
| | | | | | | Frequency in MHz |
| | | | | | | Cload in pF Parallel Resonance in pF or SR = Series Resonance |
| | | | | | | Operating Temperature Range Blank = 0 to + 70°C (STD) E = -40 to +85°C |
| | | | | | | Calibration Tolerance / Frequency Stability Blank = 30/50 (STD) B = 30/30 C = 15/30 D = 10/20 (not all frequencies) |
| | | | | | | Series Model |






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

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

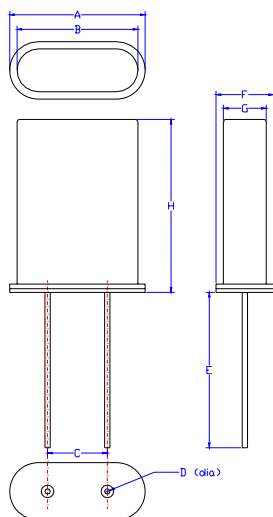
RoHS Compliant

2nd LvL Interconnect
 Category=e1
 Max Safe Temp=260C for 10s 2X Max

RoHS Compliant

2nd LvL Interconnect
 Category=e3
 Max Safe Temp=260C for 10s 2X Max

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

¹ 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.

IMPORTANT NOTICE

Pletronics Incorporated (PLE) reserves the right to make corrections, improvements, modifications and other changes to this product at anytime. PLE reserves the right to discontinue any product or service without notice. Customers are responsible for obtaining the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to PLE's terms and conditions of sale supplied at the time of order acknowledgment.

PLE warrants performance of this product to the specifications applicable at the time of sale in accordance with PLE's limited warranty. Testing and other quality control techniques are used to the extent PLE deems necessary to support this warranty. Except where mandated by specific contractual documents, testing of all parameters of each product is not necessarily performed.

PLE assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using PLE components. To minimize the risks associated with the customer products and applications, customers should provide adequate design and operating safeguards.

PLE products are not designed, intended, authorized or warranted to be suitable for use in life support applications, devices or systems or other critical applications that may involve potential risks of death, personal injury or severe property or environmental damage. Inclusion of PLE products in such applications is understood to be fully at the risk of the customer. Use of PLE products in such applications requires the written approval of an appropriate PLE officer. Questions concerning potential risk applications should be directed to PLE.

PLE does not warrant or represent that any license, either express or implied, is granted under any PLE patent right, copyright, artwork or other intellectual property right relating to any combination, machine or process which PLE product or services are used. Information published by PLE regarding third-party products or services does not constitute a license from PLE to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from PLE under the patents or other intellectual property of PLE.

Reproduction of information in PLE data sheets or web site is permissible only if the reproduction is without alteration and is accompanied by associated warranties, conditions, limitations and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. PLE is not responsible or liable for such altered documents.

Resale of PLE products or services with statements different from or beyond the parameters stated by PLE for that product or service voids all express and implied warranties for the associated PLE product or service and is an unfair or deceptive business practice. PLE is not responsible for any such statements.

Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com

Copyright © 2009, Pletronics Inc.