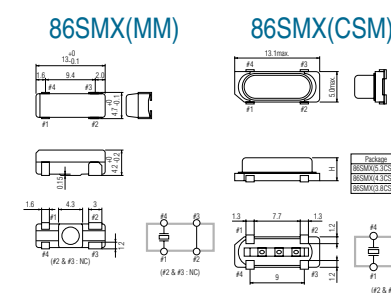
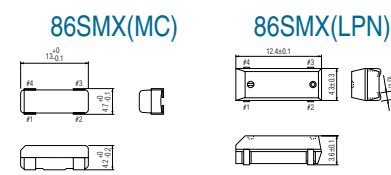


86SMX FAMILY

STANDARD SMD CRYSTALS

XTAL

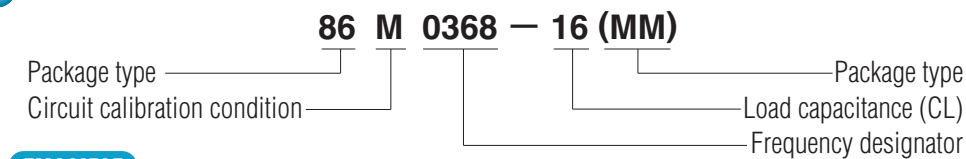
XTAL



STANDARD SPECIFICATIONS

1. Package type 86SMX(MC), 86SMX(LPN), 86SMX(MM) & 86SMX(CSM)
2. Frequency range 3.579545 MHz to 60.000 MHz
3. Frequency tolerance ± 50 ppm at $+25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
4. Temperature stability (referred to $+25^{\circ}\text{C}$) ± 50 ppm over -20°C to $+70^{\circ}\text{C}$ (AT-Cut)
 ± 100 ppm over -10°C to $+60^{\circ}\text{C}$ (BT-Cut)
5. Load capacitance (CL) 16 pF, Typical
6. Shunt capacitance (Co) 5 pF max.
7. Drive level (P) 100 μW max. (10 μW for testing)
8. Aging ± 5 ppm max. at $+25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ per year
9. Cut/Oscillation mode AT-Cut/Fundamental (3.579545 MHz to 40.000 MHz)
BT-Cut/Fundamental (32.00000 MHz to 50.000 MHz)
AT-Cut/3rd overtone (32.00000 MHz to 60.000 MHz)
10. Reflow condition 10 seconds max. at $+250^{\circ}\text{C} \pm 10^{\circ}\text{C}$

PART NUMBERING GUIDE

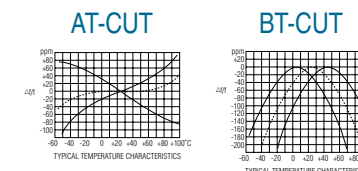


EXAMPLE

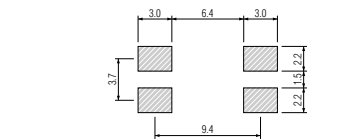
| SMI PART NO. | Package | Circuit Calibration Condition | Frequency |
|-----------------------|----------------------|--------------------------------------|--------------------|
| 86M0368-16(MM) | 86(MM) = 86SMX(MM) | M = Parallel resonance CL = 16 pF | 0368 = 3.68640 MHz |
| 86M200-20(MC) | 86(MC) = 86SMX(MC) | M = Parallel resonance CL = 20 pF | 200 = 20.000 MHz |
| 86M073-18(LPN) | 86(LPN) = 86SMX(LPN) | M = Parallel resonance CL = 18 pF | 073 = 7.37280 MHz |
| 86S049(CSM) | 86(CSM) = 86SMX(CSM) | S = Series resonance | 049 = 4.91520 MHz |

PACKAGE DATA

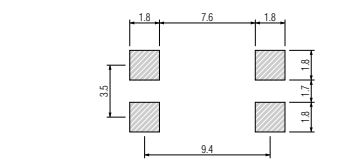
| Item | Package | 86SMX(MC) | 86SMX(LPN) | 86SMX(MM) | 86SMX(CSM) |
|-----------------------|---------|-------------------------------------|----------------------------------|-------------------------------------|--------------------|
| Outer package / Cover | | Plastic | Plastic | Plastic | Metal |
| Base | | n. a. | n. a. | n. a. | Metal |
| Insulator | | n. a. | n. a. | n. a. | 46 nylon |
| Sealing | | Press-fit (3x10mm built-in) | Press-fit (3x10mm built-in) | Press-fit (3x10mm built-in) | Resistance |
| Terminal lead frame | | 42 alloy | 42 alloy | 42 alloy | 42 alloy |
| Terminal plating | | Tin / Nickel (surface) / (under) | SnCu / Cu (surface) / (under) | Tin / Nickel (surface) / (under) | Tin |
| RoHS | | Compliant | Compliant | Compliant | Compliant(Pb-free) |



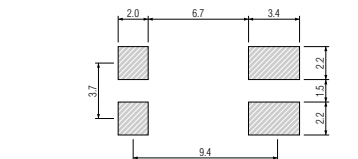
SOLDERING PATTERN for 86SMX(MC)



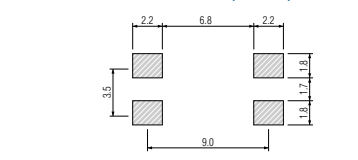
SOLDERING PATTERN for 86SMX(LPN)



