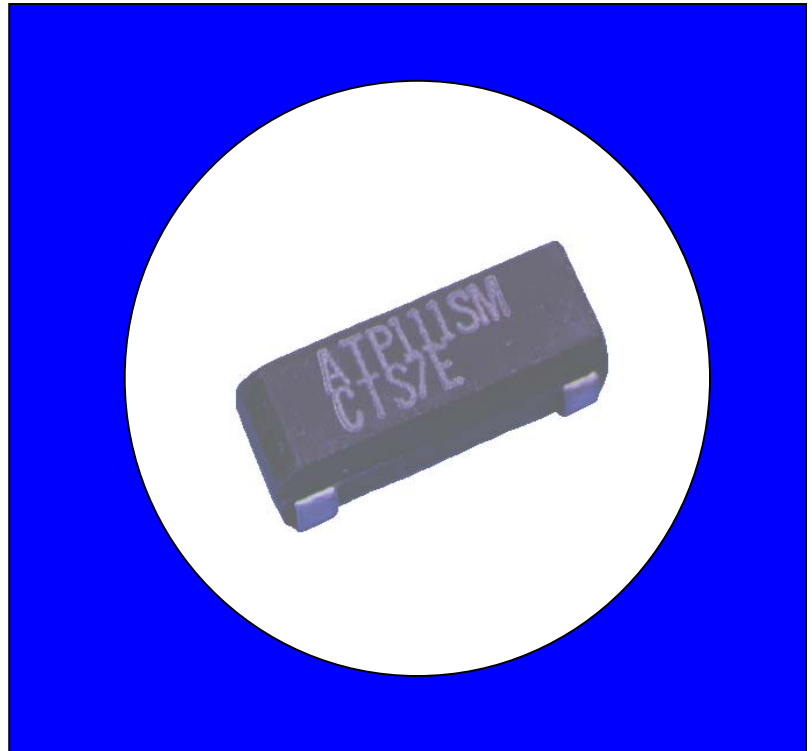


### FEATURES

- Plastic Molded Metal Cylinder Crystal Package
- Stable Frequency Over Temperature and Drive Level
- Fundamental and 3<sup>rd</sup> Overtone Crystals
- Frequency Range 3.5 – 40 MHz
- Frequency Tolerance,  $\pm 50$  ppm Standard
- Frequency Stability,  $\pm 50$  ppm Standard
- Operating Temperature,  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- Tape & Reel Packaging Available
- **RoHS Compliant**
- **RoHS Exemption**  
Per EU Directive 2002/95/EC Annex, Section 7: Lead in high temperature solders (+85% lead).

### DESCRIPTION

The ATP-SM crystal series offers excellent long-term stability and reliability in a proven plastic molded package. The excellent shock performance makes it suitable for today's microprocessor, communication, consumer electronic and networking applications.



### STANDARD PART NUMBERS AVAILABLE @ CTS DISTRIBUTORS

ATP-SM

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
ATP036SM	3.579545	18 pF	Fundamental
ATP037SM	3.686400	20 pF	Fundamental
ATP040SM	4.000000	20 pF	Fundamental
ATP042SM	4.915200	20 pF	Fundamental
ATP060SM	6.000000	20 pF	Fundamental
ATP10ASM	10.000000	20 pF	Fundamental
ATP111SM	11.059200	20 pF	Fundamental

ATP-SM

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
ATP122SM	12.288000	20 pF	Fundamental
ATP143SM	14.318180	Series	Fundamental
ATP160SM	16.000000	Series	Fundamental
ATP16ASM	16.000000	20 pF	Fundamental
ATP200SM	20.000000	Series	Fundamental
ATP204SM	20.480000	20 pF	Fundamental
ATP245SM	24.576000	Series	Fundamental

Contact your authorized CTS distributor for availability.

