

### FEATURES

- Standard HC-49/US [thru-hole] and HC-49/US-SM [surface mount] Packages
- Stable Frequency Over Temperature and Drive Level
- **Fundamental and 3<sup>rd</sup> Overtone Crystals**
- Frequency Range 3.2 – 64 MHz
- Frequency Tolerance,  $\pm 30$  ppm Standard
- Frequency Stability,  $\pm 50$  ppm Standard
- Operating Temperature,  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  Standard,  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Available
- Tape & Reel Packaging Available
- **RoHS/Green Compliant [6/6]**

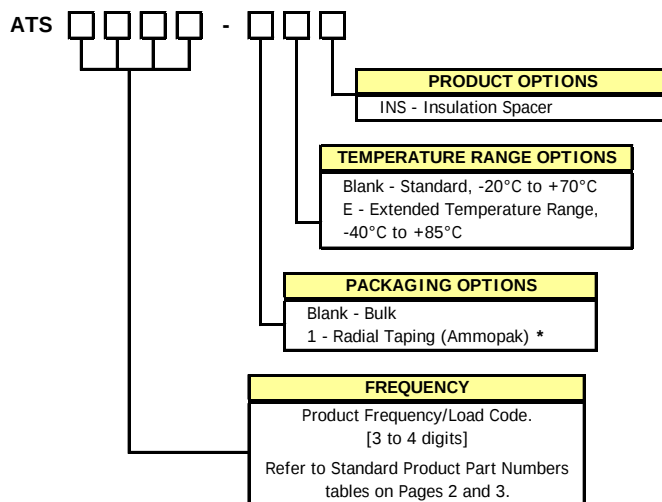


### APPLICATIONS

The ATS/ATS-SM 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, industrial, consumer electronics and networking applications.

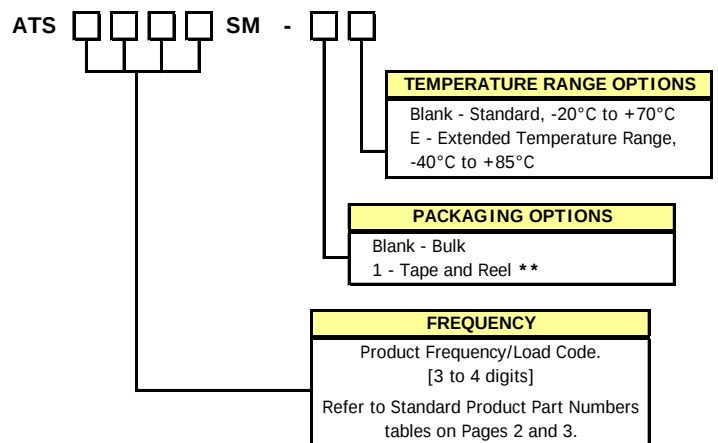
### ORDERING INFORMATION

#### ATS



\* Standard packaging is bulk in a bag.

#### ATS-SM



\*\* Standard packaging is tape and reel.  
CTS Distributors may use -T for tape and reel indicator.

### Non-Standard Ordering Options

- Contact your local CTS Representative or CTS Inside Sales Representative for assistance.