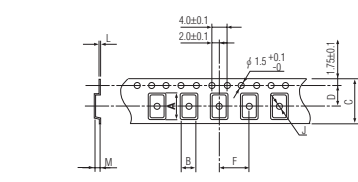
SOLDERING PATTERN for 86SMX(MM)



SOLDERING PATTERN for 86SMX(CSM)

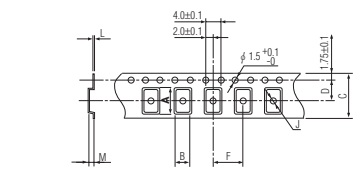


TAPE SPECIFICATIONS for 86SMX(MC), 86SMX(MM) & 86SMX(CSM)



| A | B | C | D | F | J | L | M | Reel Dia. | Qty/Reel |
|------|-----|------|------|------|-----|-----|-----|-----------|----------|
| 13.1 | 5.3 | 24.0 | 11.5 | 12.0 | 2.2 | 0.4 | 4.3 | 330 | 1000pcs |

TAPE SPECIFICATIONS for 86SMX(LPN)



| A | B | C | D | F | J | L | M | Reel Dia. | Qty/Reel |
|------|-----|------|------|------|-----|-----|-----|-----------|----------|
| 12.8 | 4.8 | 24.0 | 11.5 | 12.0 | 2.2 | 0.4 | 3.9 | 330 | 1000pcs |

86SMX STANDARD FREQUENCIES

| FREQUENCY MHz | FREQUENCY DESIGNATOR | MAX EQUIVALENT SERIES RESISTANCE OHMS(Ω) ESR | FREQUENCY MHz | FREQUENCY DESIGNATOR | MAX EQUIVALENT SERIES RESISTANCE OHMS(Ω) ESR |
|---------------|----------------------|--|---------------|----------------------|--|
| 3.579545 | 035 | 200 | 16.000000 | 160 | 50 |
| 3.600000 | 036 | 200 | 16.384000 | 163 | 50 |
| 3.686400 | 0368 | 200 | 16.588000 | 1658 | 50 |
| 4.000000 | 040 | 150 | 16.667000 | 166 | 50 |
| 4.096000 | 0409 | 150 | 16.934400 | 169 | 50 |
| 4.194304 | 041 | 150 | 17.734475 | 1773 | 50 |
| 4.433619 | 044 | 150 | 18.432000 | 184 | 50 |
| 4.608000 | 046 | 150 | 18.543000 | 185 | 50 |
| 4.915200 | 049 | 150 | 19.200000 | 192 | 50 |
| 5.000000 | 050 | 120 | 19.660800 | 196 | 50 |
| 5.068800 | 0506 | 120 | 20.000000 | 200 | 40 |
| 5.120000 | 0512 | 120 | 20.480000 | 204 | 40 |
| 5.256200 | 0525 | 120 | 20.940000 | 209 | 40 |
| 6.000000 | 060 | 100 | 21.425660 | 214 | 40 |
| 6.144000 | 061 | 100 | 22.118400 | 221 | 40 |
| 6.400000 | 064 | 100 | 23.438000 | 234 | 40 |
| 6.650000 | 0665 | 100 | 23.961600 | 239 | 40 |
| 7.372800 | 073 | 80 | 24.000000 | 240 | 40 |
| 7.441400 | 074 | 80 | 24.576000 | 245 | 40 |
| 7.621000 | 0762 | 80 | 25.000000 | 250 | 40 |
| 7.680000 | 076 | 80 | 27.000000 | 270 | 40 |
| 8.000000 | 080 | 80 | 28.224000 | 282 | 40 |
| 8.192000 | 081 | 80 | 29.491200 | 294 | 40 |
| 9.216000 | 092 | 60 | 30.000000 | 300 | 40 |
| 9.537500 | 095 | 60 | 32.000000 | 320 | 40 |
| 9.830400 | 098 | 60 | 33.000000 | 330 | 40 |
| 10.000000 | 100 | 60 | 33.868800 | 338 | 40 |
| 10.240000 | 1024 | 60 | 36.000000 | 360 | 100 (3rd OT) |
| 11.000000 | 110 | 60 | 38.400000 | 384 | 100 (3rd OT) |
| 11.059200 | 1105 | 60 | 38.880000 | 388 | 100 (3rd OT) |
| 12.000000 | 120 | 60 | 39.321600 | 393 | 40 (BT-Cut) |
| 12.288000 | 122 | 60 | 40.000000 | 400 | 40 (BT-Cut) |
| 12.296000 | 1229 | 60 | 40.320000 | 403 | 100 (3rd OT) |
| 12.800000 | 128 | 60 | 46.615000 | 466 | 100 (3rd OT) |
| 13.105000 | 131 | 50 | 48.000000 | 480 | 100 (3rd OT) |
| 13.500000 | 135 | 50 | 50.000000 | 500 | 100 (3rd OT) |
| 13.560000 | 1356 | 50 | 52.416000 | 524 | 100 (3rd OT) |
| 14.250000 | 142 | 50 | 56.448000 | 564 | 100 (3rd OT) |
| 14.318180 | 143 | 50 | 60.000000 | 600 | 100 (3rd OT) |
| 14.745600 | 147 | 50 | | | |
| 15.000000 | 150 | 50 | | | |
| 15.360000 | 153 | 50 | | | |