MP Series

Quartz Crystal



Part Dimensions:
13.46 × 10.85 × 3.8mm • 963.91mg

Features

- Standard HC-49/U Metal Package
- Fundamental and 3rd Overtone Crystal Design
- Frequency Range 1.8432 – 64MHz
- Frequency Tolerance, ±30ppm Standard
- Frequency Stability, ±50ppm Standard
- Operating Temperature Range -20°C to +70°C or -40°C to +85°C
- Tape and Reel Packaging Available

Applications

- Wireless Communications
- Broadband Access
- FPGA/Microcontrollers
- Computer Peripherals
- Microprocessors
- Test and Measurement
- Consumer Electronics
- Portable Equipment

Description

CTS MP Series incorporates a high Q quartz resonator in a proven resistance-weld metal package. It is ideal for supporting a wide range of commercial and industrial applications.

Ordering Information

Model	Frequency/Load Code	Packaging	Temperature Range	Product Options
MP	XXX or XXXX	-		

Code	Frequency
Frequency/Load Code [1]	

Code	Temp. Range
Blank	-20°C to +70°C
E	-40°C to +85°C

Code	Packing
Blank	Bulk [2]
1	Tape & Reel [3]
2	Radial Taping

Code	Option
Blank	No Option
INS	Insulation Spacer
SMMC	Surface Mount Lead Form w/ Metal Clip Third Lead

Notes:

1] Refer to Standard Product Part Numbers tables on Page 2.
2] Standard packaging is bulk in a bag.
3] SMMC Product Option only.

Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.

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Standard Product Part Numbers

Part numbers in **BOLD** are commonly stock items through CTS authorized distributors. Non-bold numbers may be stocked or are available for order.

FREQUENCY [MHz]	PART NUMBER [-20°C/+70°C]	PART NUMBER [-40°C/+85°C]	LOAD CAPACITANCE	OPERATING MODE
1.843200	MP018A	MP018A-E	Series	Fundamental
1.843200	MP018B	MP018B-E	18pF	Fundamental
1.843200	**MP018S**	MP018S-E	13pF	Fundamental
2.000000	MP020A	MP020A-E	Series	Fundamental
2.000000	**MP020S**	MP020S-E	20pF	Fundamental
2.000000	**MP020B**	**MP020B-E**	18pF	Fundamental
2.457600	**MP024S**	MP024S-E	32pF	Fundamental
3.579545	MP036	MP036-E	Series	Fundamental
3.579545	**MP036S**	MP036S-E	18pF	Fundamental
3.686400	MP037A	MP037A-E	Series	Fundamental
3.686400	**MP037**	MP037-E	20pF	Fundamental
3.686400	**MP037B**	**MP037B-E**	18pF	Fundamental
4.000000	**MP04A**	MP04A-E	Series	Fundamental
4.000000	**MP040**	MP040-E	20pF	Fundamental
4.000000	**MP040B**	**MP040B-E**	18pF	Fundamental
4.032000	MP043A	MP043A-E	Series	Fundamental
4.032000	MP043	MP043-E	20pF	Fundamental
4.096000	MP042A	MP042A-E	20pF	Fundamental
4.194304	**MP041**	MP041-E	12pF	Fundamental
4.915200	MP049A	MP049A-E	Series	Fundamental
4.915200	**MP042**	MP042-E	20pF	Fundamental
4.915200	**MP049B**	**MP049B-E**	18pF	Fundamental
5.000000	**MP05B**	MP05B-E	Series	Fundamental
5.000000	**MP05A**	MP05A-E	20pF	Fundamental
5.000000	**MP050C**	**MP050C-E**	18pF	Fundamental
5.068000	**MP050**	MP050-E	Series	Fundamental
5.068000	MP051A	MP051A-E	20pF	Fundamental
5.185000	MP052	MP052-E	Series	Fundamental
5.185000	MP051	MP051-E	20pF	Fundamental
5.185000	MP052C	MP052C-E	32pF	Fundamental
5.500000	MP055B	MP055B-E	18pF	Fundamental
5.714300	MP057	MP057-E	Series	Fundamental
5.714300	MP057A	MP057A-E	20pF	Fundamental
6.000000	MP060A	MP060A-E	Series	Fundamental
6.000000	**MP060**	MP060-E	20pF	Fundamental
6.000000	**MP060B**	**MP060B-E**	18pF	Fundamental
6.000000	MP060C	MP060C-E	32pF	Fundamental
6.144000	**MP061**	MP061-E	20pF	Fundamental
6.144000	MP061C	MP061C-E	32pF	Fundamental
6.250000	MP062	MP062-E	30pF	Fundamental
6.400000	MP064	MP064-E	20pF	Fundamental
6.553600	MP065	MP065-E	20pF	Fundamental
6.553600	MP065C	MP065C-E	12pF	Fundamental
7.372800	**MP073**	MP073-E	Series	Fundamental
7.372800	MP073A	MP073A-E	20pF	Fundamental
7.372800	MP073B	MP073B-E	18pF	Fundamental

