

ATS/ATS-SM SERIES



QUARTZ CRYSTAL

FEATURES

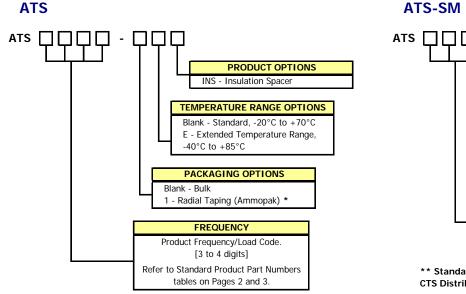
- Standard HC-49/US (thru hole) and HC-49/US-SM (surface mount) Packages
- Stable Frequency Over Temperature and Drive Level
- Fundamental and 3rd Overtone Crystals
- Frequency Range 3.2 64 MHz
- Frequency Tolerance, ±30 ppm Standard
- Frequency Stability, ±50 ppm Standard
- Operating Temperature, -20°C to +70°C Standard, -40°C to +85°C Available
- Tape & Reel Packaging Available
- RoHS/Green Compliant (6/6)

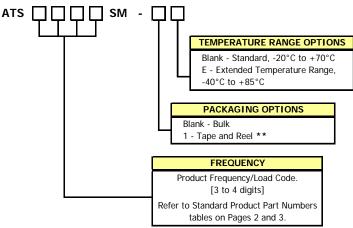


APPLICATIONS

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





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

Non-Standard Ordering Options

- Custom requirements may be available upon request. Use form C052 to detail non-standard parameters. (http://www.ctscorp.com/components/CTS_Crystal_Specifying_Form.xls)
- Contact your local CTS Representative or CTS Customer Service for assistance.

^{*} Standard packaging is bulk in a bag.



ATS/ATS-SM SERIES LOW COST QUARTZ CRYSTAL

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.

Contact your CTS Distributor or local CTS Representative for availability.

NUMBER OM/95 OM/		Contact your CTS Distributor or local CTS Representative for availability.								
3.97945 ATS0308 ATS0308 E Series Fundamental 12,35000 ATS127 ATS127-E 20 pf Fundamental 12,35000 ATS137-E 20 pf Fundamental 14,31180 ATS143-E 20 pf Fundamental 15,30000 ATS140-E 20 pf Fundamental 16,00000 ATS140-E 20 pf Fundamental	FREQUENCY	PART	PART	LOAD	OPERATING	FREQUENCY	PART	PART	LOAD	OPERATING
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ATS/ATS-SM SERIES LOW COST QUARTZ CRYSTAL

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.