**STANDARD PRODUCT PART NUMBERS - ATS**

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

| FREQUENCY<br>(MHz) | PART<br>NUMBER<br>-20/70°C | PART<br>NUMBER<br>-40/85°C | LOAD<br>CAPACITANCE | OPERATING<br>MODE | FREQUENCY<br>(MHz) | PART<br>NUMBER<br>-20/70°C | PART<br>NUMBER<br>-40/85°C | LOAD<br>CAPACITANCE | OPERATING<br>MODE |
|--------------------|----------------------------|----------------------------|---------------------|-------------------|--------------------|----------------------------|----------------------------|---------------------|-------------------|
| 3.579545           | ATS036B                    | ATS036B-E                  | Series              | Fundamental       | 12.352000          | ATS126                     | ATS126-E                   | Series              | Fundamental       |
| 3.579545           | <b>ATS036</b>              | ATS036-E                   | 18 pF               | Fundamental       | 12.352000          | ATS127                     | ATS127-E                   | 20 pF               | Fundamental       |
| 3.686400           | ATS037A                    | ATS037A-E                  | Series              | Fundamental       | 13.500000          | <b>ATS135</b>              | ATS135-E                   | 20 pF               | Fundamental       |
| 3.686400           | <b>ATS037</b>              | ATS037-E                   | 20 pF               | Fundamental       | 14.318180          | <b>ATS143</b>              | ATS143-E                   | Series              | Fundamental       |
| 3.686400           | <b>ATS037B</b>             | <b>ATS037B-E</b>           | 18 pF               | Fundamental       | 14.318180          | ATS144                     | ATS144-E                   | 20 pF               | Fundamental       |
| 4.000000           | ATS04A                     | ATS04A-E                   | Series              | Fundamental       | 14.318180          | <b>ATS143B</b>             | <b>ATS143B-E</b>           | 18 pF               | Fundamental       |
| 4.000000           | <b>ATS040</b>              | ATS040-E                   | 20 pF               | Fundamental       | 14.745600          | ATS147                     | ATS147-E                   | Series              | Fundamental       |
| 4.000000           | <b>ATS040B</b>             | <b>ATS040B-E</b>           | 18 pF               | Fundamental       | 14.745600          | <b>ATS147A</b>             | <b>ATS147A-E</b>           | 20 pF               | Fundamental       |
| 4.096000           | ATS042A                    | ATS042A-E                  | 20 pF               | Fundamental       | 14.745600          | <b>ATS147B</b>             | <b>ATS147B-E</b>           | 18 pF               | Fundamental       |
| 4.096000           | ATS042B                    | ATS042B-E                  | 18 pF               | Fundamental       | 15.000000          | ATS150                     | ATS150-E                   | Series              | Fundamental       |
| 4.194304           | ATS041C                    | ATS041C-E                  | 12 pF               | Fundamental       | 15.360000          | <b>ATS15A</b>              | ATS15A-E                   | 20 pF               | Fundamental       |
| 4.915200           | ATS049A                    | ATS049A-E                  | Series              | Fundamental       | 16.000000          | <b>ATS160</b>              | ATS160-E                   | Series              | Fundamental       |
| 4.915200           | <b>ATS042</b>              | ATS042-E                   | 20 pF               | Fundamental       | 16.000000          | <b>ATS16A</b>              | ATS16A-E                   | 20 pF               | Fundamental       |
| 4.915200           | <b>ATS049B</b>             | <b>ATS049B-E</b>           | 18 pF               | Fundamental       | 16.000000          | ATS16B                     | ATS16B-E                   | 18 pF               | Fundamental       |
| 5.000000           | ATS050C                    | ATS050C-E                  | Series              | Fundamental       | 16.384000          | ATS164B                    | ATS164B-E                  | 18 pF               | Fundamental       |
| 5.000000           | ATS050A                    | ATS050A-E                  | 20 pF               | Fundamental       | 16.934400          | ATS169                     | ATS169-E                   | 20 pF               | Fundamental       |
| 5.000000           | ATS050B                    | ATS050B-E                  | 18 pF               | Fundamental       | 18.000000          | ATS180A                    | ATS180A-E                  | 20 pF               | Fundamental       |
| 5.068800           | ATS051                     | ATS051-E                   | Series              | Fundamental       | 18.432000          | ATS184                     | ATS184-E                   | Series              | Fundamental       |
| 5.068800           | <b>ATS050</b>              | ATS050-E                   | 20 pF               | Fundamental       | 18.432000          | ATS18A                     | ATS18A-E                   | 20 pF               | Fundamental       |
| 6.000000           | ATS060A                    | ATS060A-E                  | Series              | Fundamental       | 18.432000          | ATS184B                    | ATS184B-E                  | 18 pF               | Fundamental       |
| 6.000000           | <b>ATS060</b>              | ATS060-E                   | 20 pF               | Fundamental       | 19.660800          | ATS196                     | ATS196-E                   | Series              | Fundamental       |
| 6.000000           | <b>ATS060B</b>             | <b>ATS060B-E</b>           | 18 pF               | Fundamental       | 19.660800          | ATS19A                     | ATS19A-E                   | 20 pF               | Fundamental       |
| 6.000000           | ATS060C                    | ATS060C-E                  | 32 pF               | Fundamental       | 19.660800          | ATS196B                    | ATS196B-E                  | 18 pF               | Fundamental       |
| 6.144000           | ATS061                     | ATS061-E                   | 20 pF               | Fundamental       | 20.000000          | <b>ATS200</b>              | ATS200-E                   | Series              | Fundamental       |
| 6.144000           | <b>ATS061B</b>             | <b>ATS061B-E</b>           | 18 pF               | Fundamental       | 20.000000          | ATS20A                     | ATS20A-E                   | 20 pF               | Fundamental       |
| 6.144000           | ATS061C                    | ATS061C-E                  | 32 pF               | Fundamental       | 20.000000          | <b>ATS200C</b>             | <b>ATS200C-E</b>           | 18 pF               | Fundamental       |
| 7.372800           | ATS073A                    | ATS073A-E                  | Series              | Fundamental       | 20.000000          | ATS20B                     | ATS20B-E                   | 50 pF               | Fundamental       |