**ADDITIONAL PART NUMBERS AVAILABLE FROM CTS**

ATP-SM

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
ATP04ASM	4.000000	Series	Fundamental
ATP044SM	4.433619	20 pF	Fundamental
ATP050SM	5.068800	20 pF	Fundamental
ATP061SM	6.144000	20 pF	Fundamental
ATP073SM	7.372800	20 pF	Fundamental
ATP080SM	8.000000	Series	Fundamental
ATP08ASM	8.000000	20 pF	Fundamental
ATP08BSM	8.192000	30 pF	Fundamental
ATP098SM	9.830400	20 pF	Fundamental
ATP099SM	9.830400	Series	Fundamental
ATP100SM	10.000000	Series	Fundamental
ATP115SM	11.520000	20 pF	Fundamental
ATP120SM	12.000000	Series	Fundamental
ATP12ASM	12.000000	20 pF	Fundamental
ATP125SM	12.288000	Series	Fundamental
ATP123SM	12.296000	20 pF	Fundamental
ATP124SM	12.296000	Series	Fundamental
ATP126SM	12.352000	Series	Fundamental
ATP127SM	12.352000	20 pF	Fundamental
ATP135SM	13.500000	20 pF	Fundamental

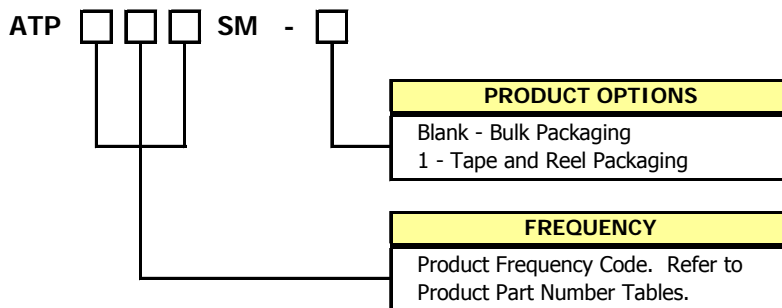
ATP-SM

PART NUMBER	FREQUENCY (MHz)	LOAD CAPACITANCE	OPERATING MODE
ATP14ASM	14.318180	20 pF	Fundamental
ATP153SM	15.360000	20 pF	Fundamental
ATP169SM	16.934400	20 pF	Fundamental
ATP184SM	18.432000	Series	Fundamental
ATP18ASM	18.432000	20 pF	Fundamental
ATP196SM	19.660800	Series	Fundamental
ATP19ASM	19.660800	20 pF	Fundamental
ATP20ASM	20.000000	20 pF	Fundamental
ATP20BSM	20.000000	50 pF	Fundamental
ATP220SM	22.118400	Series	Fundamental
ATP22ASM	22.118400	20 pF	Fundamental
ATP240SM	24.000000	Series	Fundamental
ATP24ASM	24.000000	20 pF	Fundamental
ATP24BSM	24.576000	20 pF	Fundamental
ATP250SM	25.000000	Series	Fundamental
ATP25ASM	25.000000	20 pF	Fundamental
ATP320SM	32.000000	Series	3 <sup>RD</sup> Overtone
ATP32ASM	32.000000	20 pF	3 <sup>RD</sup> Overtone
ATP400SM	40.000000	Series	3 <sup>RD</sup> Overtone
ATP40ASM	40.000000	20 pF	3 <sup>RD</sup> Overtone

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

**ADDITIONAL ORDERING INFORMATION**

**Available Standard Product Options**



**NON-Standard Ordering Options**

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

## ELECTRICAL CHARACTERISTICS

	PARAMETER	VALUE
Electrical Parameters	Operating Mode	Fundamental or 3 <sup>rd</sup> Overtone
	Crystal Cut	AT-Cut Characteristics
	Frequency Range	3.5 MHz to 40.0 MHz
	Frequency Tolerance @ 25°C	± 50 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 <sub>0</sub> )	7.0 pF Maximum
	Drive Level	10 μW Typical, 100 μW Maximum
	Reflow Condition, per JEDEC J-STD-020	+255°C ± 5°C, 10 Seconds Maximum

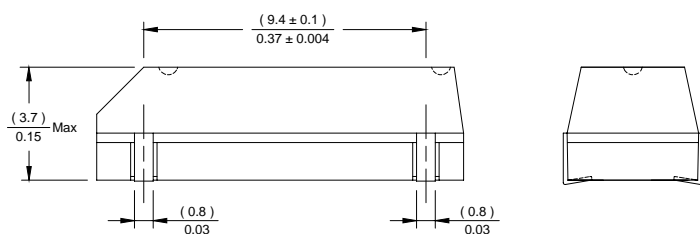
\* Custom requirements are available upon request. Use form C052 to communicate crystal parameters. Contact your local CTS Representative or CTS Customer Service for assistance.

