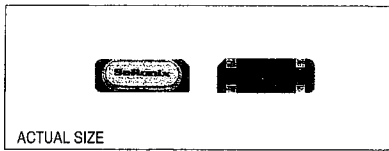


Miniature Quartz Crystal

HC-49, Low Profile, SMD

Technical Data

49SMLB / SAB / SUB / SNC



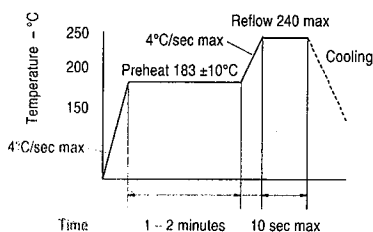
Description

The crystals are miniature AT or BT cut strip resonators housed in low profile packages for surface mounting. The parts present a proven metal package technology with a precision molded base and universal contact configuration.

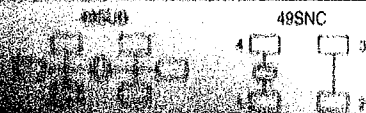
Applications & Features

- Low profile SMD
- AT or BT cut performance
- Resistance weld seal
- 49SNC is interchangeable with popular molded crystal configurations
- Available on tape & reel; 24mm tape, 1000pcs per reel

Solder Reflow Guide



Lead Configurations



Frequency Range: 3.2 MHz to 80 MHz
 3.2 to 29.999 MHz, AT Fundamental
 26.8 to 50.000 MHz, BT Fundamental
 30.0 to 80.000 MHz, AT 3rd OT

Temperature Range:
 Operating: -20 to +70°C (-40 to +85°C available)
 Storage: -55 to +125°C

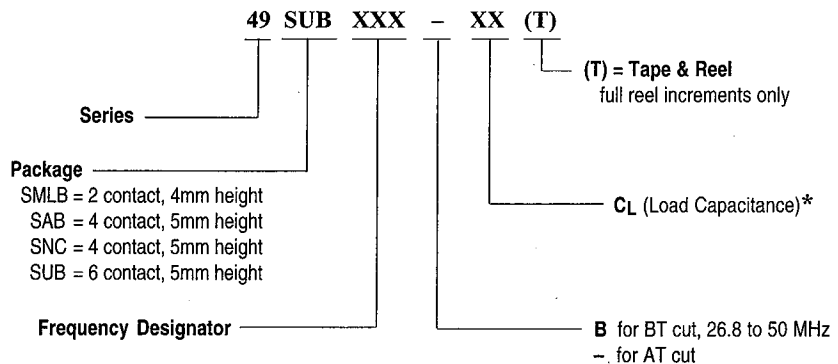
Frequency Stability Tolerance: ±50 ppm -20 to +70°C (0 to -100 ppm for BT)

Characteristics at 25°C ±2°C:
 Frequency Calibration Tolerance: ±50 ppm (tighter available)
 Load Capacitance: 16 pF to 32 pF or series resonance
 Effective Series Resistance: 30 to 200Ω (frequency dependent)
 Drive Level: 25μW correlation, 500μW max
 Shunt Capacitance: 7pF max

Mechanical:
 Shock: MIL-STD-883, Method 2002, Condition B
 Solderability: MIL-STD-883, Method 2003
 Terminal Strength: MIL-STD-202, Method 211, Conditions A and C
 Vibration: MIL-STD-883, Method 2007, Condition A
 Solvent Resistance: MIL-STD-202, Method 215
 Resistance to Soldering Heat: MIL-STD-202, Method 210, Condition I or J

Environmental:
 Gross Leak Test: MIL-STD-883, Method 1014, Condition C
 Fine Leak Test: MIL-STD-883, Method 1014, Condition A
 Thermal Shock: MIL-STD-883, Method 1011, Condition A
 Moisture Resistance: MIL-STD-883, Method 1004

Part Numbering Guide:



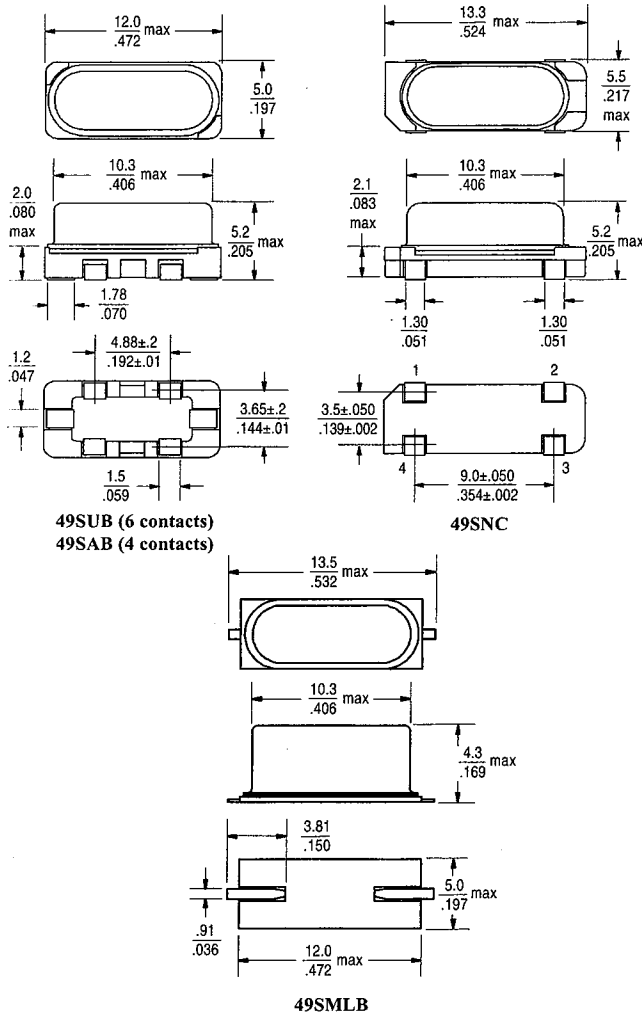
* If no CL value is specified, crystal is calibrated for series resonance.
 Example: 49SAB120 (Part marked: S120)

If CL value is specified, crystal is calibrated for parallel resonance.
 Example: 49SUB073-20 (Part marked: S073-20)

Technical Data

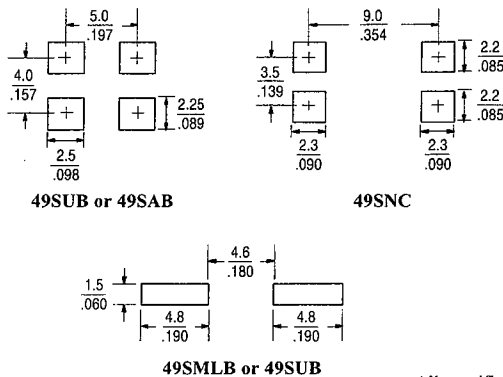
49SMLB / SAB / SUB / SNC

Package Details



Scale: None (Dimensions in mm inches)

Recommended Land Patterns



Common Frequencies:

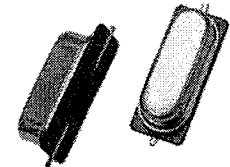
The following selection chart lists series of crystals considered standard. Special frequencies and load calibrations are available upon request.

