

Model 425W IoT Enhanced Quartz Crystal

Features

- Optimized Design for Low Plating Capacitance and ESR
- Improves Start-Up and Power Savings for Low Energy Applications
- Hermetic Ceramic Surface Mount Package
- Fundamental Crystal Design
- Frequency Range 12 80MHz
- Operating Temperature Range to -40°C to +125°C
- Tape and Reel Packaging, EIA-481



Standard Frequencies – see Page for developed frequencies.

Applications

- Wireless Communications
- Low Power MCUs, SoCs, RF ICs
- M2M Communications
- WiFi, ZigBee, ZigBee RF4CE, Z-Wave
- Bluetooth, Bluetooth Low Energy
- LoRa, LPWAN, 6LowPan, WLAN
- Near Field Communication

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Part Dimensions:

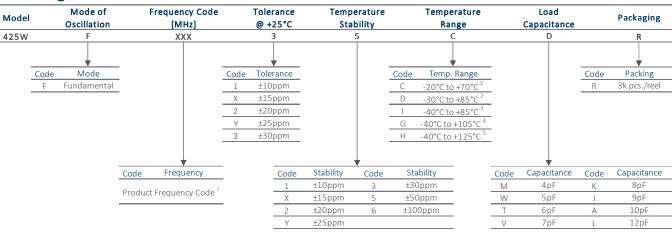
2.5 × 2.0 × 0.65mm • 9.3742mg

- Low Drive Chipsets
- ISM Band Applications

Description

CTS Model 425W incorporates a high Q quartz resonator and has optimized design parameters for Low ESR and Load Capacitance [CL]. M425W is ideal for supporting commercial and industrial IoT applications using low power MCUs, portable RF communication ICs and low drive chipsets.

Ordering Information



- 1] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz.
- 2] Available with all stability codes.

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- 3] Available with stability codes X, 2, Y, 3, 5 and 6.
- 4] Available with stability codes 3, 5 and 6.
- 5] Available with stability codes 5 and 6. Contact factory for 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 |
|-----------------------|--------|------------|-----|-----|------|------|
| | | | -20 | | +70 | |
| | | | -30 | | +85 | |
| Operating Temperature | TA | - | -40 | +25 | +85 | °C |
| | | | -40 | | +105 | |
| | | | -40 | | +125 | |
| Storage Temperature | Tstg | _ | -55 | - | +125 | °C |

Frequency Stability

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------|-------------------|-----------------------------|-------------------------------|-----|-----|------|
| Frequency Range | fo | - | | MHz | | |
| Frequency Tolerance | $\Delta f/f_{O}$ | @ +25°C | 10, 15, 20, 25 or 30 | | | ±ppm |
| Frequency Stability | $\Delta f/f_{25}$ | Referenced to +25°C reading | 10, 15, 20, 25, 30, 50 or 100 | | | ±ppm |
| Aging | $\Delta f/f_0$ | Typical per year @ +25°C | -3 | ±2 | 3 | ppm |

Crystal Parameters

| MAX | UNIT | | |
|--------------------------|-----------------------|--|--|
| Fundamental | | | |
| AT-Cut Strip | | | |
| See Ordering Information | | | |
| <3.0 | pF | | |
| | | | |
| 100 | | | |
| 80 | Ω | | |
| 60 | | | |
| 40 | | | |
| 100 | μW | | |
| - | MΩ | | |
| | 80 60 40 100 | | |

 $[\]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

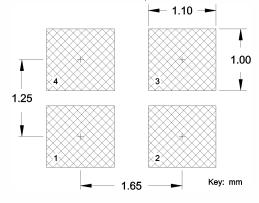
Package Drawing 2.50 ±0.10 DXXX 0.65 Max 0.60 Bottom View 3 0.90

Marking Information

- 1. 425W CTS model.
- 2. D Date Code. See Table I for codes.
- 3. xxx Frequency Code, 3-digits for frequencies below 100MHz.

