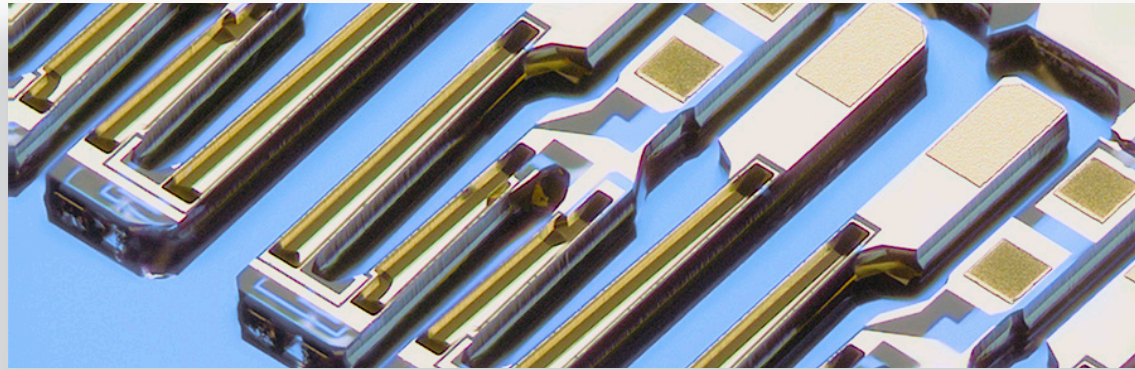


Micro Crystal



kHz Tuning Fork Crystals

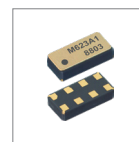
MHz AT-Cut Crystals

Real-Time Clock Modules

Temperature Sensor Module









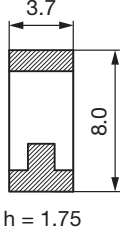
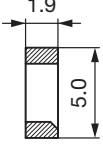
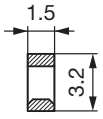
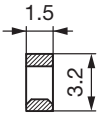
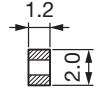
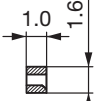
kHz Oscillators

Medical Implantable Products



Short Form Catalog Q4 2024

kHz Tuning Fork Crystals in Ceramic Packages

Crystal Type	30.0 kHz to 2'000 kHz Tuning Fork Crystals							Units
Product Type	CC1V-T1A	CC4V-T1A	CM7V-T1A	CM7V-T1A low ESR	CM8V-T1A	CM9V-T1A		
Dimensions (l x w x h)	8.0 x 3.7 x 1.75	5.0 x 1.9 x 0.90	3.2 x 1.5 x 0.65	3.2 x 1.5 x 0.65	2.0 x 1.2 x 0.60	1.6 x 1.0 x 0.50		mm
								mm
 PCB Symbol, Footprint & 3D Model available on product pages on website								mm
Lid Material	Ceramic	Ceramic	Metal	Metal	Metal	Metal		
Operating Temp. Range TA	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85		°C
Operating Temp. Range TB ¹⁾	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125		°C

Frequency	F _L	32.768	32.768	32.768	32.768	32.768	32.768	kHz
Standard Load Capacitance ²⁾	C _L	9 / 12.5	6 / 7 / 9 / 12.5	6 / 7 / 9 / 12.5	6 / 7 / 9 / 12.5	4 / 7 / 9 / 12.5	4 / 7 / 9 / 12.5	pF
Frequency Tolerance @ 25°C ³⁾	ΔF/F	±20	±20	±20	±20	±20	±20	ppm
Series Resistance typ./max.	R _s	40 / 60	50 / 65	50 / 70	40 / 50	55 / 70	60 / 75	kΩ
Motional Capacitance typ.	C _i	2.0	2.1	3.7	4.7	4.7	6.3	fF
Static Capacitance typ.	C ₀	1.6	1.2	1.2	1.3	1.2	1.4	pF
Drive Level max.	P	1.0	1.0	1.0	1.0	0.5	0.5	μW
Aging max. 1st Year @ 25°C	ΔF/F	±3	±3	±3	±3	±3	±3	ppm
Turnover Temperature	T ₀	25 ±5	25 ±5	25 ±5	25 ±5	25 ±5	25 ±5	°C
Frequency vs. Temperature	ΔF/F	-0.035 ppm/°C ² (T-T ₀) ² ±10%						ppm

1) Also available in -55 to +125°C temp. range (TC).

2) Other load capacitance on request.

3) Tighter and wider frequency tolerances on request.

