

### 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]**

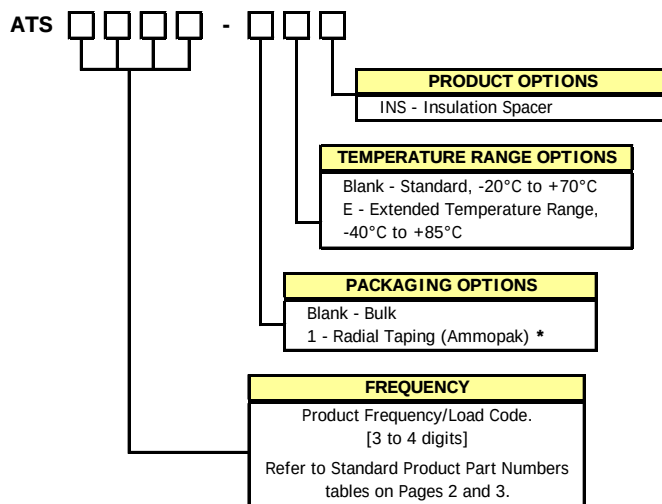


### APPLICATIONS

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.

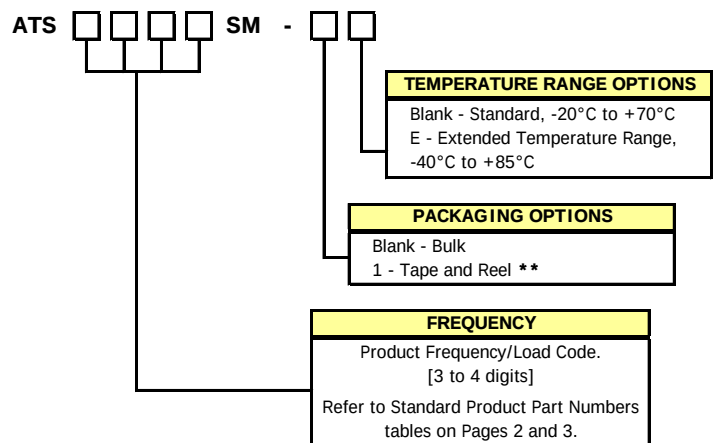
### ORDERING INFORMATION

#### 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 (MHz) | PART NUMBER<br>-20/70°C | PART NUMBER<br>-40/85°C | LOAD CAPACITANCE | OPERATING MODE | FREQUENCY (MHz) | PART NUMBER<br>-20/70°C | PART NUMBER<br>-40/85°C | LOAD CAPACITANCE | OPERATING 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**

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| FREQUENCY (MHz) | PART NUMBER<br>-20/70°C | PART NUMBER<br>-40/85°C | LOAD CAPACITANCE | OPERATING MODE | FREQUENCY (MHz) | PART NUMBER<br>-20/70°C | PART NUMBER<br>-40/85°C | LOAD CAPACITANCE | OPERATING 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

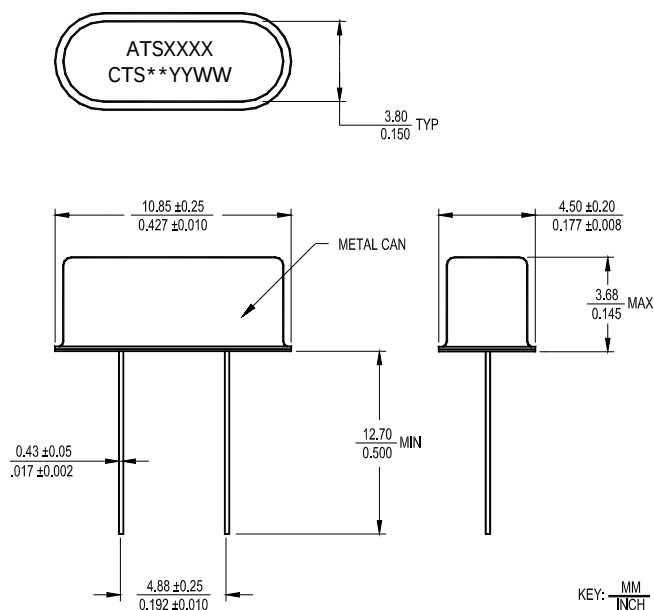
| ELECTRICAL PARAMETERS | PARAMETER                                                                                  | VALUE                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
|                       | 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



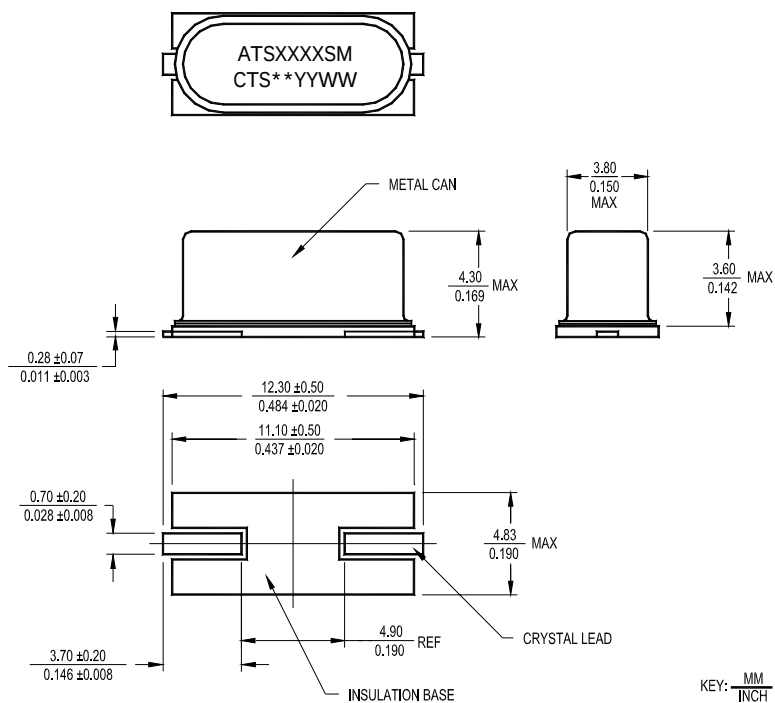
### MARKING INFORMATION

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



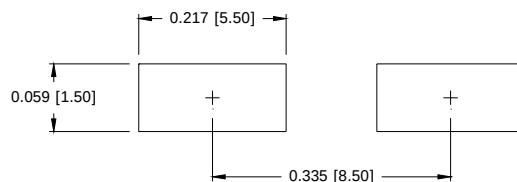
### MARKING INFORMATION

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. The drawing includes a top view and a side view. The top view shows a rectangular part with a width of 22.50 Max and a height of 18.00. There are four vertical slots, each with a diameter of  $\varnothing 4.00$ . The distance between the centers of the slots is 12.70. The distance from the right edge to the center of the rightmost slot is 3.81. The side view shows a height of 18.00 and a width of 0.90 Max.

## DIMENSIONS IN MILLIMETERS