Part	numbers in BOLD	are common stoc	k items through CT	S authorized dist	tributors. Non-k	oold part numbers	may be stocked or	r are available for o	order.
FREQUENCY	PART	PART	LOAD	OPERATING	FREQUENCY	PART	PART	LOAD	OPERATING
(MHz)	NUMBER	NUMBER	CAPACITANCE	MODE	(MHz)	NUMBER	NUMBER	CAPACITANCE	MODE
	-20/70°C	-40/85°C	CAFACITANCE	WODE		-20/70°C	-40/85°C	CAPACITANCE	WODL
3.579545	ATS036BSM-1	ATS036BSM-1E	Series	Fundamental	14.318180	ATS143SM-1	ATS143SM-1E	Series	Fundamental
3.579545	ATS036SM-1	ATS036SM-1E	18 pF	Fundamental	14.318180	ATS14ASM-1	ATS14ASM-1E	20 pF	Fundamental
3.686400	ATS037ASM-1	ATS037ASM-1E	Series	Fundamental	14.318180	ATS143BSM-1	ATS143BSM-1E	18 pF	Fundamental
3.686400	ATS037SM-1	ATS037SM-1E	20 pF	Fundamental	14.745600	ATS147SM-1	ATS147SM-1E	Series	Fundamental
3.686400	ATS037BSM-1	ATS037BSM-1E	18 pF	Fundamental	14.745600	ATS147ASM-1	ATS147ASM-1E	20 pF	Fundamental
4.000000	ATS04ASM-1	ATS04ASM-1E	Series	Fundamental	14.745600	ATS147BSM-1	ATS147BSM-1E	18 pF	Fundamental
4.000000	ATS040SM-1	ATS040SM-1E	20 pF	Fundamental	15.000000	ATS150SM-1	ATS150SM-1E	Series	Fundamental
4.000000		ATS040BSM-1E	18 pF	Fundamental		ATS150BSM-1	ATS150BSM-1E	18 pF	Fundamental
4.096000	ATS042ASM-1	ATS042ASM-1E	20 pF	Fundamental	15.360000	ATS15ASM-1	ATS15ASM-1E	20 pF	Fundamental
4.096000	ATS042BSM-1	ATSO42BSM-1E	18 pF	Fundamental	16.000000	ATS160SM-1	ATS160SM-1E	Series	Fundamental
4.194304	ATSO40ASM-1	ATSO40ASM-1E	12 pF	Fundamental	16.000000	ATS16ASM-1	ATS16ASM-1E	20 pF	Fundamental
4.915200 4.915200	ATS049ASM-1 ATS042SM-1	ATS049ASM-1E ATS042SM-1E	Series 20 pF	Fundamental Fundamental	16.000000 16.384000	ATS16BSM-1 ATS164BSM-1	ATS16BSM-1E ATS164BSM-1E	18 pF 18 pF	Fundamental Fundamental
4.915200		ATS049BSM-1E	18 pF	Fundamental	16.934400	ATS169SM-1	ATS169SM-1E	20 pF	Fundamental
5.000000	ATS050CSM-1	ATS050CSM-1E	Series	Fundamental	18.432000	ATS184SM-1	ATS184SM-1E	Series	Fundamental
5.000000	ATS050ASM-1	ATS050CSM-1E	20 pF	Fundamental	18.432000	ATS184SM-1	ATS184SM-1E	20 pF	Fundamental
5.000000	ATS050BSM-1	ATS050ASW-1E	18 pF	Fundamental	18.432000	ATS184BSM-1	ATS184BSM-1E	18 pF	Fundamental
5.068800		ATS050BSW-TE	Series	Fundamental	19.660800	ATS194B3M-1	ATS196SM-1E	Series	Fundamental
5.068800	ATS050SM-1	ATS050SM-1E	20 pF	Fundamental	19.660800	ATS19ASM-1	ATS19ASM-1E	20 pF	Fundamental
6.000000	ATS060ASM-1	ATS060ASM-1E	Series	Fundamental	19.660800	ATS196BSM-1	ATS196BSM-1E	18 pF	Fundamental
6.000000	ATS060SM-1	ATS060SM-1E	20 pF	Fundamental	20.000000	ATS200SM-1	ATS200SM-1E	Series	Fundamental
6.000000		ATS060BSM-1E	18 pF	Fundamental	20.000000	ATS20ASM-1	ATS20ASM-1E	20 pF	Fundamental
6.000000	ATS060CSM-1	ATS060CSM-1E	32 pF	Fundamental	20.000000	ATS200CSM-1	ATS200CSM-1E	18 pF	Fundamental
6.144000	ATS061SM-1	ATS061SM-1E	20 pF	Fundamental	20.000000	ATS20BSM-1	ATS20BSM-1E	50 pF	Fundamental
6.144000	ATS061BSM-1	ATS061BSM1E	18 pF	Fundamental	20.480000	ATS204SM-1	ATS204SM-1E	20 pF	Fundamental