FREQUENCY [MHz]	PART NUMBER [-20°C/+70°C]	PART NUMBER [-40°C/+85°C]	LOAD CAPACITANCE	OPERATING MODE
8.000000	**MP080**	MP080-E	Series	Fundamental
8.000000	**MP080A**	MP080A-E	20pF	Fundamental
8.000000	**MP080B**	**MP080B-E**	18pF	Fundamental
8.000000	MP080C	MP080C-E	32pF	Fundamental
8.192000	MP081B	MP081B-E	18pF	Fundamental
9.216000	MP092B	MP092B-E	18pF	Fundamental
9.830400	MP098A	MP098A-E	Series	Fundamental
9.830400	**MP098**	MP098-E	20pF	Fundamental
9.830400	**MP098B**	**MP098B-E**	18pF	Fundamental
10.000000	**MP100**	MP100-E	Series	Fundamental
10.000000	MP100A	MP100A-E	20pF	Fundamental
10.000000	MP100B	MP100B-E	18pF	Fundamental
10.000000	**MP101**	MP101-E	30pF	Fundamental
10.738635	**MP107**	MP107-E	32pF	Fundamental
11.000000	MP110B	MP110B-E	Series	Fundamental
11.000000	MP110A	MP110A-E	20pF	Fundamental
11.000000	**MP110**	MP110-E	18pF	Fundamental
11.059200	**MP111**	MP111-E	Series	Fundamental
11.059200	MP111A	MP111A-E	20pF	Fundamental
11.059200	MP111B	MP111B-E	18pF	Fundamental
11.059200	MP111C	MP111C-E	32pF	Fundamental
12.000000	**MP120**	MP120-E	Series	Fundamental
12.000000	MP120A	MP120A-E	20pF	Fundamental
12.000000	MP120B	MP120B-E	18pF	Fundamental
12.000000	MP120C	MP120C-E	32pF	Fundamental
12.288000	MP122C	MP122C-E	Series	Fundamental
12.288000	MP122A	MP122A-E	20pF	Fundamental
12.288000	MP122B	MP122B-E	18pF	Fundamental
12.288000	**MP122**	MP122-E	32pF	Fundamental
14.318180	**MP143**	MP143-E	Series	Fundamental
14.318180	**MP143B**	**MP143B-E**	18pF	Fundamental
14.745600	**MP147**	MP147-E	Series	Fundamental
14.745600	MP147A	MP147A-E	20pF	Fundamental
14.745600	MP147B	MP147B-E	18pF	Fundamental
15.000000	**MP150**	MP150-E	Series	Fundamental
16.000000	**MP160**	MP160-E	Series	Fundamental
16.000000	MP160A	MP160A-E	20pF	Fundamental
16.000000	MP160B	MP160B-E	18pF	Fundamental
18.000000	MP180	MP180-E	Series	Fundamental
18.432000	**MP184**	MP184-E	Series	Fundamental
18.432000	MP184A	MP184A-E	20pF	Fundamental
18.432000	MP184B	MP184B-E	18pF	Fundamental
19.660800	**MP196**	MP196-E	Series	Fundamental
19.660800	MP196A	MP196A-E	20pF	Fundamental
19.660800	MP196B	MP196B-E	18pF	Fundamental

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Standard Product Part Numbers Continued

