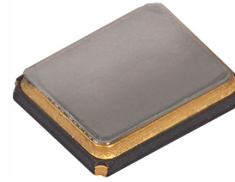




**THE DATASHEET OF
SA324250F36MAR**



SA324 Series Automotive Grade Quartz Crystal



Part Dimensions:
3.2 × 2.5 × 0.8mm • 20.716mg

Features

- AEC-Q200 Compliant
- Hermetic Ceramic Surface Mount Package
- Fundamental and 3rd Overtone Crystal Design
- Frequency Range 8 – 160MHz
- Frequency Tolerance, ±30ppm Standard
- Frequency Stability, ±50ppm Standard
- Operating Temperature Range to -55°C to +125°C
- Tape and Reel Packaging, EIA-481

Standard Frequencies – see Page 5 for developed frequencies.
* Check with factory for availability of frequencies not listed.

Applications

- Automotive Electronics
- Mobile Multimedia/Infotainment
- Car Navigation Systems
- Internet of Things [IoT, IIoT]
- Microcontrollers and FPGAs
- Wireless Communication
- Ethernet/GbE/SyncE
- Medical Electronics
- Commercial Military & Aerospace

Description

CTS Model SA324 incorporates a low cost, high Q, small size quartz resonator specifically developed to operate over extended temperature ranges for use in automotive electronics.

Ordering Information

| Model | Frequency Code [MHz] | Mode of Oscillation | Tolerance @ +25°C | Temperature Stability | Temperature Range | Load Capacitance | Packaging |
|-------|--|---|--|--|--|---|--------------------------------------|
| SA324 | XXX or XXXX | F | 3 | 5 | G | A | R |
| | Code Frequency Product Frequency Code ¹ | | Code Tolerance 1 ±10ppm X ±15ppm 2 ±20ppm 3 ±30ppm 5 ±50ppm | | Code Temp. Range I -40°C to +85°C ² G -40°C to +105°C ³ H -40°C to +125°C ⁴ N -40°C to +150°C ⁵ P -55°C to +105°C ⁵ M -55°C to +125°C ⁵ | | Code Packing R 3k pcs./reel |
| | | Code Mode F Fundamental T 3rd Overtone | | Code Stability Code Stability X ±15ppm 5 ±50ppm 2 ±20ppm 6 ±100ppm 3 ±30ppm 7 ±150ppm | | Code Capacitance Code Capacitance V 7pF C 16pF K 8pF D 18pF J 9pF E 20pF A 10pF F 24pF L 12pF G 30pF B 13pF S Series | |

Notes:

- 1] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.
- 2] Available with all stability codes.
- 3] Available with stability codes 3, 5, 6 and 7.
- 4] Available with stability codes 5, 6 and 7.
- 5] Stability codes 6 and 7. Contact factory for code 5 availability.

**Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.**

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.



Electrical Specifications

Operating Conditions

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------------|------------------|------------|-----|-----|------|------|
| Operating Temperature | T _A | - | -40 | | +85 | °C |
| | | | -40 | | +105 | |
| | | | -40 | +25 | +125 | |
| | | | -40 | | +150 | |
| | | | -55 | | +105 | |
| | | | -55 | | +125 | |
| Storage Temperature | T _{STG} | - | -55 | - | +125 | °C |

Frequency Stability

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------|-------------------|-----------------------------|-----|----------------------------|-----|------|
| Frequency Range | f ₀ | Fundamental mode | | 8 - 80 | | MHz |
| | | 3rd Overtone mode | | 80 - 160 | | MHz |
| Frequency Tolerance | $\Delta f/f_0$ | @ +25°C | | 10, 15, 20, 30 or 50 | | ±ppm |
| Frequency Stability | $\Delta f/f_{25}$ | Referenced to +25°C reading | | 15, 20, 30, 50, 100 or 150 | | ±ppm |
| Aging | $\Delta f/f_0$ | Typical per year @ +25°C | -3 | - | 3 | ppm |