## EQUIVALENT SERIES RESISTANCE TABLE

FREQUENCY RANGE	MODE of OSCILLATION	ESR Maximum
3.50 MHz - < 4.00 MHz	Fundamental	200 Ohms
4.00 MHz - < 6.00 MHz	Fundamental	150 Ohms
6.00 MHz - < 10.00 MHz	Fundamental	100 Ohms
10.0 MHz - < 27.00 MHz	Fundamental	50 Ohms
27.00 MHz - < 36.00 MHz	Fundamental	50 Ohms
27.00 MHz - < 36.00 MHz	3 <sup>RD</sup> Overtone	100 Ohms
36.00 MHz - 40.00 MHz	3 <sup>RD</sup> Overtone	80 Ohms

## MECHANICAL SPECIFICATIONS

### ATP-SM PACKAGE DRAWING



Key: (MM)  
Inch

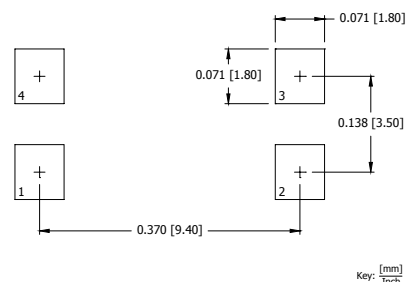
### MARKING INFORMATION

1. CTS Part Number.
2. \*\* - Manufacturing Site Code.
3. YYWW – Date Code, YY – year, WW – week.
4. CTS part number, frequency value and date code information must appear on reel and box labels.

### NOTES

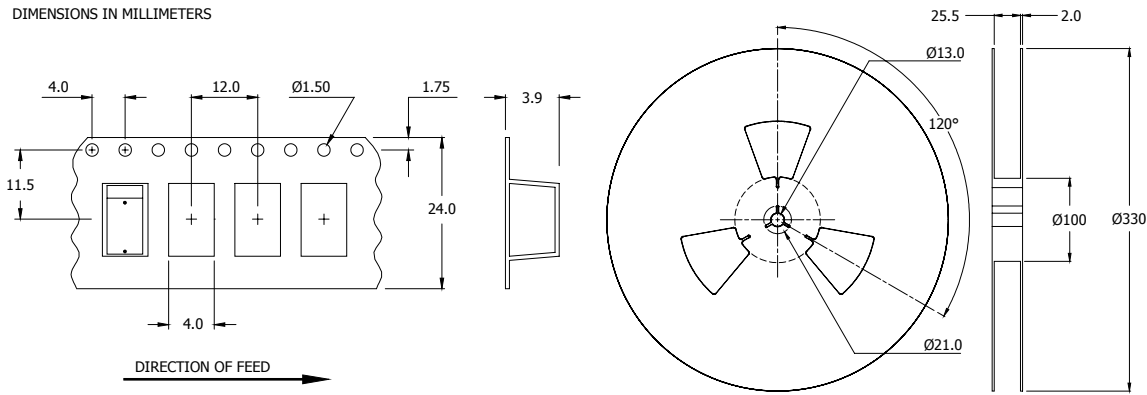
1. Lead finish (e5), SnZnCu.

### SUGGESTED SOLDER PAD GEOMETRY



Key: (mm)  
Inch

**PACKAGING INFORMATION**



Device quantity is 1,000 pieces per reel.

**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, 1/2 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 $2 \times 10^{-8}$ 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 $\pm 5$ 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.