| Frequency MHz | SaRonix Part Number | Max ESR (Fund) | SaRonix Part Number | Max ESR (3rd OT) |
|---------------|---------------------|----------------|---------------------|------------------|
| 3.579545 | 49xxx035-18 | 200 | | |
| 3.686400 | 49xxx037 | 160 | | |
| 3.686400 | 49xxx037-20 | 160 | | |
| 4.000000 | 49xxx040 | 150 | | |
| 4.915200 | 49xxx049 | 150 | | |
| 5.068800 | 49xxx051 | 120 | | |
| 6.000000 | 49xxx060 | 100 | | |
| 7.372800 | 49xxx073-20 | 80 | | |
| 8.000000 | 49xxx080 | 80 | | |
| 10.000000 | 49xxx100 | 60 | | |
| 11.059200 | 49xxx111-20 | 60 | | |
| 12.000000 | 49xxx120 | 60 | | |
| 12.288000 | 49xxx122-20 | 60 | | |
| 14.318180 | 49xxx143-32 | 30 | | |
| 15.000000 | 49xxx150 | 30 | | |
| 16.000000 | 49xxx160 | 30 | | |
| 16.000000 | 49xxx160-20 | 30 | | |
| 18.000000 | 49xxx180-20 | 30 | | |
| 18.432000 | 49xxx184 | 30 | | |
| 19.660800 | 49xxx196-20 | 30 | | |
| 20.000000 | 49xxx200-20 | 30 | | |
| 20.000000 | 49xxx200-50 | 30 | | |
| 24.000000 | 49xxx240 | 30 | | |
| 24.000000 | 49xxx240-16 | 30 | | |
| 24.000000 | 49xxx240-20 | 30 | | |
| 24.576000 | 49xxx245 | 30 | | |
| 24.576000 | 49xxx245-16 | 30 | | |
| 25.000000 | 49xxx250 | 30 | | |
| 25.000000 | 49xxx250-16 | 30 | | |
| 26.800000 | 49xxx268B | 30 | | |
| 26.800000 | 49xxx268B16 | 30 | | |
| 28.000000 | 49xxx280B | 30 | | |
| 28.000000 | 49xxx280B16 | 30 | | |
| 29.491200 | 49xxx294B | 30 | | |
| 29.491200 | 49xxx294B16 | 30 | | |
| 30.000000 | 49xxx300B | 30 | 49xxx300 | 80 |
| 30.000000 | 49xxx300B16 | 30 | 49xxx300-16 | 80 |
| 32.000000 | 49xxx320B | 30 | 49xxx320 | 80 |
| 32.000000 | 49xxx320B16 | 30 | 49xxx320-16 | 80 |
| 32.256000 | 49xxx322B | 30 | 49xxx322 | 80 |
| 32.256000 | 49xxx322B22 | 30 | 49xxx322-22 | 80 |
| 33.000000 | 49xxx330B | 30 | | |
| 33.333000 | 49xxx333B | 30 | | |
| 33.868000 | 49xxx338B | 30 | | |
| 35.251200 | 49xxx352B | 30 | 49xxx352 | 80 |
| 35.251200 | 49xxx352B18 | 30 | 49xxx352-18 | 80 |
| 36.000000 | 49xxx360B | 30 | 49xxx360 | 80 |
| 36.000000 | 49xxx360B22 | 30 | 49xxx360-22 | 80 |
| 40.000000 | 49xxx400B | 30 | 49xxx400 | 80 |
| 40.000000 | 49xxx400B16 | 30 | 49xxx400-16 | 80 |
| 40.320000 | 49xxx403B | 30 | 49xxx403 | 80 |
| 40.960000 | | | 49xxx409 | 80 |
| 42.000000 | 49xxx420B | 30 | 49xxx420 | 80 |
| 42.000000 | 49xxx420B16 | 30 | 49xxx420-16 | 80 |
| 42.500000 | | | 49xxx425 | 80 |
| 45.000000 | 49xxx450B | 30 | 49xxx450 | 80 |
| 45.000000 | 49xxx450B16 | 30 | 49xxx450-16 | 80 |
| 46.000000 | 49xxx460B | 30 | 49xxx460 | 80 |
| 46.000000 | 49xxx460B16 | 30 | 49xxx460-16 | 80 |
| 48.000000 | | | 49xxx480 | 80 |
| 48.000000 | | | 49xxx480-16 | 80 |
| 50.000000 | 49xxx500B | 30 | 49xxx500 | 80 |
| 50.000000 | 49xxx500B16 | 30 | 49xxx500-16 | 80 |
| 52.416000 | | | 49xxx524 | 80 |
| 56.448000 | | | 49xxx564 | 80 |
| 60.000000 | | | 49xxx600 | 80 |
| 60.000000 | | | 49xxx600-16 | 80 |
| 66.666667 | | | 49xxx666 | 80 |
| 66.666667 | | | 49xxx666-16 | 80 |