| 7.372800           | ATS073                     | ATS073-E                   | 20 pF               | Fundamental       | 20.480000          | <b>ATS204</b>              | ATS204-E                   | 20 pF               | Fundamental       |
| 7.372800           | ATS073B                    | ATS073B-E                  | 18 pF               | Fundamental       | 22.118400          | ATS22A                     | ATS22A-E                   | 20 pF               | Fundamental       |
| 7.500000           | ATS075                     | ATS075-E                   | Series              | Fundamental       | 22.118400          | ATS221B                    | ATS221B-E                  | 18 pF               | Fundamental       |
| 7.500000           | ATS075A                    | ATS075A-E                  | 20 pF               | Fundamental       | 24.000000          | ATS240                     | ATS240-E                   | Series              | Fundamental       |
| 7.500000           | ATS075B                    | ATS075B-E                  | 18 pF               | Fundamental       | 24.000000          | ATS24A                     | ATS24A-E                   | 20 pF               | Fundamental       |
| 8.000000           | ATS080                     | ATS080-E                   | Series              | Fundamental       | 24.000000          | ATS240B                    | ATS240B-E                  | 18 pF               | Fundamental       |
| 8.000000           | <b>ATS08A</b>              | ATS08A-E                   | 20 pF               | Fundamental       | 24.000000          | ATS240C                    | ATS240C-E                  | 12 pF               | Fundamental       |
| 8.000000           | <b>ATS080B</b>             | <b>ATS080B-E</b>           | 18 pF               | Fundamental       | 24.576000          | <b>ATS245</b>              | ATS245-E                   | Series              | Fundamental       |
| 8.000000           | ATS080C                    | ATS080C-E                  | 32 pF               | Fundamental       | 24.576000          | ATS24B                     | ATS24B-E                   | 20 pF               | Fundamental       |
| 8.192000           | ATS081B                    | ATS081B-E                  | 18 pF               | Fundamental       | 24.576000          | <b>ATS245A</b>             | <b>ATS245A-E</b>           | 18 pF               | Fundamental       |
| 9.830400           | ATS099                     | ATS099-E                   | Series              | Fundamental       | 25.000000          | <b>ATS250</b>              | ATS250-E                   | Series              | Fundamental       |
| 9.830400           | <b>ATS098</b>              | ATS098-E                   | 20 pF               | Fundamental       | 25.000000          | <b>ATS25A</b>              | ATS25A-E                   | 20 pF               | Fundamental       |
| 9.830400           | <b>ATS098B</b>             | <b>ATS098B-E</b>           | 18 pF               | Fundamental       | 25.000000          | <b>ATS250B</b>             | <b>ATS250B-E</b>           | 18 pF               | Fundamental       |
| 10.000000          | <b>ATS100</b>              | ATS100-E                   | Series              | Fundamental       | 27.000000          | ATS270A                    | ATS270A-E                  | 20 pF               | Fundamental       |
| 10.000000          | ATS10A                     | ATS10A-E                   | 20 pF               | Fundamental       | 27.000000          | ATS270B                    | ATS270B-E                  | 18 pF               | Fundamental       |
| 10.000000          | <b>ATS100B</b>             | <b>ATS100B-E</b>           | 18 pF               | Fundamental       | 32.000000          | ATS320                     | ATS320-E                   | Series              | 3rd Overtone      |
| 11.059200          | ATS111A                    | ATS111A-E                  | Series              | Fundamental       | 32.000000          | ATS32A                     | ATS32A-E                   | 20 pF               | 3rd Overtone      |
| 11.059200          | <b>ATS111</b>              | ATS111-E                   | 20 pF               | Fundamental       | 32.000000          | ATS320B                    | ATS320B-E                  | 18 pF               | 3rd Overtone      |
| 11.059200          | <b>ATS111B</b>             | <b>ATS111B-E</b>           | 18 pF               | Fundamental       | 40.000000          | ATS400                     | ATS400-E                   | Series              | 3rd Overtone      |
| 11.059200          | ATS111C                    | ATS111C-E                  | 32 pF               | Fundamental       | 40.000000          | ATS40A                     | ATS40A-E                   | 20 pF               | 3rd Overtone      |
| 12.000000          | <b>ATS120</b>              | ATS120-E                   | Series              | Fundamental       | 40.000000          | ATS400B                    | ATS400B-E                  | 18 pF               | 3rd Overtone      |
| 12.000000          | ATS12A                     | ATS12A-E                   | 20 pF               | Fundamental       | 48.000000          | ATS480A                    | ATS480A-E                  | 20 pF               | 3rd Overtone      |
| 12.000000          | <b>ATS120B</b>             | <b>ATS120B-E</b>           | 18 pF               | Fundamental       | 48.000000          | ATS480B                    | ATS480B-E                  | 18 pF               | 3rd Overtone      |
| 12.000000          | ATS120C                    | ATS120C-E                  | 32 pF               | Fundamental       | 60.000000          | ATS600A                    | ATS600A-E                  | 20 pF               | 3rd Overtone      |
| 12.288000          | ATS125                     | ATS125-E                   | Series              | Fundamental       | 60.000000          | ATS600B                    | ATS600B-E                  | 18 pF               | 3rd Overtone      |
| 12.288000          | <b>ATS122</b>              | ATS122-E                   | 20 pF               | Fundamental       | 64.000000          | ATS640A                    | ATS640A-E                  | 20 pF               | 3rd Overtone      |
| 12.288000          | <b>ATS122B</b>             | <b>ATS122B-E</b>           | 18 pF               | Fundamental       | 64.000000          | ATS640B                    | ATS640B-E                  | 18 pF               | 3rd Overtone      |
| 12.296000          | ATS124                     | ATS124-E                   | Series              | Fundamental       |                    |                            |                            |                     |                   |
| 12.296000          | ATS123                     | ATS123-E                   | 20 pF               | Fundamental       |                    |                            |                            |                     |                   |
| 12.296000          | ATS123B                    | ATS123B-E                  | 18 pF               | Fundamental       |                    |                            |                            |                     |                   |