6.144000	ATS061CSM-1	ATS061CSM-1E	32 pF	Fundamental	22.118400	ATS22ASM-1	ATS22ASM-1E	20 pF	Fundamental
7.372800	ATS073ASM-1	ATS073ASM-1E	Series	Fundamental	22.118400	ATS221BSM-1	ATS221BSM-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	ATS08ASM-1	ATS08ASM-1E	20 pF	Fundamental	24.000000	ATS240CSM-1	ATS240CSM-1E	12 pF	Fundamental
8.000000	ATS080BSM-1	ATS080BSM-1E	18 pF	Fundamental	24.576000	ATS245SM-1	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	ATS245ASM-1	ATS245ASM-1E	18 pF	Fundamental
9.830400	ATS099SM-1	ATS099SM-1E	Series	Fundamental	25.000000	ATS250SM-1	ATS250SM-1E	Series	Fundamental
9.830400	ATS098SM-1	ATS098SM-1E	20 pF	Fundamental		ATS25ASM-1	ATS25ASM-1E	20 pF	Fundamental
9.830400	ATS098BSM-1	ATS098BSM-1E	18 pF	Fundamental	25.000000	ATS250BSM-1	ATS250BSM-1E	18 pF	Fundamental
10.000000	ATS100SM-1	ATS100SM-1E	Series	Fundamental	26.000000	ATS260ASM-1	ATS260ASM-1E	20 pF	Fundamental
		ATS10ASM-1E	20 pF	Fundamental		ATS260BSM-1	ATS260BSM-1E	18 pF	Fundamental
		ATS100BSM-1E ATS111ASM-1E	18 pF Series	Fundamental Fundamental		ATS270ASM-1 ATS270BSM-1	ATS270ASM-1E ATS270BSM-1E	20 pF 18 pF	Fundamental Fundamental
		ATS111ASW-1E ATS111SM-1E	20 pF	Fundamental		ATS300ASM-1	ATS300ASM-1E	20 pF	Fundamental
11.059200		ATS1113W-1E ATS111BSM-1E	20 pr 18 pF	Fundamental	30.000000	ATS300ASW-1	ATS300ASW-1E	18 pF	Fundamental
11.059200	ATS111BSM-1	ATS111B3W-1E	32 pF	Fundamental	32.000000	ATS320SM-1	ATS320SM-1E	Series	3rd Overtone
		ATS111C3W-1E	Series	Fundamental		ATS32ASM-1	ATS3203W-1E ATS32ASM-1E	20 pF	3rd Overtone
		ATS120SM-1E ATS12ASM-1E	20 pF	Fundamental	32.000000	ATS32ASW-1	ATS32ASW-1E	18 pF	3rd Overtone
12.000000	ATS120BSM-1	ATS12ASM-1E	18 pF	Fundamental	33.000000	ATS320BSM-1	ATS320DSM-1E	20 pF	3rd Overtone
		ATS120CSM-1E	32 pF	Fundamental	33.000000	ATS330BSM-1	ATS330BSM-1E	18 pF	3rd Overtone
		ATS125SM-1E	Series	Fundamental		ATS360ASM-1	ATS360ASM-1E	20 pF	3rd Overtone
12.288000	ATS122SM-1	ATS122SM-1E	20 pF	Fundamental		ATS360BSM-1	ATS360BSM-1E	18 pF	3rd Overtone
12.288000		ATS122BSM-1E	18 pF	Fundamental		ATS400SM-1	ATS400SM-1E	Series	3rd Overtone
		ATS123SM-1E	Series	Fundamental	40.000000	ATS40ASM-1	ATS40ASM-1E	20 pF	3rd Overtone
12.296000		ATS124SM-1E	20 pF	Fundamental	40.000000	ATS400BSM-1	ATS400BSM-1E	18 pF	3rd Overtone
12.352000	ATS127SM-1	ATS127SM-1E	Series	Fundamental	48.000000	ATS480ASM-1	ATS480ASM-1E	20 pF	3rd Overtone
	ATS126SM-1	ATS126SM-1E	20 pF	Fundamental	48.000000	ATS480BSM-1	ATS480BSM-1E	18 pF	3rd Overtone
12.500000	ATS125BSM-1	ATS125BSM-1E	18 pF	Fundamental	60.000000	ATS600ASM-1	ATS600ASM-1E	20 pF	3rd Overtone
13.000000	ATS130SM-1	ATS130SM-1E	20 pF	Fundamental	60.000000	ATS600BSM-1	ATS600BSM-1E	18 pF	3rd Overtone
		ATS135SM-1E	20 pF	Fundamental		ATS640ASM-1	ATS640ASM-1E	20 pF	3rd Overtone
13.500000	ATS135BSM-1	ATS135BSM-1E	18 pF	Fundamental	64.000000	ATS640BSM-1	ATS640BSM-1E	18 pF	3rd Overtone

