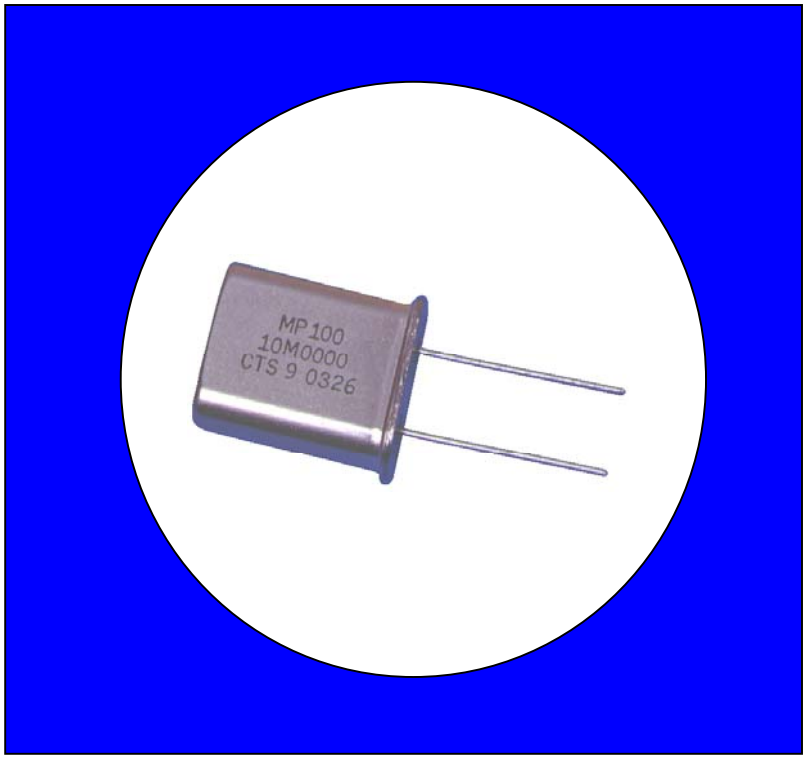
MP Series

Quartz Crystal

FEATURES

- Standard HC-49/U Package, HC-49/U SM Package Option Available
- Stable Frequency Over Temperature and Drive Level
- Fundamental and 3rd Overtone Crystals
- Frequency Range 1.8 – 48 MHz
- Frequency Tolerance, ±45 ppm Standard
- Frequency Stability, ±50 ppm Standard
- Operating Temperature, –20°C to +70°C
- Tape & Reel Packaging Available
- **RoHS/Green Compliant**



DESCRIPTION

The MP crystal series offers excellent long-term stability and reliability in a proven resistance-weld metal package. The excellent shock performance makes it suitable for microprocessor, telecommunication, consumer electronic and networking applications.

STANDARD PART NUMBERS AVAILABLE @ CTS DISTRIBUTORS

MP

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
MP018S	1.843200	13 pF	Fundamental
MP020S	2.000000	20 pF	Fundamental
MP024S	2.457600	32 pF	Fundamental
MPS036S	3.579545	18 pF	Fundamental
MP037	3.686400	20 pF	Fundamental
MP040	4.000000	20 pF	Fundamental
MP04A	4.000000	Series	Fundamental
MP041	4.194304	12 pF	Fundamental
MP042	4.915200	20 pF	Fundamental
MP05A	5.000000	20 pF	Fundamental
MP05B	5.000000	Series	Fundamental
MP060	6.000000	20 pF	Fundamental
MP061	6.144000	20 pF	Fundamental
MP073	7.372800	Series	Fundamental
MP080	8.000000	Series	Fundamental
MP080A	8.000000	20 pF	Fundamental
MP098	9.830400	20 pF	Fundamental
MP100	10.000000	Series	Fundamental

MP

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
MP101	10.000000	30 pF	Fundamental
MP107	10.738635	32 pF	Fundamental
MP110	11.000000	18 pF	Fundamental
MP111	11.059200	Series	Fundamental
MP120	12.000000	Series	Fundamental
MP122	12.288000	32 pF	Fundamental
MP143	14.318180	Series	Fundamental
MP147	14.745600	Series	Fundamental
MP150	15.000000	Series	Fundamental
MP160	16.000000	Series	Fundamental
MP184	18.432000	Series	Fundamental
MP196	19.660800	Series	Fundamental
MP200	20.000000	Series	Fundamental
MP221	22.118400	Series	Fundamental
MP240	24.000000	Series	Fundamental
MP245	24.576000	Series	Fundamental
MP250	25.000000	Series	Fundamental

Contact your authorized CTS Distributor for availability.