**STANDARD PRODUCT PART NUMBERS - ATS-SM**

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

| FREQUENCY<br>(MHz) | PART<br>NUMBER<br>-20/70°C | PART<br>NUMBER<br>-40/85°C | LOAD<br>CAPACITANCE | OPERATING<br>MODE | FREQUENCY<br>(MHz) | PART<br>NUMBER<br>-20/70°C | PART<br>NUMBER<br>-40/85°C | LOAD<br>CAPACITANCE | OPERATING<br>MODE |
|--------------------|----------------------------|----------------------------|---------------------|-------------------|--------------------|----------------------------|----------------------------|---------------------|-------------------|
| 3.579545           | ATS036BSM-1                | ATS036BSM-1E               | Series              | Fundamental       | 14.318180          | <b>ATS143SM-1</b>          | ATS143SM-1E                | Series              | Fundamental       |
| 3.579545           | <b>ATS036SM-1</b>          | ATS036SM-1E                | 18 pF               | Fundamental       | 14.318180          | ATS14ASM-1                 | ATS14ASM-1E                | 20 pF               | Fundamental       |
| 3.686400           | ATS037ASM-1                | ATS037ASM-1E               | Series              | Fundamental       | 14.318180          | <b>ATS143BSM-1</b>         | ATS143BSM-1E               | 18 pF               | Fundamental       |
| 3.686400           | <b>ATS037SM-1</b>          | ATS037SM-1E                | 20 pF               | Fundamental       | 14.745600          | ATS147SM-1                 | ATS147SM-1E                | Series              | Fundamental       |
| 3.686400           | <b>ATS037BSM-1</b>         | ATS037BSM-1E               | 18 pF               | Fundamental       | 14.745600          | <b>ATS147ASM-1</b>         | ATS147ASM-1E               | 20 pF               | Fundamental       |
| 4.000000           | ATS04ASM-1                 | ATS04ASM-1E                | Series              | Fundamental       | 14.745600          | <b>ATS147BSM-1</b>         | ATS147BSM-1E               | 18 pF               | Fundamental       |
| 4.000000           | <b>ATS040SM-1</b>          | ATS040SM-1E                | 20 pF               | Fundamental       | 15.000000          | ATS150SM-1                 | ATS150SM-1E                | Series              | Fundamental       |
| 4.000000           | <b>ATS040BSM-1</b>         | ATS040BSM-1E               | 18 pF               | Fundamental       | 15.000000          | ATS150BSM-1                | ATS150BSM-1E               | 18 pF               | Fundamental       |
| 4.096000           | ATS042ASM-1                | ATS042ASM-1E               | 20 pF               | Fundamental       | 15.360000          | <b>ATS15ASM-1</b>          | ATS15ASM-1E                | 20 pF               | Fundamental       |
| 4.096000           | ATS042BSM-1                | ATS042BSM-1E               | 18 pF               | Fundamental       | 16.000000          | <b>ATS160SM-1</b>          | ATS160SM-1E                | Series              | Fundamental       |
| 4.194304           | ATS041BSM-1                | ATS041BSM-1E               | 18 pF               | Fundamental       | 16.000000          | ATS16ASM-1                 | ATS16ASM-1E                | 20 pF               | Fundamental       |
| 4.194304           | ATS041CSM-1                | ATS041CSM-1E               | 12 pF               | Fundamental       | 16.000000          | ATS16BSM-1                 | ATS16BSM-1E                | 18 pF               | Fundamental       |
| 4.915200           | ATS049ASM-1                | ATS049ASM-1E               | Series              | Fundamental       | 16.384000          | ATS164BSM-1                | ATS164BSM-1E               | 18 pF               | Fundamental       |
| 4.915200           | <b>ATS042SM-1</b>          | ATS042SM-1E                | 20 pF               | Fundamental       | 16.934400          | ATS169SM-1                 | ATS169SM-1E                | 20 pF               | Fundamental       |
| 4.915200           | <b>ATS049BSM-1</b>         | ATS049BSM-1E               | 18 pF               | Fundamental       | 18.432000          | ATS184SM-1                 | ATS184SM-1E                | Series              | Fundamental       |
| 5.000000           | ATS050CSM-1                | ATS050CSM-1E               | Series              | Fundamental       | 18.432000          | ATS18ASM-1                 | ATS18ASM-1E                | 20 pF               | Fundamental       |
| 5.000000           | ATS050ASM-1                | ATS050ASM-1E               | 20 pF               | Fundamental       | 18.432000          | ATS184BSM-1                | ATS184BSM-1E               | 18 pF               | Fundamental       |
| 5.000000           | <b>ATS050BSM-1</b>         | ATS050BSM-1E               | 18 pF               | Fundamental       | 19.660800          | ATS196SM-1                 | ATS196SM-1E                | Series              | Fundamental       |
| 5.068800           | ATS051SM-1                 | ATS051SM-1E                | Series              | Fundamental       | 19.660800          | ATS19ASM-1                 | ATS19ASM-1E                | 20 pF               | Fundamental       |