[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.
- Due to package variability, the pad chamfer on the bottom could be located on Pin 1 or 2 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

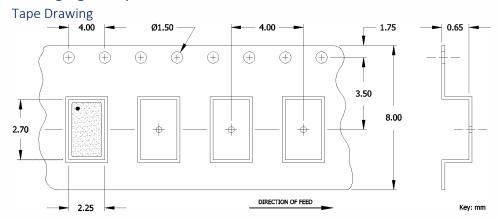
| MONTH | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | ОСТ | NOV | DEC | | |
|-------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|
| YEAR | | DEC | | | | | | | | | | | | | | |
| 2021 | 2025 | 2029 | 2033 | 2037 | А | В | С | D | Е | F | G | Н | J | K | L | М |
| 2022 | 2026 | 2030 | 2034 | 2038 | N | Р | Q | R | S | Т | U | V | W | Χ | Υ | Z |
| 2023 | 2027 | 2031 | 2035 | 2039 | а | b | С | d | е | f | g | h | j | k | I | m |
| 2024 | 2028 | 2032 | 2036 | 2040 | n | р | q | r | S | t | u | V | W | Х | У | Z |

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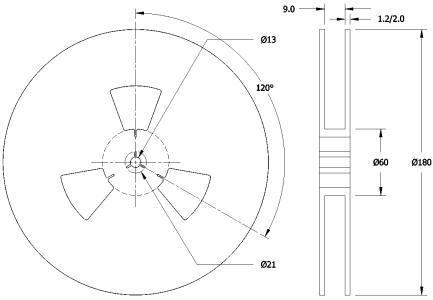
www.ctscorp.com



Packaging - Tape and Reel



Reel Drawing



Notes

- 1. Device quantity is 1k pieces minimum and 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 Frequencies Additional Frequencies

| Common wine | eless riequelicles | Additional Fit | equencies | | | | | |
|----------------|--------------------|----------------|-------------------|-----------|-------------------|-----------|-------------------|--|
| FREQUENCY CODE | | FREQUENCY | FREQUENCY CODE | FREQUENCY | FREQUENCY CODE | FREQUENCY | FREQUENCY CODE | |
| 16.000000 | 160 | 16.367600 | 16E | 26.041660 | 26F | 39.062500 | 39A | |
| 19.200000 | 192 | 16.384000 | 163 | 27.000000 | 270 | 41.600000 | 41C | |
| 20.000000 | 200 | 16.666700 | 16N | 28.224000 | 282 | 44.000000 | 440 | |
| 24.000000 | 240 | 16.800000 | 168 | 28.322000 | 28C | 45.000000 | 450 | |
| 25.000000 | 250 | 16.934400 | 169 | 28.375000 | 283 | 49.152000 | 491 | |
| 26.000000 | 260 | 18.000000 | 180 | 28.636360 | 286 | 50.000000 | 500 | |
| 27.120000 | 271 | 18.432000 | 184 | 29.491200 | 29B | 54.000000 | 540 | |
| 30.000000 | 300 | 19.440000 | 194 | 30.400000 | 304 | | | |
| 32.000000 | 320 | 19.660800 | 19B | 30.720000 | 307 | | | |
| 37.400000 | 374 | 19.680000 | 196 | 31.250000 | 312 | | | |
| 38.400000 | 384 | 20.480000 | 204 | 32.768000 | 327 | | | |
| 40.000000 | 400 | 20.736000 | 207 | 33.000000 | 330 | | | |
| 48.000000 | 480 | 22.118400 | 221 | 33.330000 | 333 | | | |
| 52.000000 | 520 | 22.579200 | 225 | 33.333000 | 33E | | | |
| | | 24.305000 | 243 | 33.333300 | 33A | | | |
| | | 24.545400 | 24F | 33.868800 | 338 | | | |
| | | 24.545454 | 24G | 35.328000 | 353 | | | |
| | | 24.553500 | 24B | 36.000000 | 360 | | | |
| | | 24.576000 | 24C | 38.000000 | 380 | | | |
| | | 25.000625 | 25A | 38.880000 | 388 | | | |