All specifications are subject to change without notice.

DS-153 REV E

Rev. F.



Actual Size

Product Description

The crystals are miniature AT or BT cut strip resonators housed in low profile packages for surface mounting. The parts utilize a proven, low-cost, metal package technology with a precision molded base and universal contact configuration.

Product Features

- 49SNC is interchangeable with common plastic-molded crystal configurations.
- Pb-free and RoHS/Green compliant available.

Typical Applications

- Set-Top Box/Multimedia
- Clock/VCXO Multiplier
- Network Adapter Cards
- Modems
- Microcontrollers and Processors
- Remote control devices

Frequency Range:

- 3.2 to 29.999 MHz, AT Fundamental
- 30.0 to 54.000 MHz, AT 3rd OT
- 26.8 to 54.000 MHz, BT Fundamental

Characteristics at 25°C ±2°C:

- Frequency Calibration Tolerance (as specified): ±30ppm, ±50ppm
- Load Capacitance (as specified): 12 to 32pF or Series Resonance
- Effective Series Resistance:
 - 200Ω max (3.2 to 3.499MHz)
 - 180Ω max (3.5 to 3.999MHz)
 - 150Ω max (4 to 4.999MHz)
 - 120Ω max (5 to 5.999MHz)
 - 100Ω max (6 to 6.999MHz)
 - 80Ω max (7 to 8.999MHz)
 - 60Ω max (9 to 12.999MHz)
 - 40Ω max (13 to 19.999MHz)
 - 30Ω max (20 to 29.999MHz, AT Fund)
 - 80Ω max (30 to 54MHz, AT (3rd overtone))
 - 30Ω max (26.8 to 54MHz, BT Fund)
- Drive Level: 100μW correlation, (500μW Max)
- Shunt Capacitance: 7pF Max.

Temperature Range:

- Operating: -20 to +70°C ; -40 to +85°C (as specified)
- Storage: -55 to +125°C

Temperature Stability (as specified):

- ±30ppm (-20 to +70°C) AT Cut
- ±50 or ±100ppm (-40 to +85°C) AT Cut
- 0 to -100ppm (-20 to +70°C) BT Cut

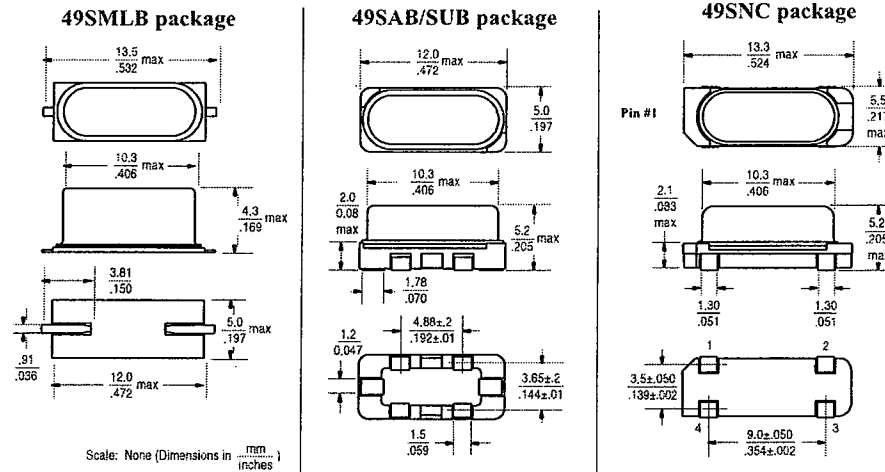
Aging @ 25°C, first year:

- ±3ppm (typ), ±5ppm (max)

Reflow Temperature:

- 240°C Max (non-RoHS package)
- 260°C Max, 10 sec max (RoHS package)

Packaging Information: HC-49

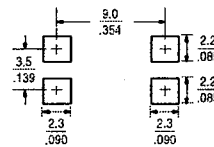
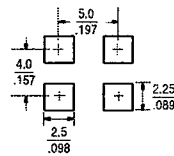
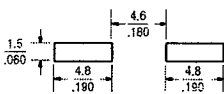


Package Marking Information

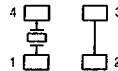
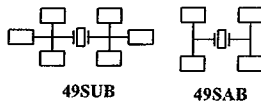
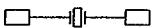
Line 1: S = SaRonix
 xxx = Calib/Stability/Temp Code
 YYWWX = Date Code
 Line 2: Frequency (up to 7 digits, including decimal point)
 Z = - (dash) for AT-cut parallel resonant
 = blank for AT-cut series resonant
 = B for BT-cut
 xx = Load Capacitance (leave Blank if Series)

SxxxYYWWX
24.5760xxx

Land Pattern



Pad Connection Configurations



Ordering Information

49SMLB 03.6864 = 18 GGC -E (X)

Type / Package
 49SMLB = 2 contact, 4mm high
 49SAB = 4 contact, 5 mm high
 49SNC = 4 contact, 5mm high
 49SUB = 6 contact, 5mm high

Frequency
 Frequency (in MHz) = 0x.xxxx, xx.xxxx
 (a zero is used in front of frequencies under 10 MHz)

Cut Type
 - (dash) = AT-cut Parallel Resonance
 Blank = AT-cut Series Resonance
 B = BT-Cut

Load Capacitance
 xx = Parallel Resonance (specify load)
 Blank = Series Resonance

Options
 (T) = Tape and Reel (full increments only) 1000 pieces
 (Q) = Manufactured in a TS16949 or QS9000 registered facility
 Blank = Bulk

-E (dash E) = Lead (Pb)-free RoHS Compliant Version
 Blank = non-RoHS (not available for new designs)

Calibration / Stability / Temp Range
 GGC = ±30ppm / ±30ppm / -20 to +70°C (ATCut) ←
 GHE = ±30ppm / ±50ppm / -40 to +85°C (ATCut)
 HJE = ±50ppm / ±100ppm / -40 to +85°C (ATCut)
 Blank = ±50ppm/0 to -100ppm/-20 to +70°C (BTCut)
 *others available

Part Number Examples: Freq 5.1234MHz, ±30ppm calib, ±30ppm stability, -20 to +70°C, 16pF
 = 49SMLB05.1234-16GGC
 = 49SMLB05.1234-16GGC-E (for PB-Free/RoHS Compliant)

Mechanical:

- Shock: JESD22-B104 Condition B
- Solderability: MIL-STD-883, Method 2003 (non-RoHS package)
- Solderability: J-STD-002 (RoHS package)
- Terminal Strength: MIL-STD-883 Method 2004
- Vibration: JESD22-B103
- Solvent Resistance: JESD22-B107
- Resistance to Soldering Heat: MIL-STD-202, Method 210, Condition I or J (Non-RoHS package)
- Resistance to Soldering Heat: J-STD-020C Table 5-2 Pb-free devices (3 cycles max) (RoHS package)

Environmental:

- Gross Test Leak: JESD22-A109, Condition C
- Fine Test Leak: JESD22-A109, Condition A1
- Moisture Resistance: JESD22-A113
- Insulation Resistance: 500 MΩ min (100 VDC)