| 5.068800           | <b>ATS050SM-1</b>          | ATS050SM-1E                | 20 pF               | Fundamental       | 19.660800          | ATS196BSM-1                | ATS196BSM-1E               | 18 pF               | Fundamental       |
| 6.000000           | ATS060ASM-1                | ATS060ASM-1E               | Series              | Fundamental       | 20.000000          | <b>ATS200SM-1</b>          | ATS200SM-1E                | Series              | Fundamental       |
| 6.000000           | <b>ATS060SM-1</b>          | ATS060SM-1E                | 20 pF               | Fundamental       | 20.000000          | ATS20ASM-1                 | ATS20ASM-1E                | 20 pF               | Fundamental       |
| 6.000000           | <b>ATS060BSM-1</b>         | ATS060BSM-1E               | 18 pF               | Fundamental       | 20.000000          | <b>ATS200CSM-1</b>         | ATS200CSM-1E               | 18 pF               | Fundamental       |
| 6.000000           | ATS060CSM-1                | ATS060CSM-1E               | 32 pF               | Fundamental       | 20.000000          | ATS20BSM-1                 | ATS20BSM-1E                | 50 pF               | Fundamental       |
| 6.144000           | ATS061SM-1                 | ATS061SM-1E                | 20 pF               | Fundamental       | 20.480000          | <b>ATS204SM-1</b>          | ATS204SM-1E                | 20 pF               | Fundamental       |
| 6.144000           | <b>ATS061BSM-1</b>         | ATS061BSM-1E               | 18 pF               | Fundamental       | 22.118400          | ATS22ASM-1                 | ATS22ASM-1E                | 20 pF               | Fundamental       |
| 6.144000           | ATS061CSM-1                | ATS061CSM-1E               | 32 pF               | Fundamental       | 22.118400          | ATS221BSM-1                | ATS221BSM-1E               | 18 pF               | Fundamental       |
| 7.372800           | ATS073ASM-1                | ATS073ASM-1E               | Series              | Fundamental       | 22.579200          | ATS225BSM-1                | ATS225BSM-1E               | 18 pF               | Fundamental       |
| 7.372800           | ATS073SM-1                 | ATS073SM-1E                | 20 pF               | Fundamental       | 24.000000          | ATS240SM-1                 | ATS240SM-1E                | Series              | Fundamental       |
| 7.372800           | ATS073BSM-1                | ATS073BSM-1E               | 18 pF               | Fundamental       | 24.000000          | ATS24ASM-1                 | ATS24ASM-1E                | 20 pF               | Fundamental       |
| 8.000000           | ATS080SM-1                 | ATS080SM-1E                | Series              | Fundamental       | 24.000000          | ATS240BSM-1                | ATS240BSM-1E               | 18 pF               | Fundamental       |
| 8.000000           | <b>ATS08ASM-1</b>          | ATS08ASM-1E                | 20 pF               | Fundamental       | 24.000000          | ATS240CSM-1                | ATS240CSM-1E               | 12 pF               | Fundamental       |
| 8.000000           | <b>ATS080BSM-1</b>         | ATS080BSM-1E               | 18 pF               | Fundamental       | 24.576000          | <b>ATS245SM-1</b>          | ATS245SM-1E                | Series              | Fundamental       |
| 8.000000           | ATS080CSM-1                | ATS080CSM-1E               | 32 pF               | Fundamental       | 24.576000          | ATS24BSM-1                 | ATS24BSM-1E                | 20 pF               | Fundamental       |
| 8.192000           | ATS081BSM-1                | ATS081BSM-1E               | 18 pF               | Fundamental       | 24.576000          | <b>ATS245ASM-1</b>         | ATS245ASM-1E               | 18 pF               | Fundamental       |
| 9.830400           | ATS099SM-1                 | ATS099SM-1E                | Series              | Fundamental       | 25.000000          | ATS250SM-1                 | ATS250SM-1E                | Series              | Fundamental       |
| 9.830400           | <b>ATS098SM-1</b>          | ATS098SM-1E                | 20 pF               | Fundamental       | 25.000000          | ATS25ASM-1                 | ATS25ASM-1E                | 20 pF               | Fundamental       |
| 9.830400           | <b>ATS098BSM-1</b>         | ATS098BSM-1E               | 18 pF               | Fundamental       | 25.000000          | ATS250BSM-1                | ATS250BSM-1E               | 18 pF               | Fundamental       |
| 10.000000          | <b>ATS100SM-1</b>          | ATS100SM-1E                | Series              | Fundamental       | 26.000000          | ATS260ASM-1                | ATS260ASM-1E               | 20 pF               | Fundamental       |
| 10.000000          | <b>ATS10ASM-1</b>          | ATS10ASM-1E                | 20 pF               | Fundamental       | 26.000000          | ATS260BSM-1                | ATS260BSM-1E               | 18 pF               | Fundamental       |