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• • • www.ctscorp.com • • •

ADDITIONAL PART NUMBERS AVAILABLE FROM CTS

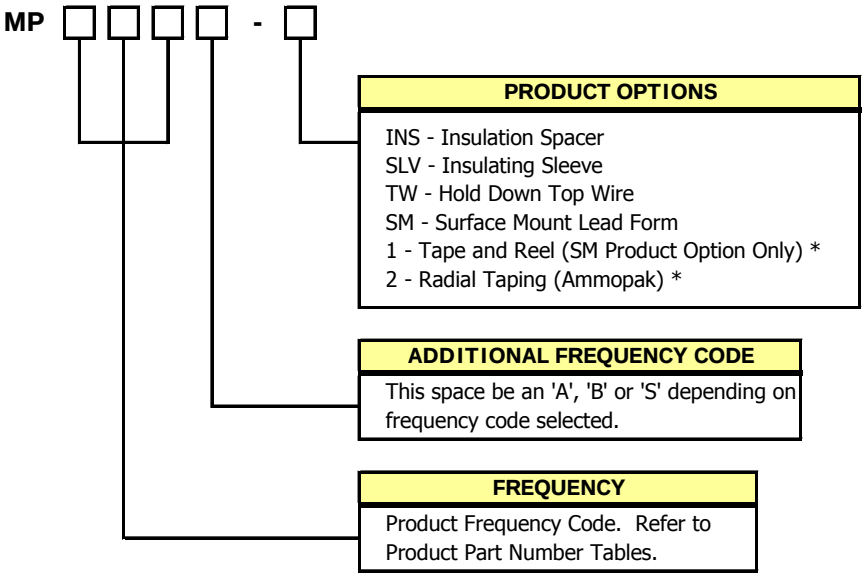
MP

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
MP043	4.032000	22 pF	Fundamental
MP050	5.068800	Series	Fundamental
MP051	5.185000	20 pF	Fundamental
MP057	5.714300	Series	Fundamental
MP057A	5.714300	20 pF	Fundamental
MP062	6.250000	30 pF	Fundamental
MP064	6.400000	20 pF	Fundamental
MP065	6.553600	20 pF	Fundamental
MP180	18.000000	Series	Fundamental
MP270	27.000000	Series	3RD Overtone
MP360	36.000000	Series	3RD Overtone
MP400	40.000000	20 pF	3RD Overtone
MP480	48.000000	Series	3RD Overtone

Contact your local CTS Representative or CTS Customer Service for availability.

ADDITIONAL ORDERING INFORMATION

Available Standard Product Options



*** Standard packaging is bulk in a bag.**

NON-Standard Ordering Options

Custom performance characteristics and lead trim requirements available upon request. Use form C052 to detail non-standard parameters. Contact your local CTS Representative or CTS Customer Service for assistance.

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ELECTRICAL CHARACTERISTICS

	PARAMETER	VALUE
Electrical Parameters	Operating Mode	Fundamental or 3rd Overtone
	Crystal Cut	AT-Cut
	Frequency Range	1.8 MHz to 48.0 MHz
	Frequency Tolerance @ 25°C	± 45 ppm Standard *
	Frequency Stability Tolerance (Operating Temperature Range, Referenced to 25°C Reading)	± 50 ppm Standard *
	Operating Temperature Range	-20°C to +70°C *
	Storage Temperature Range	-55°C to +125°C
	Equivalent Series Resistance	See ESR Table
	Load Capacitance or Resonance Mode	See Standard Part Number Tables *
	Shunt Capacitance (C_0)	7.0 pF Maximum
	Drive Level	100 µW Maximum
	Reflow Condition, per JEDEC J-STD-020	+255°C ± 5°C, 10 Seconds Maximum

* Custom requirements are available upon request. Use form C052 to communicate crystal parameters. Contact your local CTS Representative or CTS Customer Service for assistance.