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FREQUENCY [MHz]	PART NUMBER [-20°C/+70°C]	PART NUMBER [-40°C/+85°C]	LOAD CAPACITANCE	OPERATING MODE
20.000000	**MP200**	MP200-E	Series	Fundamental
20.000000	MP200A	MP200A-E	20pF	Fundamental
20.000000	MP200B	MP200B-E	18pF	Fundamental
22.118400	**MP221A**	MP221A-E	Series	Fundamental
22.118400	**MP221**	MP221-E	20pF	Fundamental
22.118400	MP221B	MP221B-E	18pF	Fundamental
24.000000	**MP240**	MP240-E	Series	Fundamental
24.000000	MP240A	MP240A-E	20pF	Fundamental
24.000000	MP240B	MP240B-E	18pF	Fundamental
24.576000	**MP245**	MP245-E	Series	Fundamental
24.576000	MP245B	MP245B-E	18pF	Fundamental
25.000000	**MP250**	MP250-E	Series	Fundamental
25.000000	MP250A	MP250A-E	20pF	Fundamental
25.000000	MP250B	MP250B-E	18pF	Fundamental
27.000000	MP270	MP270-E	Series	3rd Overtone
27.000000	MP270B	MP270B-E	18pF	3rd Overtone
32.000000	MP320A	MP320A-E	20pF	3rd Overtone
32.000000	MP320B	MP320B-E	18pF	3rd Overtone
32.768000	MP327B	MP327B-E	18pF	3rd Overtone
36.000000	MP360	MP360-E	Series	3rd Overtone
40.000000	MP400	MP400-E	20pF	3rd Overtone
48.000000	MP480	MP480-E	Series	3rd Overtone
48.000000	MP480A	MP480A-E	20pF	3rd Overtone
48.000000	MP480B	MP480B-E	18pF	3rd Overtone
50.000000	MP500B	MP500B-E	18pF	3rd Overtone
64.000000	MP640B	MP640B-E	18pF	3rd Overtone

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Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Temperature	T_A	-	-20 -40	+25	+70 +85	℃
Storage Temperature	T_{STG}	-	-40	-	+125	℃

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range						
Fundamental	f_O	-		1.8432 - 30		MHz
3rd Overtone				24 - 64		
Frequency Tolerance	$\Delta f/f_O$	@ +25°C	-30	-	30	ppm
Frequency Stability	$\Delta f/f_{25}$	Referenced to +25°C reading	-50	-	50	ppm
Aging	$\Delta f/f_0$	Typical per year @ +25°C	-5	±3	5	ppm

Crystal Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Mode	-	-		Fundamental or 3rd Overtone		-
Crystal Cut	-	-		AT-Cut		-
Load Capacitance	C_L	-		Note 1		pF
Shunt Capacitance	C_0	-	-	-	7.0	pF
Series Resistance						
Fundamental	R_1	1.8MHz - <2.0MHz	-	-	600	Ω
		2.0MHz - <3.0MHz	-	-	500	
		3.0MHz - <3.5MHz	-	-	150	
		3.5MHz - <4.0MHz	-	-	120	
		4.0MHz - <5.0MHz	-	-	100	
		5.0MHz - <6.0MHz	-	-	80	
		6.0MHz - <7.0MHz	-	-	60	
		7.0MHz - <8.0MHz	-	-	50	
		8.0MHz - <10.0MHz	-	-	40	
		10.0MHz - <13.0MHz	-	-	30	
		13.0MHz - 30.0MHz	-	-	25	
3rd Overtone		24.0MHz - 64.0MHz	-	-	55	
Drive Level	DL	-	-	100	1000	µW
Insulation Resistance	R_i	+100Vdc ±15Vdc	500	-	-	MΩ

1.] Refer to Standard Product Part Numbers table on Pages 2.

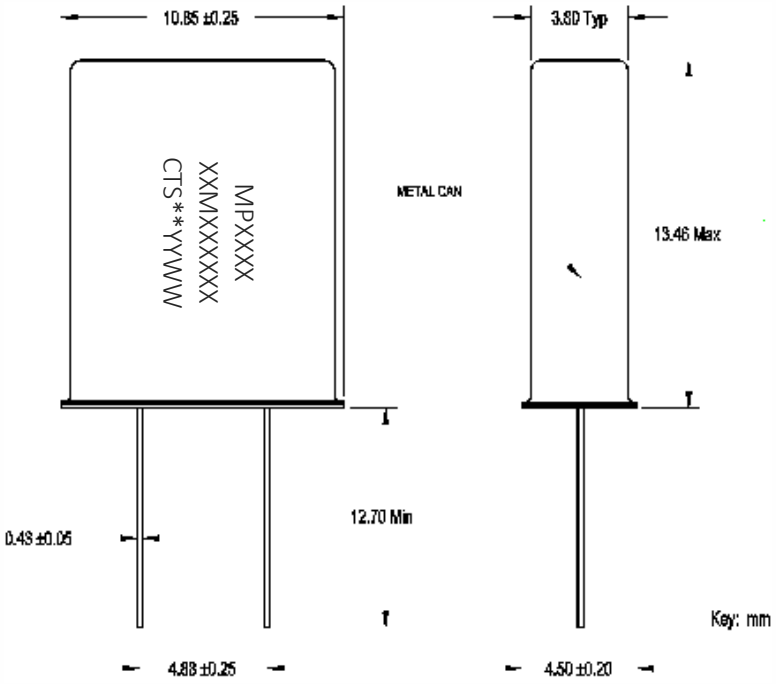
$\Delta f/f_0$ - Frequency deviation referenced to nominal frequency.