14.000000 ATS140BSM-1 ATS140BSM-1E

Fundamental

18 pF



ELECTRICAL CHARACTERISTICS

	PARAMETER	VALUE		
	Frequency Range	3.2 MHz to 64.0 MHz		
	Operating Mode	Fundamental or 3rd Overtone		
RS	Crystal Cut	AT-Cut		
凹	Frequency Tolerance @ +25°C	± 30 ppm Standard *		
PARAME	Frequency Stability Tolerance (Operating Temperature Range, Referenced to 25°C Reading)	± 50 ppm Standard *		
	Operating Temperature Range	-20°C to +70°C * -40°C to +85°C Available, See Ordering Information		
AL	Equivalent Series Resistance	See ESR Table		
C	Load Capacitance or Resonance Mode	See Standard Part Numbers tables *		
TR	Shunt Capacitance (C ₀)	7.0 pF Maximum		
EC	Drive Level	100 μW Typical, 1,000 μW Maximum		
딥	Aging @ +25°C	±3 ppm/yr Typical, ±5 ppm/yr Maximum		
	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. Use form C052 to detail non-standard parameters.

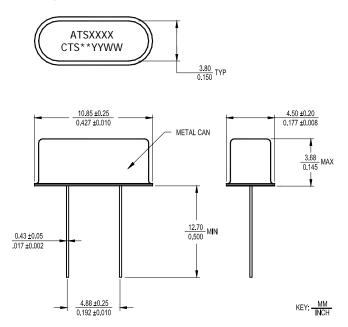
EQUIVALENT SERIES RESISTANCE TABLE

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/ATS-SM SERIES LOW COST QUARTZ CRYSTAL

MECHANICAL SPECIFICATIONS

ATS PACKAGE DRAWING



MARKING INFORMATION

- 1. ATSXXXX 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.

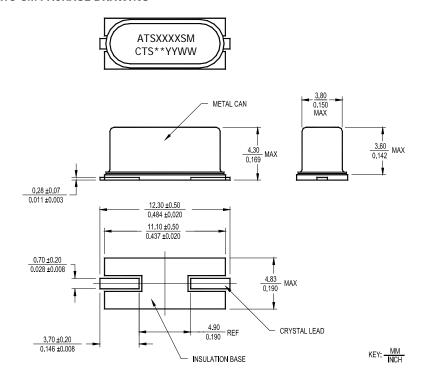
[See Standard Product Part Numbers tables.]

- 2. ** Manufacturing Site Code.
- 3. YYWW Date Code, YY year, WW week.
- Complete CTS part number, frequency value and date code information must appear on bag and box labels.

NOTES

1. Lead finish (e1), SnAgCu.

ATS-SM PACKAGE DRAWING



MARKING INFORMATION

- 1. ATSXXXXXSM 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.

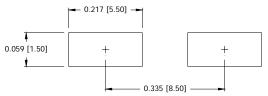
[See Standard Product Part Numbers tables.]

- 2. ** Manufacturing Site Code.
- 3. YYWW Date Code, YY year, WW week.
- Complete CTS part number, frequency value and date code information must appear on bag and box labels.

NOTES

1. Lead finish (e1), SnAgCu.

SUGGESTED SOLDER PAD GEOMETRY

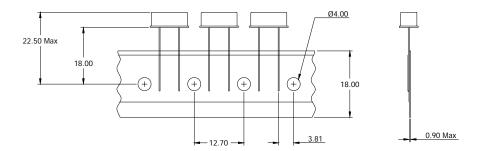




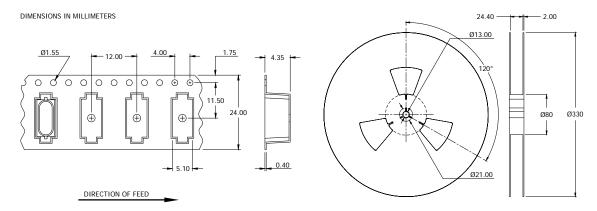
PACKAGING INFORMATION

ATS Radial Taping (Ammopak)

DIMENSIONS IN MILLIMETERS



ATS-SM Tape and Reel



ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle: 400 cycles from -55°C to +125°C, 10 minute dwell at each temperature, 1 minute transfer time

between temperatures.

Mechanical Shock: 1,500g's, 0.5mS duration, ½ sinewave, 3 shocks each direction along 3 mutually perpendicular

planes (18 total shocks).

Sinusoidal Vibration: 0.06 inches double amplitude, 10 to 55 Hz and 20g's, 55 to 2,000 Hz, 3 cycles each in 3 mutually

perpendicular planes (9 times total).

Gross Leak: No leak shall appear while immersed in an FC40 or equivalent liquid at +125°C for 20 seconds.

Fine Leak: Mass spectrometer leak rates less than 2x10⁻⁸ ATM cc/sec air equivalent.

Resistance to Solder Heat: Product must survive 3 reflows of +250°C maximum, 10 seconds maximum.

High Temperature Operating Bias: 2,000 hours at +125°C, disregarding frequency shift.

Frequency Aging: 1,000 hours at +85°C, maximum ±5 ppm shift.

Insulation Resistance: 500M Ohms @ $100V_{DC} \pm 15V_{DC}$. Moisture Sensitivity Level: Level 1 per JEDEC J-STD-020.