| 10.000000          | <b>ATS100BSM-1</b>         | ATS100BSM-1E               | 18 pF               | Fundamental       | 27.000000          | ATS270ASM-1                | ATS270ASM-1E               | 20 pF               | Fundamental       |
| 11.059200          | ATS111ASM-1                | ATS111ASM-1E               | Series              | Fundamental       | 27.000000          | ATS270BSM-1                | ATS270BSM-1E               | 18 pF               | Fundamental       |
| 11.059200          | <b>ATS111SM-1</b>          | ATS111SM-1E                | 20 pF               | Fundamental       | 28.636360          | ATS286ASM-1                | ATS286ASM-1E               | 20 pF               | Fundamental       |
| 11.059200          | <b>ATS111BSM-1</b>         | ATS111BSM-1E               | 18 pF               | Fundamental       | 30.000000          | ATS300ASM-1                | ATS300ASM-1E               | 20 pF               | Fundamental       |
| 11.059200          | ATS111CSM-1                | ATS111CSM-1E               | 32 pF               | Fundamental       | 30.000000          | ATS300BSM-1                | ATS300BSM-1E               | 18 pF               | Fundamental       |
| 12.000000          | <b>ATS120SM-1</b>          | ATS120SM-1E                | Series              | Fundamental       | 32.000000          | ATS320SM-1                 | ATS320SM-1E                | Series              | 3rd Overtone      |
| 12.000000          | ATS12ASM-1                 | ATS12ASM-1E                | 20 pF               | Fundamental       | 32.000000          | ATS32ASM-1                 | ATS32ASM-1E                | 20 pF               | 3rd Overtone      |
| 12.000000          | <b>ATS120BSM-1</b>         | ATS120BSM-1E               | 18 pF               | Fundamental       | 32.000000          | ATS320BSM-1                | ATS320BSM-1E               | 18 pF               | 3rd Overtone      |
| 12.000000          | ATS120CSM-1                | ATS120CSM-1E               | 32 pF               | Fundamental       | 33.000000          | ATS330ASM-1                | ATS330ASM-1E               | 20 pF               | 3rd Overtone      |
| 12.288000          | ATS125SM-1                 | ATS125SM-1E                | Series              | Fundamental       | 33.000000          | ATS330BSM-1                | ATS330BSM-1E               | 18 pF               | 3rd Overtone      |
| 12.288000          | <b>ATS122SM-1</b>          | ATS122SM-1E                | 20 pF               | Fundamental       | 36.000000          | ATS360ASM-1                | ATS360ASM-1E               | 20 pF               | 3rd Overtone      |
| 12.288000          | <b>ATS122BSM-1</b>         | ATS122BSM-1E               | 18 pF               | Fundamental       | 36.000000          | ATS360BSM-1                | ATS360BSM-1E               | 18 pF               | 3rd Overtone      |
| 12.296000          | ATS123SM-1                 | ATS123SM-1E                | Series              | Fundamental       | 40.000000          | ATS400SM-1                 | ATS400SM-1E                | Series              | 3rd Overtone      |
| 12.296000          | ATS124SM-1                 | ATS124SM-1E                | 20 pF               | Fundamental       | 40.000000          | ATS40ASM-1                 | ATS40ASM-1E                | 20 pF               | 3rd Overtone      |
| 12.352000          | ATS127SM-1                 | ATS127SM-1E                | Series              | Fundamental       | 40.000000          | ATS400BSM-1                | ATS400BSM-1E               | 18 pF               | 3rd Overtone      |
| 12.352000          | ATS126SM-1                 | ATS126SM-1E                | 20 pF               | Fundamental       | 48.000000          | ATS480ASM-1                | ATS480ASM-1E               | 20 pF               | 3rd Overtone      |
| 12.500000          | ATS125BSM-1                | ATS125BSM-1E               | 18 pF               | Fundamental       | 48.000000          | ATS480BSM-1                | ATS480BSM-1E               | 18 pF               | 3rd Overtone      |
| 13.000000          | ATS130SM-1                 | ATS130SM-1E                | 20 pF               | Fundamental       | 60.000000          | ATS600ASM-1                | ATS600ASM-1E               | 20 pF               | 3rd Overtone      |
| 13.500000          | ATS135SM-1                 | ATS135SM-1E                | 20 pF               | Fundamental       | 60.000000          | ATS600BSM-1                | ATS600BSM-1E               | 18 pF               | 3rd Overtone      |
| 13.500000          | ATS135BSM-1                | ATS135BSM-1E               | 18 pF               | Fundamental       | 64.000000          | ATS640ASM-1                | ATS640ASM-1E               | 20 pF               | 3rd Overtone      |
| 14.000000          | ATS140BSM-1                | ATS140BSM-1E               | 18 pF               | Fundamental       | 64.000000          | ATS640BSM-1                | ATS640BSM-1E               | 18 pF               | 3rd Overtone      |