$\Delta f/f_{25}$ - Frequency deviation over operating temperature range, referenced to +25°C frequency.

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Mechanical Specifications

MP Package Drawing



Marking Information

1. MPXXXX – CTS Part Number.
   [Per Ordering Information format.]
   XXMXXXXXX – Frequency is marked with only leading significant digits before the 'M' and 4 – 6 digits after the 'M' [including zeros].
   Ex. XMXXXXXX – 3M579545
   XXMXXXXX – 14M31818
   XXMXXXX – 20M0000
2. ** – Manufacturing Site Code.
3. YYWW – Date Code; YY = year, WW = week.

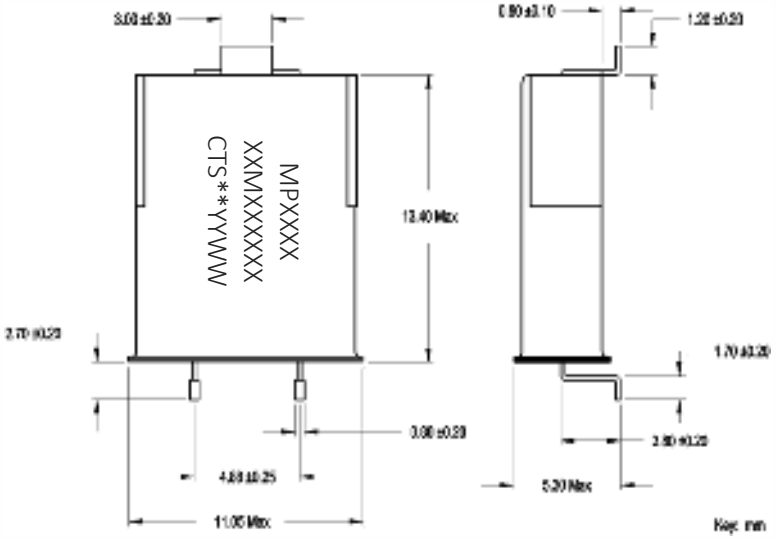
Schematic



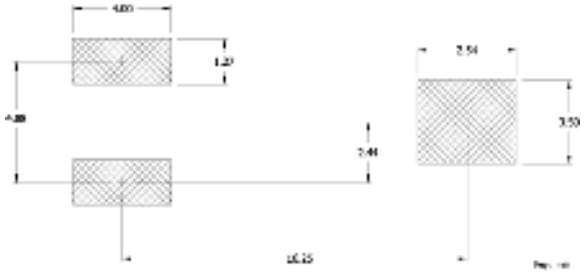
Notes

1. JEDEC termination code (e1). Barrier-plating is nickel [Ni] with tin-silver-copper [SnAgCu] lead finish.
2. Manual soldering with application to PCB and device terminals, 2 times. Solder iron temperature [@ tip] +350°C maximum, 10 seconds maximum.
3. MSL = 1.

MP-SMMC – Package Drawing



Recommended Pad Layout



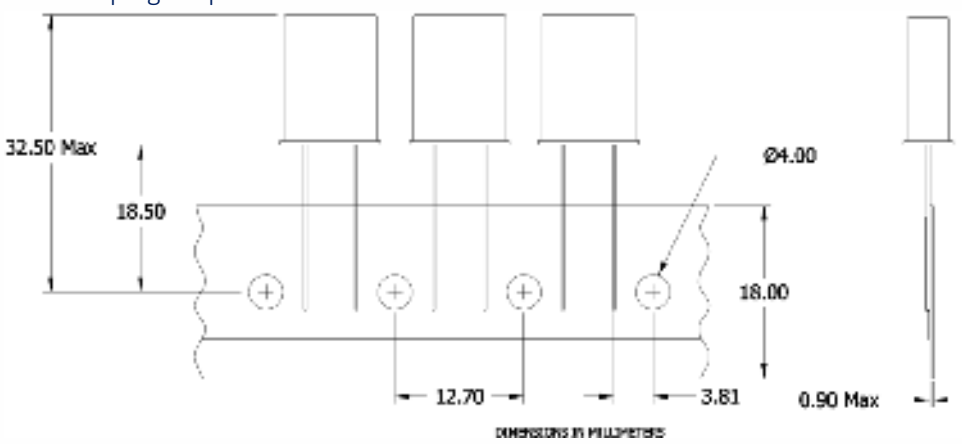
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Packaging – MP, Bulk in Bag or Radial Taping