EQUIVALENT SERIES RESISTANCE TABLE

FREQUENCY RANGE	MODE of OSCILLATION	ESR Maximum
1.80 MHz - < 2.00 MHz	Fundamental	750 Ohms
2.00 MHz - < 2.40 MHz	Fundamental	550 Ohms
2.40 MHz - < 3.50 MHz	Fundamental	300 Ohms
3.50 MHz - < 4.00 MHz	Fundamental	150 Ohms
4.00 MHz - < 5.00 MHz	Fundamental	75 Ohms
5.00 MHz - < 6.40 MHz	Fundamental	50 Ohms
6.40 MHz - < 10.00 MHz	Fundamental	45 Ohms
10.00 MHz - < 30.00 MHz	Fundamental	35 Ohms
25.00 MHz - < 40.10 MHz	3RD Overtone	55 Ohms
40.10 MHz - 48.00 MHz	3RD Overtone	75 Ohms

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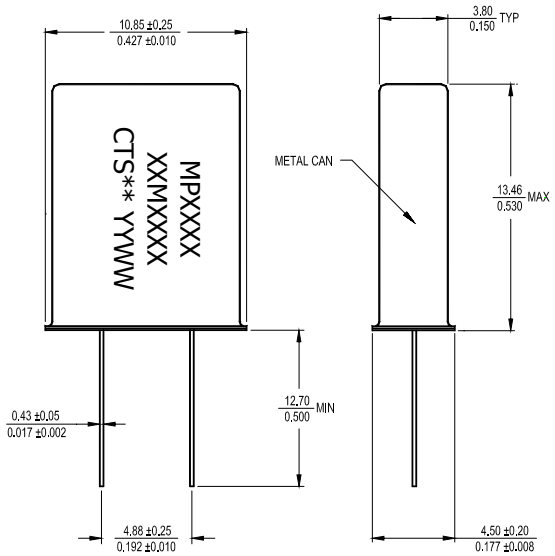
MECHANICAL SPECIFICATIONS

MP PACKAGE DRAWING



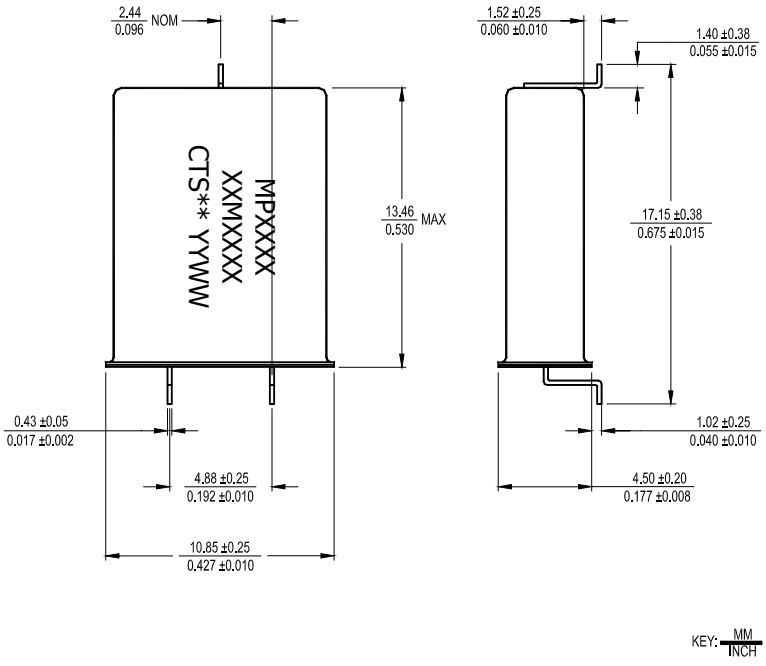
MARKING INFORMATION

1. CTS Part Number.
2. XXMXXXX – Frequency marked with 4 significant digits after the 'M'.
2. ** - Manufacturing Site Code.
3. YYWW – Date Code, YY – year, WW – week.
4. Complete CTS part number, frequency value and date code information must appear on bag and box labels.