## ELECTRICAL CHARACTERISTICS

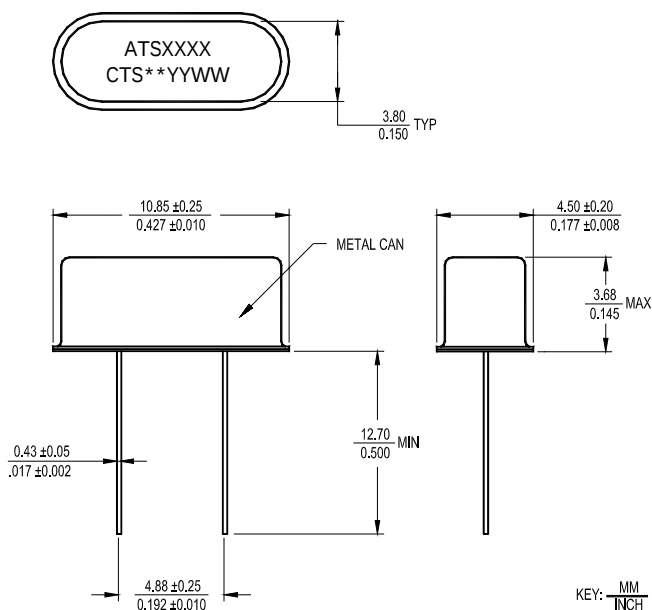
| ELECTRICAL PARAMETERS | PARAMETER                                                                                  | VALUE                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
|                       | Frequency Range                                                                            | 3.2 MHz to 64.0 MHz                                                    |
|                       | Operating Mode                                                                             | Fundamental or 3rd Overtone                                            |
|                       | Crystal Cut                                                                                | AT-Cut                                                                 |
|                       | Frequency Tolerance @ +25°C                                                                | ± 30 ppm Standard *                                                    |
|                       | Frequency Stability Tolerance<br>(Operating Temperature Range, Referenced to 25°C Reading) | ± 50 ppm Standard *                                                    |
|                       | Operating Temperature Range                                                                | -20°C to +70°C *<br>-40°C to +85°C Available, See Ordering Information |
|                       | Equivalent Series Resistance                                                               | See ESR Table                                                          |
|                       | Load Capacitance or Resonance Mode                                                         | See Standard Part Numbers tables *                                     |
|                       | Shunt Capacitance (C <sub>0</sub> )                                                        | 7.0 pF Maximum                                                         |
|                       | Drive Level                                                                                | 100 µW Typical, 1,000 µW Maximum                                       |
|                       | Aging @ +25°C                                                                              | ±3 ppm/yr Typical, ±5 ppm/yr Maximum                                   |
|                       | Insulation Resistance                                                                      | 500 Ohms @ DC 100V                                                     |
|                       | Storage Temperature Range                                                                  | -40°C to +85°C                                                         |
|                       | Reflow Condition, per JEDEC J-STD-020                                                      | +260°C Maximum, 10 Seconds Maximum                                     |

\* Custom requirements may be available upon request.