Bulk in Bag – Standard

Packaging is bulk in anti-static plastic bag.

Radial Taping – Optional



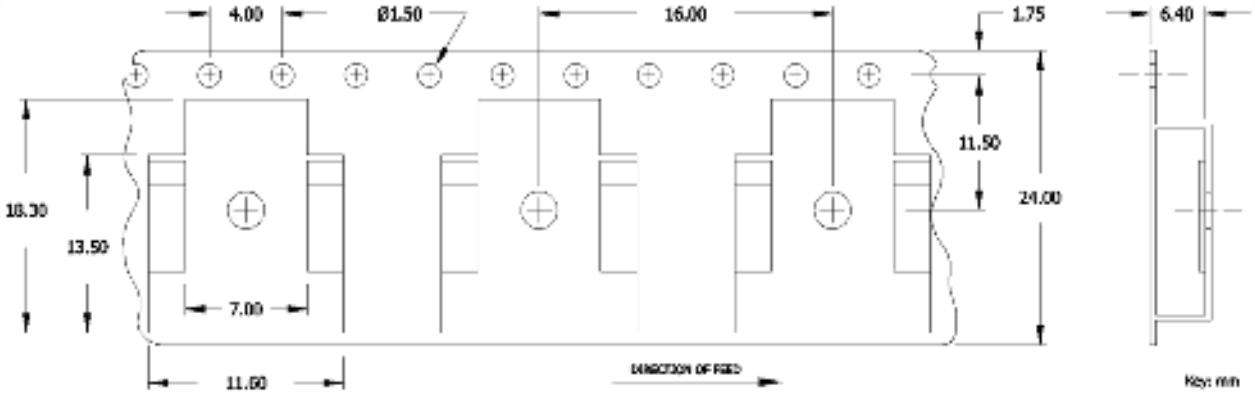
Notes

1. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on bag, reel and carton labels.

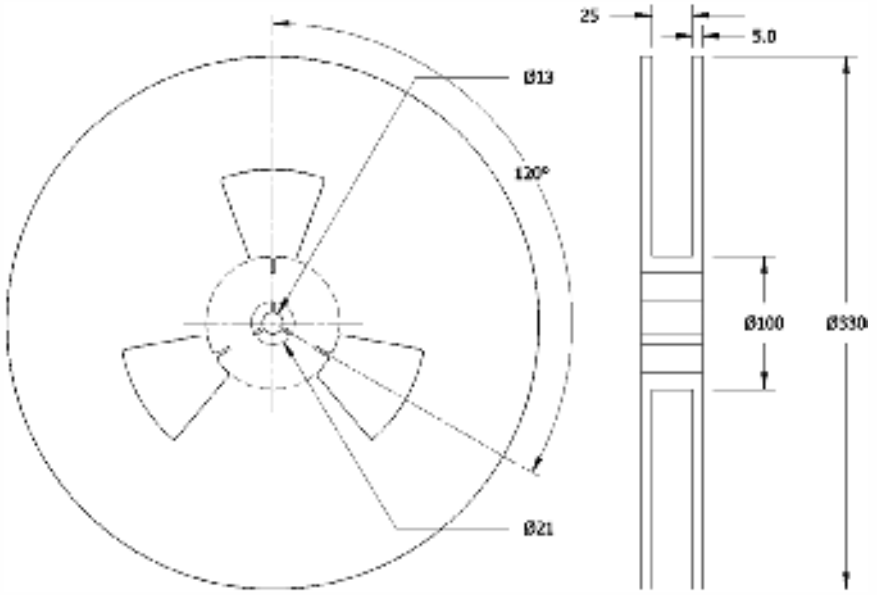
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Packaging – MP-SMMC, Tape and Reel

Tape Drawing



Reel Drawing



Notes

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