Crystal Parameters

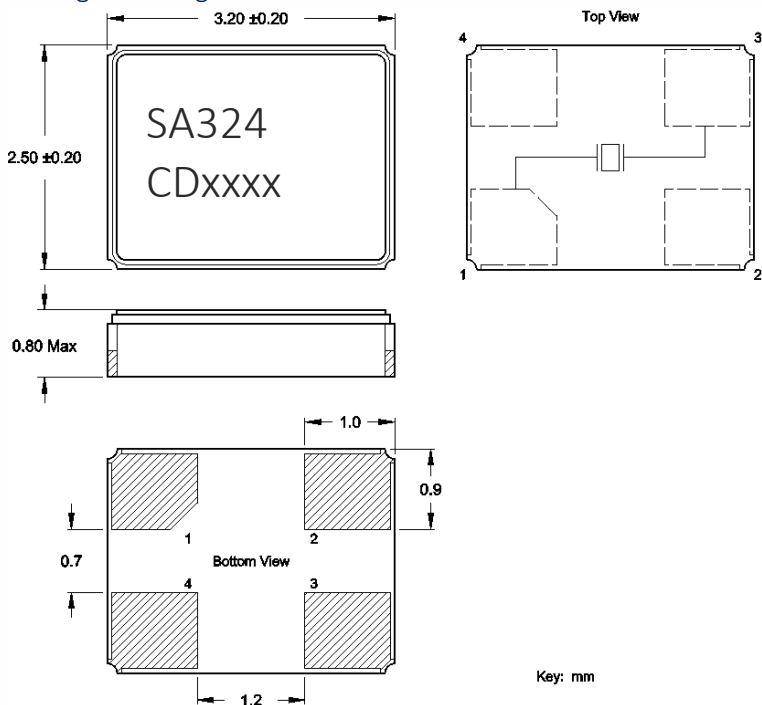
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|----------------|----------------|----------------------------|-----|-----|------|
| Operating Mode | - | - | Fundamental & 3rd Overtone | | | - |
| Crystal Cut | - | - | AT-Cut Strip | | | - |
| Load Capacitance | C _L | - | See Ordering Information | | | pF |
| Shunt Capacitance | C ₀ | - | - | - | 3.0 | pF |
| Series Resistance | | | | | | |
| Fundamental | R ₁ | 8MHz - <10MHz | - | - | 500 | Ω |
| | | 10MHz - <11MHz | - | - | 250 | |
| | | 11MHz - <12MHz | - | - | 150 | |
| | | 12MHz - <16MHz | - | - | 100 | |
| | | 16MHz - <30MHz | - | - | 70 | |
| | | 30MHz - 80MHz | - | - | 50 | |
| 3rd Overtone | R ₁ | 80MHz - 160MHz | - | - | 100 | |
| Drive Level | DL | - | - | 10 | 200 | μW |
| Insulation Resistance | R _i | +100Vdc ±15Vdc | 500 | - | - | MΩ |

$\Delta f/f_0$ - Frequency deviation referenced to nominal frequency.

$\Delta f/f_{25}$ - Frequency deviation over operating temperature range, referenced to +25°C frequency.

Mechanical Specifications

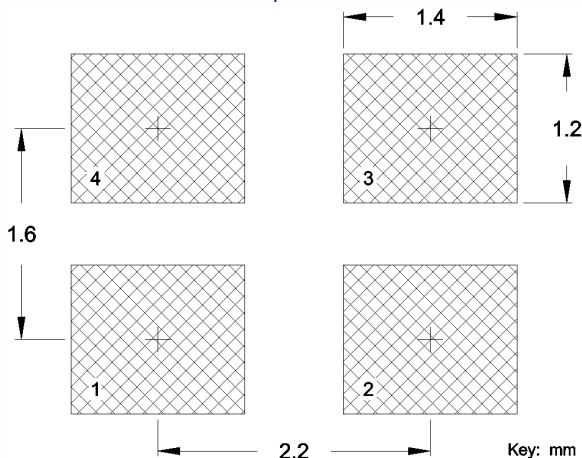
Package Drawing



Marking Information

1. SA324 – CTS model.
2. C – CTS.
2. D – Date Code. See Table I for codes.
3. xxx or xxxx – Frequency Code.
3-digits, frequencies below 100MHz
4-digits, frequencies 100MHz or greater
[See document 016-1454-0, Frequency Code Tables.]

Recommended Pad Layout



Notes

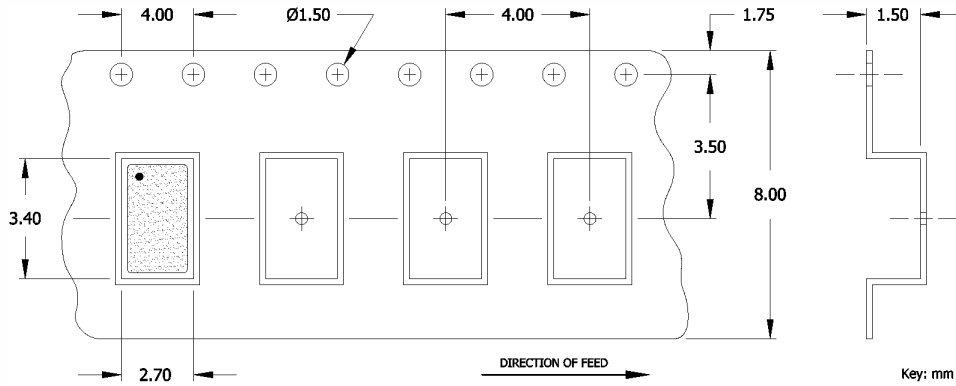
1. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Terminations #2, #4 and the metal lid are connected internally. End user may connect these pins to circuit ground for EMI suppression.
3. Due to package variability, the pad chamfer on the bottom could be located on Pin 1 in a given lot. Layout orientation should be based on the top view [marking side], as indicated in package drawing. The chamfer location does not affect the electrical performance of the device.
4. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
5. MSL = 1.

