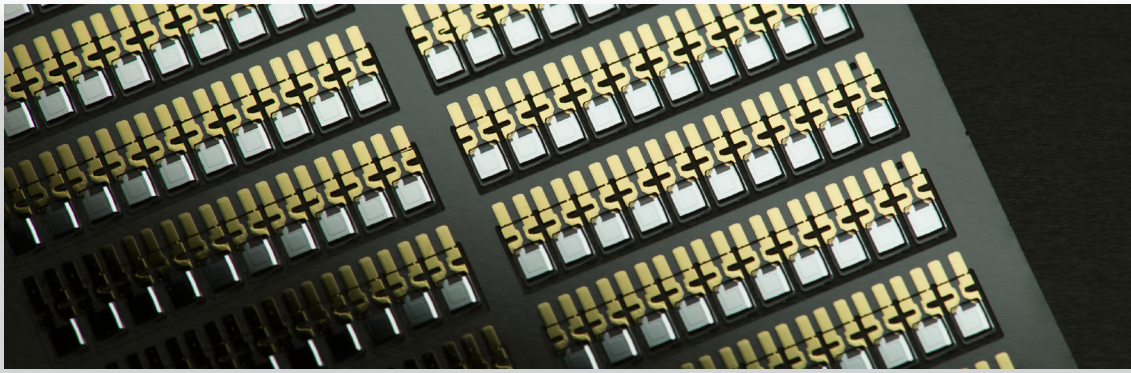
MICRO CRYSTAL SWITZERLAND

A COMPANY OF THE SWATCH GROUP

Micro Crystal

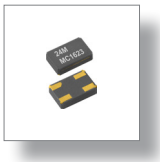


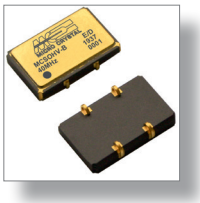
MHz AT-Cut Crystals

MHz Clock Oscillators

MHz VCXO Oscillators

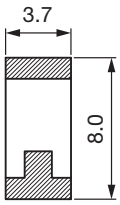
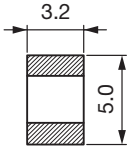
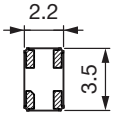
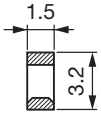
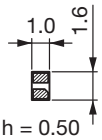
MHz OCXO Oscillators





Short Form Catalog Q2 2024

MHz AT-Cut Crystals in Ceramic Packages

Product Type	CC1A/F	CC2A	CC6A/F	CC7A	CC8A	CM8A	CC9A
Dimensions (l × w) mm	8.0 x 3.7	5.0 x 3.2	3.5 x 2.2	3.2 x 1.5	2.0 x 1.2	2.0 x 1.2	1.6 x 1.0
			 4 or 2 pads				
PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 1.75	 h = 1.20	 h = 1.0/0.80	 h = 0.75	 h = 0.60	 h = 0.60	 h = 0.50

Standard (Fundamental Mode)

Product Type	Number of pads	Frequency MHz	Temp. Range °C	R_S typ. in Ω @ Fmin - Fmax	C_1 typ. in fF @ Fmin - Fmax	C_0 typ. in pF @ Fmin - Fmax	Key Features / Applications
CC1A-T1A	2	8 - 30	-55 to +125	60 - 30	4 - 11	2.0 - 4.0	
CC1F-T1A	2	30 - 250	-55 to +125	35 - 15	4 - 7	2.0 - 4.0	Inverted mesa crystal
CC2A-T1A	2	12 - 70	-55 to +125	60 - 10	3 - 12	2.0 - 5.0	
CC6A-T1D	4	16 - 70	-55 to +125	60 - 20	2 - 5	1.5 - 3.0	
CC6F-T1A	2	70 - 250	-55 to +125	30 - 15	5 - 6	2.4 - 3.2	Inverted mesa crystal
CC6F-T1A F	2	70 - 200	-55 to +125	35 - 15	3 - 3	2.4 - 3.2	Inverted mesa crystal Filter applications - low spurious
CC7A-T1A	2	20 - 50	-55 to +125	40 - 25	2 - 2	0.7 - 0.7	
CC8A-T1A	2	24 - 50	-55 to +125	40 - 20	1 - 1	0.7 - 0.7	Smallest package
CM8A-T1D	4	24 - 50	-55 to +125	40 - 20	1 - 1	0.7 - 0.7	Smallest package
CC7A-T1A Medical	2	14 - 50	0 to +55	60 - 25	2 - 2	0.7 - 0.7	Medical implantable
CC8A-T1A Medical	2	24 - 50	0 to +55	40 - 20	1 - 1	0.7 - 0.7	Medical implantable
CC9A-T1A Medical [1]	2	32 - 50	0 to +55	40 - 20	1 - 1	0.7 - 0.7	Medical implantable

High Temperature / High Shock and Vibration Resistant (Fundamental Mode)

CC1A-T1A H	2	8 - 24	-55 to +200	100 - 50	4 - 9	2.0 - 3.2	Harsh Environment
CC2A-T1A H	2	14 - 40	-55 to +200	70 - 40	5 - 10	2.5 - 4.0	Harsh Environment
CC6A-T1D H	4	16 - 40	-55 to +200	80 - 50	2 - 4	1.5 - 2.5	Harsh Environment

1) In qualification.