NOTES

1. Lead finish (e1), SnAgCu.

MP-SM PACKAGE DRAWING



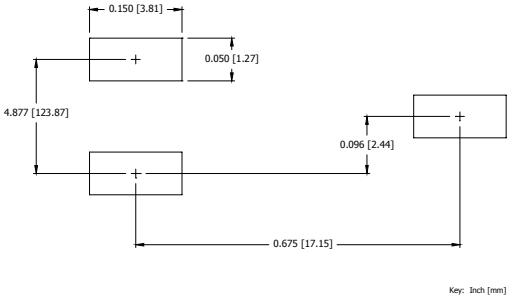
MARKING INFORMATION

1. CTS Part Number.
2. XXMXXXX – Frequency marked with 4 significant digits after the 'M'.
2. ** - Manufacturing Site Code.
3. YYWW – Date Code, YY – year, WW – week.
4. Complete CTS part number, frequency value and date code information must appear on bag and box labels.

NOTES

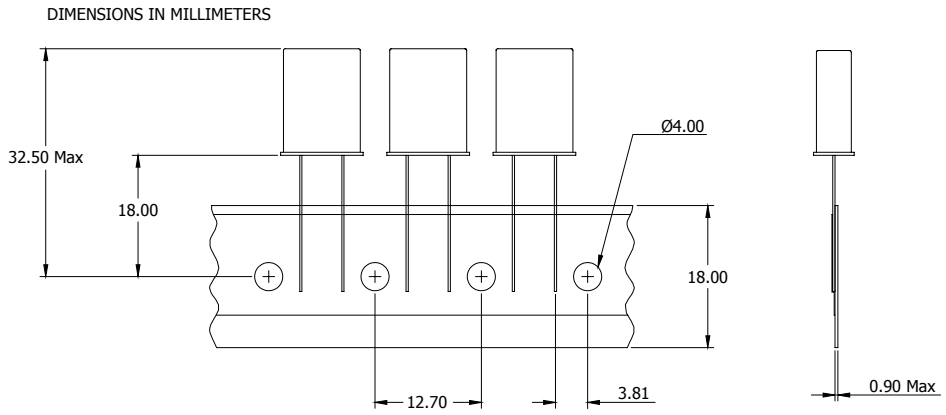
1. Lead finish (e1), SnAgCu.

SUGGESTED SOLDER PAD GEOMETRY



PACKAGING INFORMATION

MP Taping (Ammopak)



ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle:	400 cycles from –55°C to +125°C, 10 minute dwell at each temperature, 1 minute transfer time between temperatures.
Mechanical Shock:	1,500g's, 0.5mS duration, ½ sinewave, 3 shocks each direction along 3 mutually perpendicular planes (18 total shocks).
Sinusoidal Vibration:	0.06 inches double amplitude, 10 to 55 Hz and 20g's, 55 to 2,000 Hz, 3 cycles each in 3 mutually perpendicular planes (9 times total).
Gross Leak:	No leak shall appear while immersed in an FC40 or equivalent liquid at +125°C for 20 seconds.
Fine Leak:	Mass spectrometer leak rates less than $2x10^{-8}$ ATM cc/sec air equivalent.
Resistance to Solder Heat:	Product must survive 3 reflows of +260°C peak, 10 seconds maximum.
High Temperature Operating Bias:	2,000 hours at +125°C, disregarding frequency shift.
Frequency Aging:	1,000 hours at +85°C, maximum ±5 ppm shift.
Insulation Resistance:	500M Ohms @ $100V_{DC}$ $\pm 15V_{DC}$.
Moisture Sensitivity Level:	Level 1 per JEDEC J-STD-020.

QUALITY AND RELIABILITY

Quality systems meet or exceed the requirements of ISO 9000:2000 standards.

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