

### 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]**

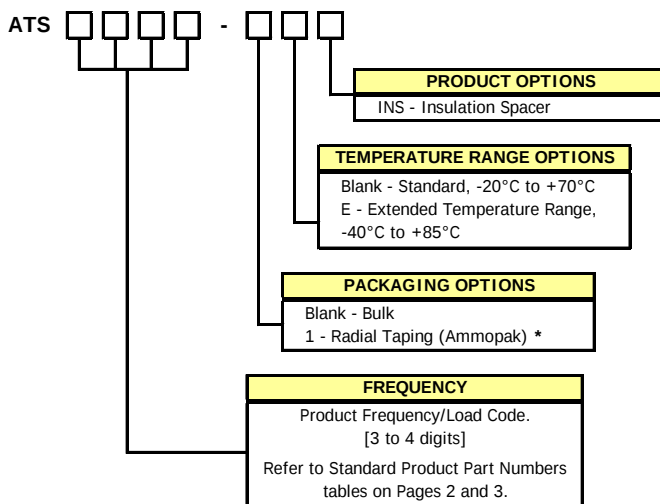


### APPLICATIONS

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 (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

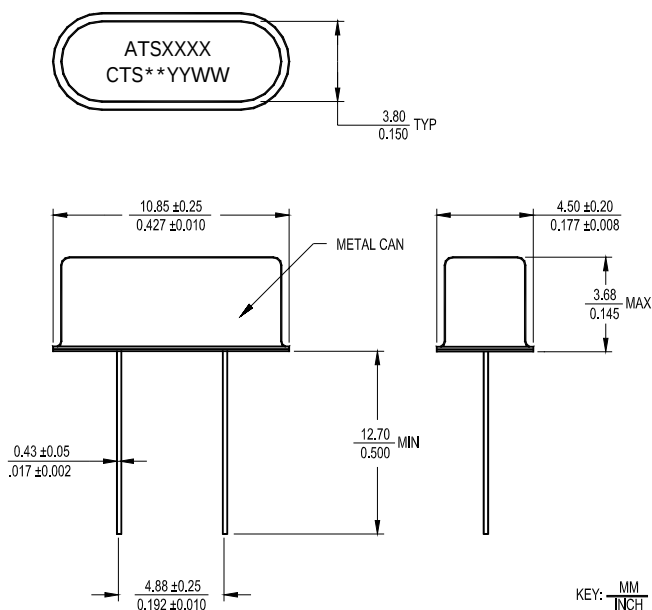
| ELECTRICAL PARAMETERS | PARAMETER                                                                                  | VALUE                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
|                       | 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 wavy bottom edge. Dimensions include a total height of 22.50 Max, a distance of 18.00 from the top edge to the center of the first hole, and a distance of 18.00 from the center of the first hole to the bottom edge. The part has four holes, each with a diameter of  $\varnothing 4.00$ . The distance between the centers of the first and second holes is 12.70, and the distance between the centers of the third and fourth holes is 3.81. The side view shows a vertical profile with a maximum width of 0.90 Max.

## DIMENSIONS IN MILLIMETERS