Applications

Customer-specific applications such as:

- Filters
- Industrial
- Telemetry
- Animal Tracking
- Optical Network
- Airborne Equipment
- Avionics / Aerospace
- Radio Communication
- Geothermal Equipment
- TCXO, VCTCXO, VCXO
- Downhole and Well Drilling
- Healthcare, Medical and Medical Implantable

Ordering Information

C C 6 A - T 1 D H | 24.000 MHz | 20.0 pF | ±50 ppm | TC | QI

Ceramic package

Package lid
C = Ceramic lid
M = Metal lid

Package size
1 = 8.0 x 3.7 x 1.75 mm
2 = 5.0 x 3.2 x 1.20 mm
6 = 3.5 x 2.2 x 1.00 mm
7 = 3.2 x 1.5 x 0.75 mm
8 = 2.0 x 1.2 x 0.60 mm
9 = 1.6 x 1.0 x 0.50 mm

Quartz blank
A = AT-Cut
F = AT-Cut inverted mesa

SMD package

Au flashed pads

Number of pads
A = 2 pads
D = 4 pads

Frequency F_L

Load capacitance C_L

Frequency tolerance

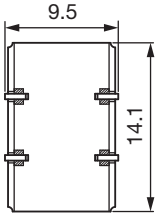
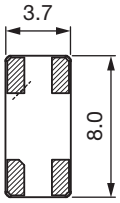
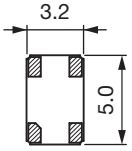
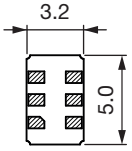
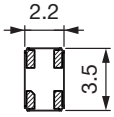
Temperature range
TA = -40 to +85°C (Standard)
TB = -40 to +125°C
TC = -55 to +125°C
TD = -55 to +175°C
TG = -55 to +200°C
TM = 0 to +55°C
TX = Custom

Qualification
QI = Industrial Grade (Standard)
QM = Medical Grade
QS = Custom Specification

Special feature
H = Harsh environment
F = Filter applications

Micro Crystal: MHz Quartz Crystals

MHz Clock and VCXO Oscillators in Ceramic Packages

Product Type	MCSO	MCSO1	MCSO2 / VCXO2	MCSO2L	MCSO6
Dimensions (l × w) mm	14.1 x 9.5	8.0 x 3.7	5.0 x 3.2	5.0 x 3.2	3.5 x 2.2
					
PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 3.6	 h = 2.1	 h = 1.7	 h = 1.7	 h = 1.4

Standard Clock Oscillators						
Product Type	**Number of pads**	**Frequency**	**Supply V_{DD} V**	**Temp. Range °C**	**Output**	**Key Features / Applications**
MCSO	4	10 kHz to 225 MHz	2.5 / 3.3 / 5.0	-55 to +125	HCMOS	
MCSO1	4	10 kHz to 225 MHz	1.8 / 2.5 / 3.3 / 5.0	-55 to +125	HCMOS	
MCSO2	4	10 kHz to 225 MHz	1.8 / 2.5 / 3.3 / 5.0	-55 to +125	HCMOS	
MCSO2L	6	40 MHz to 130 MHz	2.5 / 3.3	-55 to +125	LVDS	Low-Voltage Differential Signaling
MCSO6	4	10 kHz to 155 MHz	1.8 / 2.5 / 3.3 / 5.0	-55 to +125	HCMOS	Smallest Package, Low Jitter
High Temperature / Harsh Environment Clock Oscillators						
MCSO1E	4	15 kHz to 100 MHz	2.5 / 3.3 / 5.0	-55 to +210	HCMOS	
MCSO1EU	4	32,768 kHz	2.5 / 3.3	-55 to +175	HCMOS	Consumption 20 µA
MCSO1ES	4	15 kHz to 100 MHz	2.5 / 3.3 / 5.0	-10 to +210	HCMOS	High Stability
MCSO2E	4	15 kHz to 100 MHz	2.5 / 3.3 / 5.0	-55 to +210	HCMOS	
MCSO2EU	4	32,768 kHz	2.5 / 3.3	-55 to +175	HCMOS	Consumption 20 µA
MCSO6E	4	15 kHz to 60 MHz	2.5 / 3.3 / 5.0	-55 to +210	HCMOS	Smallest Package
MCSO6EU	4	32,768 kHz	2.5 / 3.3	-55 to +175	HCMOS	Smallest Package, Consumption 20 µA
Standard VCXO						
VCXO2H	4	5 MHz to 170 MHz	3.3	-55 to +125	HCMOS	Low Noise, High APR (±110 to ±130 ppm)
High Temperature / Harsh Environment VCXO						
VCXO2E	4	5 MHz to 40 MHz	3.3	-10 to +210	HCMOS	Very High Shock and Vibration Resistant

