

LOW PROFILE CRYSTALS

MS49 • SMS49



Monitor Products' MS49 and SMS49 crystals greatly reduce the space required by conventional MM49 mounted crystals. Their low height allows them to be vertically mounted between circuit boards and affords superior protection against shock and vibration. Our resistance-welded packages offer excellent aging characteristics and may be used with all types of wave soldering and vapor cleaning equipment.

SPECIFICATIONS

Frequency Range	3.5 ~ 60.0 MHz
Frequency Stability	± 30ppm @ 25°C
Stability vs Temperature	± 50ppm from -20°C to 70°C *
Operating Temperature Range	-20°C to 70°C standard *
Storage Temperature Range	-55°C to 125°C
Drive Level	1.0 mW max
Shunt Capacitance	7.0 pF
Equivalent Series Resistance	3.5 ~ 3.9 = 200
Resistance	4.0 ~ 4.9 = 150
Freq Range (MHz): Ω Max	5.0 ~ 7.2 = 120
(All fundamental unless otherwise indicated)	7.3 ~ 9.9 = 80
	10.0 ~ 13.9 = 60
	14.0 ~ 23.9 = 50
	24.0 ~ 40.0 = 40
	28.1 ~ 60.0 = 80 (3rd Overtone)

* See Part Numbering Key for other options

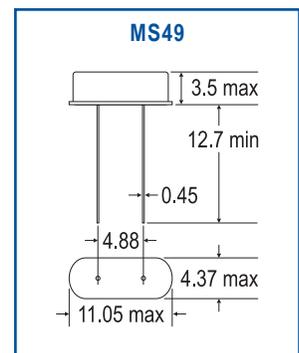
APPLICATIONS

- ATM
- Networking
- Computers
- CD ROMs
- DVDs
- Cameras
- Wireless RF
- Disk & tape drives
- Microprocessor controllers

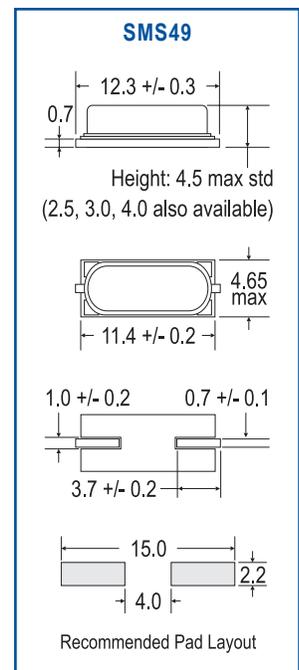
FEATURES

- Low profile
- Fundamental to 45 MHz
- Resistance welded
- Optional surface mount (SMS49 only)
- MM49 (HC49U) compatible
- Tape & reel available (1000 pcs/reel)

Monitor Products has a proven track record as a pioneer manufacturer in the frequency control market. If our extensive selection of standard and engineered crystals and oscillators does not meet your spec, we will work with you towards a customized solution.



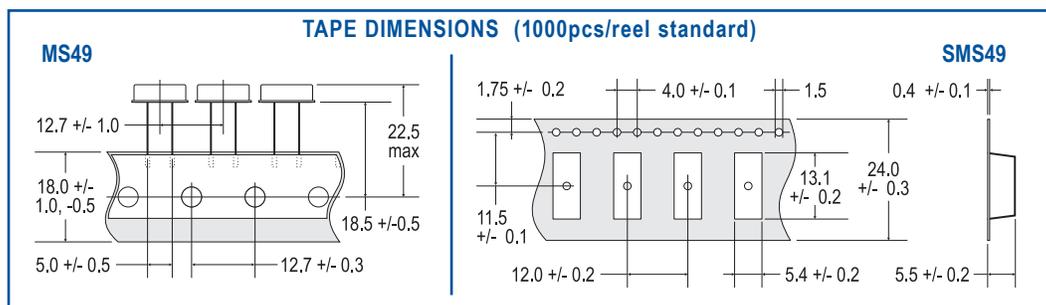
Units=mm



MS49 • SMS49

ENVIRONMENTAL PERFORMANCE SPECIFICATIONS

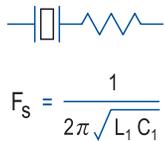
Operating Temp Range	-20°C to 70°C Standard
Storage Temp Range	-55°C to 125°C
Vibration	MIL-STD-202F Method 204, 35G, 50 to 2000 Hz
Shock	MIL-STD-202F Method 213B Test Cond E, 1000G, 1/2 Sine Wave
Humidity	85% RH, 85°C, 48 Hours
Hermetic Seal	Leak Rate 2 x 10 ⁻⁸ ATM-cm ³ /sec max
Solderability	MIL-STD-202F Method 208E
Packaging	MS49 = Tape (22.5mm) & Reel (1000pcs/reel) or Bulk (<1000pcs) SMS49 = Tape (24.0mm) & Reel (1000pcs/reel) or Bulk (<1000pcs)



CRYSTAL CORRELATION THEORY

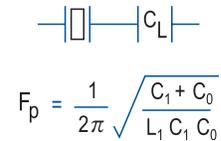
Series Resonance:

At series resonance, the crystal looks resistive in the circuit, and correlation of frequency is not a problem. It must be specified if unit is to be manufactured at series or at a particular load capacitance.



Anti-Resonance Parallel:

Crystals operating at anti-resonance will look inductive in the circuit. Changes of reactive values in the circuit will change the crystal frequency. If the crystal is to be used at anti-resonance, the load capacitance should always be specified. The load capacitance C_L is the dynamic capacitance of the total circuit as measured across the crystal terminals.



PART NUMBERING KEY

Sample Part Part Numbers

MS49N1C3H35A @ 14.318MHz

SMS49S1C3H45E @ 12.0MHz

SERIES	CORRELATION	MODE	FREQUENCY STABILITY	TEMP RANGE	HEIGHT	PACKAGING	FREQUENCY
MS49 (Thru-Hole)	L = 12 pF M = 15 pF N = 20 pF* O = 32 pF Q = 24 pF S = Series Resonant X = Cust spec	1 = Fundamental 3 = 3rd Overtone	A = 1000 ppm B = 100 ppm C = 50 ppm* D = 30 ppm E = 25 ppm X = Cust spec	0 = @ 25°C 1 = -10°C~60°C 2 = 0°C~70°C 3 = -20°C~70°C* 4 = -40°C~70° 5 = -40°C~85° 7 = -10°C~70° 9 = Cust spec	MS49 H35 = 3.5 mm* SMS49 H25 = 2.5 mm H30 = 3.0 mm H32 = 3.2 mm H40 = 4.0 mm H45 = 4.5 mm*	A = 2 lead E = Tape & Reel (1000pcs/reel) K = Insulating Spacer (MS49 only) X = Cust spec	
MS49	N	1	C	3	H35	A	14.318
SMS49	S	1	C	3	H45	E	24.0

* Standard

Call factory for additional options. Use full descriptive part number when ordering. Parts will be marked with series and frequency only.