## EQUIVALENT SERIES RESISTANCE TABLE

| FREQUENCY RANGE         | OSCILLATION MODE | ESR MAXIMUM |
|-------------------------|------------------|-------------|
| 3.20 MHz - < 4.00 MHz   | Fundamental      | 150 Ohms    |
| 4.00 MHz - < 5.00 MHz   | Fundamental      | 120 Ohms    |
| 5.00 MHz - < 8.00 MHz   | Fundamental      | 80 Ohms     |
| 8.00 MHz - < 12.00 MHz  | Fundamental      | 60 Ohms     |
| 12.00 MHz - < 20.00 MHz | Fundamental      | 40 Ohms     |
| 20.00 MHz - < 30.00 MHz | Fundamental      | 30 Ohms     |
| 27.00 MHz - 64.00 MHz   | 3rd Overtone     | 80 Ohms     |

### ATS PACKAGE DRAWING



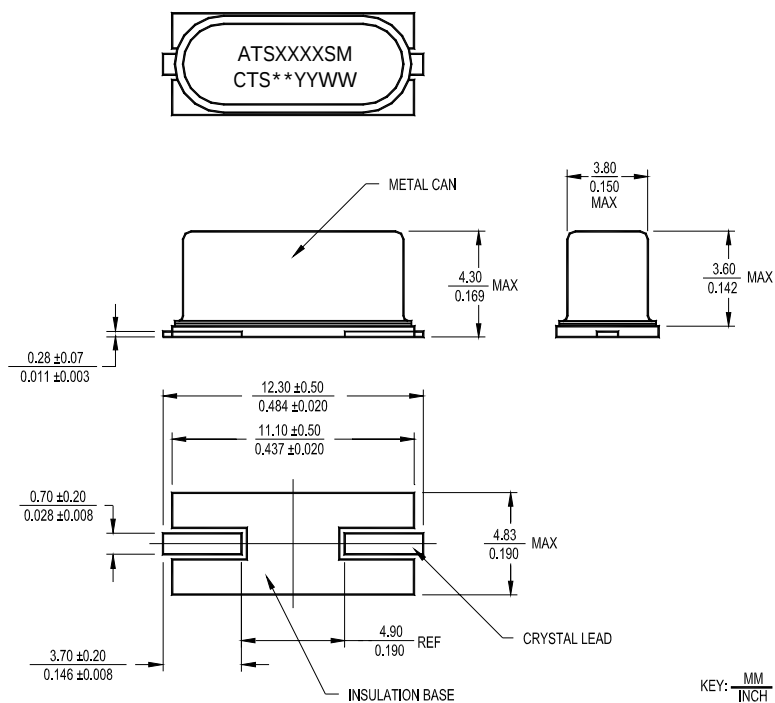
### MARKING INFORMATION

1. ATXXXXX - CTS Part Number.
  - a) The package code "1" is not required in the marking.
  - b) The -E is required in the marking for extended temperature range parts.
 [See Standard Product Part Numbers tables.]
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.
2. MSL = 1.

### ATS-SM PACKAGE DRAWING



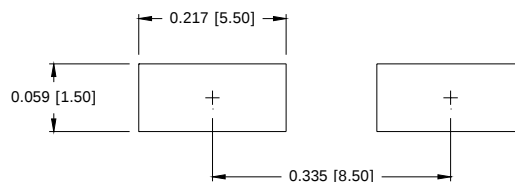
### MARKING INFORMATION

1. ATXXXXXSM - CTS Part Number.
  - a) The package code "1" is not required in the marking.
  - b) The -E is required in the marking for extended temperature range parts.
 [See Standard Product Part Numbers tables.]
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.
2. MSL = 1.

### SUGGESTED SOLDER PAD GEOMETRY



### ATS Radial Taping (Ammopak)

Technical drawing of a 3D printed part, showing top, side, and detail views with dimensions in millimeters.

**Top View Dimensions:**

- Overall width: 22.50 Max
- Distance from top edge to the first hole center: 18.00
- Distance between hole centers: 12.70
- Distance from the last hole center to the right edge: 3.81
- Hole diameter:  $\varnothing 4.00$
- Feature: Four circular holes, each marked with a "+" symbol.

**Side View Dimensions:**

- Overall height: 18.00

**Detail View Dimensions:**

- Feature: A vertical detail of a hole, showing a diameter of 0.90 Max at the bottom.

## DIMENSIONS IN MILLIMETERS