Table I – Date Code, Beginning year 2021

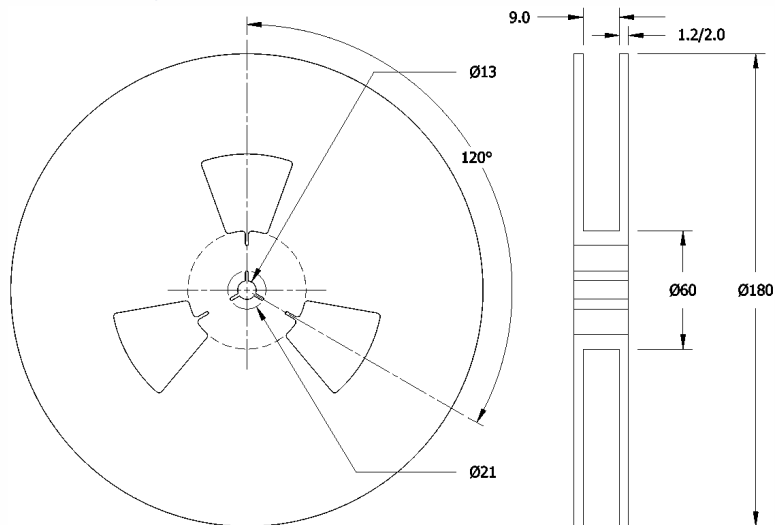
| MONTH | | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| YEAR | | | | | | | | | | | | | | | | |
| 2021 | 2025 | 2029 | 2033 | 2037 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2022 | 2026 | 2030 | 2034 | 2038 | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| 2023 | 2027 | 2031 | 2035 | 2039 | a | b | c | d | e | f | g | h | j | k | l | m |
| 2024 | 2028 | 2032 | 2036 | 2040 | n | p | q | r | s | t | u | v | w | x | y | z |

Packaging – Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 1k pieces minimum to 3k pieces maximum per 180mm reel.
2. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.



Addendum

Common Frequencies and Frequency Codes – MHz

Common Wireless Frequency Additional Frequencies

| FREQUENCY | FREQUENCY CODE | FREQUENCY | FREQUENCY CODE | FREQUENCY | FREQUENCY CODE | FREQUENCY | FREQUENCY CODE |
|-----------|----------------|-----------|----------------|-----------|----------------|------------|----------------|
| 12.000000 | 120 | 8.000000 | 080 | 19.440000 | 194 | 32.768000 | 327 |
| 13.560000 | 13C | 10.000000 | 100 | 19.660800 | 19B | 33.000000 | 330 |
| 16.000000 | 160 | 11.059200 | 111 | 19.680000 | 196 | 33.330000 | 333 |
| 19.200000 | 192 | 12.288000 | 122 | 20.480000 | 204 | 33.333000 | 33E |
| 20.000000 | 200 | 12.500000 | 125 | 20.736000 | 207 | 33.333300 | 33A |
| 24.000000 | 240 | 12.688000 | 126 | 22.118400 | 221 | 33.868800 | 338 |
| 25.000000 | 250 | 12.800000 | 128 | 22.579200 | 225 | 35.328000 | 353 |
| 26.000000 | 260 | 13.000000 | 130 | 24.305000 | 243 | 36.000000 | 360 |
| 27.120000 | 271 | 13.500000 | 135 | 24.545400 | 24F | 37.500000 | 375 |
| 30.000000 | 300 | 13.553750 | 13B | 24.545454 | 24G | 38.000000 | 380 |
| 32.000000 | 320 | 13.824000 | 138 | 24.553500 | 24B | 38.880000 | 388 |
| 37.400000 | 374 | 13.934400 | 139 | 24.576000 | 24C | 39.062500 | 39A |
| 38.400000 | 384 | 14.000000 | 140 | 25.000625 | 25A | 41.600000 | 41C |
| 40.000000 | 400 | 14.318180 | 143 | 26.041660 | 26F | 44.000000 | 440 |
| 48.000000 | 480 | 14.400000 | 144 | 26.800000 | 268 | 45.000000 | 450 |
| 52.000000 | 520 | 14.745600 | 147 | 27.000000 | 270 | 49.152000 | 491 |
| | | 15.360000 | 153 | 27.600000 | 27C | 50.000000 | 500 |
| | | 16.367600 | 16E | 28.224000 | 282 | 54.000000 | 540 |
| | | 16.368000 | 16C | 28.322000 | 28C | 75.000000 | 750 |
| | | 16.384000 | 163 | 28.375000 | 283 | 114.285000 | 1142 |
| | | 16.666700 | 16N | 28.636360 | 286 | 156.250000 | 1562 |
| | | 16.800000 | 168 | 29.491200 | 29B | | |
| | | 16.934400 | 169 | 30.400000 | 304 | | |
| | | 18.000000 | 180 | 30.720000 | 307 | | |
| | | 18.432000 | 184 | 31.250000 | 312 | | |

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View SA324250F36MAR on WIN SOURCE](#)
- ⊖ [CTS-Frequency Controls Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management