Applications

Customer-specific applications such as:

- Security / Safety
- Avionics / Aerospace
- Radio Communication
- Geothermal Equipment
- Remote Control / Telemetry
- Down Hole and Well Drilling
- Microprocessor and FPGA Clocks
- Test and Measurement Equipment
- Wired and Wireless Communications

Ordering Information

MCSO1 F C H V T – C 40.000 MHz E/D T3 XXX

Frequency

F = Low jitter *
Blank = Standard

C = Ceramic lid
Blank = Kovar lid

Frequency range
H = > 20 MHz
Blank = ≤ 20 MHz **

Supply voltage
Z = V_{DD} = 1.8 V
W = V_{DD} = 2.5 V
V = V_{DD} = 3.3 V
Blank = V_{DD} = 5.0 V ***

Frequency stability
T = ±50 ppm
Blank = ±100 ppm

Temperature range
A = 0 to +70°C
B = -40 to +85°C
C = -55 to +125°C
X = Custom

Option 1
E/D = Enable/Disable
Blank = No function

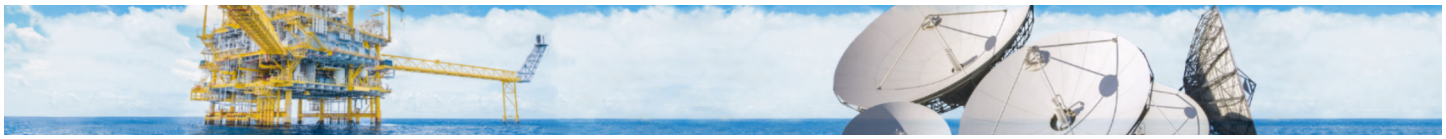
Option 2
T3 = SnAgCu solder dipped pads
Blank = Au flashed pads

Customer specification N°

* One-sigma jitter for low jitter version (F):
t_{RMS} < 2 ps for F ≤ 20 MHz
t_{RMS} < 10 ps for F > 20 MHz

** pin 2 also 45° chamfered for F ≤ 20 MHz

*** 5.0 V version not available for low jitter version (F)

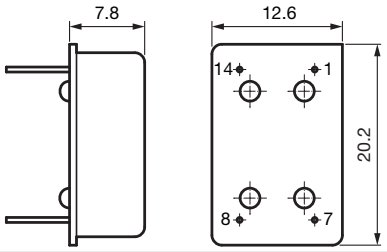


Micro Crystal: MHz Oscillators

Micro Crystal: VCXO Oscillators

MHz OCXO Oscillators in DIL-14 Metal Package

Product Type	OCXO
Dimensions (l × w) mm	20.2 x 12.6



Standard

Product Type	Package Size	Frequency MHz	Supply V_{DD} V	Temp. Range °C	Output	Frequency Stabiity	Current I_{DD}	Key Features / Applications
SCOCXOL	DIL-14	Up to 54	3.3 / 5.0	-55 to +85	HCMOS	From ±25 ppb	From 50 mA	High Stability, Ultra Fast Warm-up, Ultra Low Power
SCOCXO	DIL-14	Up to 120	3.3 / 5.0	-55 to +85	HCMOS	From ±25 ppb	From 80 mA	High Stability, Low Phase Noise
SCOCXOS	DIL-14	Up to 120	3.3 / 5.0	-55 to +85	Sine Wave	From ±25 ppb	From 80 mA	High Stability, Low Phase Noise
OCXOVT-SAR	DIL-14	Up to 40	5.0	-40 to +55	Sine Wave	±3 ppb / 50 s	From 40 mA	Cospas-Sarsat
OCXOS	DIL-14	Up to 54	3.3 / 5.0	-55 to +85	Sine Wave	From ±75 ppb	From 80 mA	
OCXO	DIL-14	Up to 54	3.3 / 5.0	-55 to +85	HCMOS	From ±75 ppb	From 80 mA	

Applications

Customer-specific applications such as:

- Cospas-Sarsat
- Instrumentation
- Digital Switching
- Radio Transceiver
- Airborne Equipment
- Telecom Transmission
- Battery Operated Systems
- Sonet / SDH / DWDM / FDM/36 / WIMAX

Ordering Information

OCXO W T – C V3 20.000 MHz D2 XXX

Supply voltage
W = V_{DD} = 3.3 V
V = V_{DD} = 5.0 V

Frequency stability
T = High stability
Blank = Standard

Temperature range
A = 0 to +60°C
B = -20 to +70°C
C = -40 to +85°C
E = -55 to +85°C *
X = Custom

Frequency control
R1 = R_C = 0 to 10 kΩ
V3 = V_C = 0 to 3.3 V
V5 = V_C = 0.5 to 5.0 V
YA = Internal accuracy ≤ ±1.0 ppm
YB = Internal accuracy ≤ ±0.5 ppm
Y = Custom

Frequency

Option 1
D2 = SMD (formed leads)
Blank = THD (Standard)

Customer specification N°

* E version is only available at 5.0 V version (V)

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Micro Crystal: OCXO Oscillators