Applications

- IoT
- Computing
- Automotive
- Wireless Units
- Smart Metering
- Industrial Control
- Embedded Modules
- GPS and Navigation
- Tablets, Smart Phones
- Security and Access Control
- Wearables, Portable Devices
- Remote Keyless Entry Systems
- High Temperature Range Designs
- Ultra Small Size Devices, Smart Cards
- Healthcare, Medical and Medical Implantable

Ordering Information

<p>C M 7 V - T 1 A 0.3</p> <p>Ceramic package</p> <p>Package lid C = Ceramic lid M = Metal lid</p> <p>Package size 1 = 8.0 x 3.7 x 1.75 mm 4 = 5.0 x 1.9 x 0.90 mm 5 = 4.1 x 1.5 x 0.90 mm 7 = 3.2 x 1.5 x 0.65 mm 8 = 2.0 x 1.2 x 0.60 mm 9 = 1.6 x 1.0 x 0.50 mm</p> <p>Tuning fork</p> <p>SMD package</p> <p>Au flashed pads</p> <p>2 pads</p>	<p>32.768 kHz 12.5 pF ±20 ppm TA QC</p> <p>Frequency F_L</p> <p>Load capacitance C_L</p> <p>Frequency tolerance</p> <p>Temperature range TA = -40 to +85°C (Standard) TB = -40 to +125°C</p> <p>Qualification QC = Commercial Grade (Standard) QA = Automotive Grade AEC-Q200 QM = Medical Grade (see page 6)</p> <p>Special feature 0.3 = Lowest profile, 0.35 mm Low ESR = 50 kΩ max.</p>
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




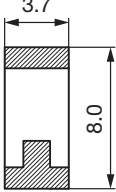
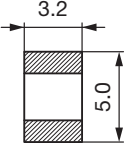
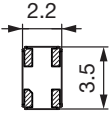
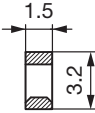




Micro Crystal: kHz Quartz Crystals



www.microcrystal.com

MHz AT-Cut Crystals in Ceramic Packages

Crystal Type	MHz AT-Cut Crystals					
Product Type	CC1A/F	CC2A	CC6A/F	CC7A	CC8A	CM8A
Dimensions (l x w x h) mm	8.0 x 3.7 x 1.75	5.0 x 3.2 x 1.20	3.5 x 2.2 x 1.0/0.8	3.2 x 1.5 x 0.75	2.0 x 1.2 x 0.60	2.0 x 1.2 x 0.60
			 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

Standard (Fundamental Mode)

Product Type	Number of pads	Frequency MHz	Widest Temp. Range °C	Frequency Tol. @ 25°C ± ppm ¹⁾	Stability Options ΔF/F ₀ ± ppm ²⁾	R _s typ. in Ω @ F _{min} - F _{max}	C ₁ typ. in fF @ F _{min} - F _{max}	C ₀ typ. in pF @ F _{min} - F _{max}
CC1A-T1A	2	8 - 30	-55 to +125	50	50/80/100	60 - 30	4 - 11	2.0 - 4.0
CC1F-T1A	2	30 - 250	-55 to +125	50	30/80/100	35 - 15	4 - 7	2.0 - 4.0
CC2A-T1A	2	12 - 70	-55 to +125	50	50/80/100	60 - 10	3 - 12	2.0 - 5.0
CC6A-T1D	4	16 - 70	-55 to +125	50	50/80/100	60 - 20	2 - 5	1.5 - 3.0
CC6F-T1A	2	70 - 250	-55 to +125	50	30/80/100	30 - 15	5 - 6	2.4 - 3.2
CC7A-T1A	2	20 - 50	-55 to +125	50	50/80/100	40 - 25	2 - 2	0.7 - 0.7
CC8A-T1A	2	24 - 50	-55 to +125	50	50/80/100	40 - 20	1 - 1	0.7 - 0.7
CM8A-T1D	4	24 - 50	-55 to +125	50	50/80/100	40 - 20	1 - 1	0.7 - 0.7

High Temperature / Harsh Environment (Fundamental Mode)

CC1A-T1A H	2	8 - 24	-55 to +200	50	100/150/250	100 - 50	4 - 9	2.0 - 3.2
CC2A-T1A H	2	14 - 40	-55 to +200	50	100/150/250	70 - 40	5 - 10	2.5 - 4.0
CC6A-T1D H	4	16 - 40	-55 to +200	50	100/150/250	80 - 50	2 - 4	1.5 - 2.5

- 1) Tighter frequency tolerances on request.
2) Tighter thermal stability on request.

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	Frequency F_L	Load capacitance C_L	Frequency tolerance	Temperature range	Qualification
Package lid C = Ceramic lid M = Metal lid				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 TX = Custom	QI = Industrial Grade (Standard) QM = Medical Grade (see page 6) QS = Custom Specification
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					Special feature H = Harsh environment
Quartz blank A = AT-Cut F = AT-Cut inverted mesa					
SMD package					
Au flashed pads					
Number of pads A = 2 pads D = 4 pads					







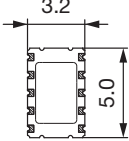
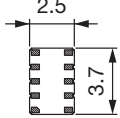
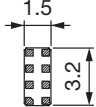



Micro Crystal: MHz Quartz Crystals



www.microcrystal.com

RTC Modules in Ceramic Packages

Product Type	RV-xxxx-C2	RV-xxxx-C3	RV-xxxx-C7	RV-xxxx-C8
Dimensions (l x w x h) mm	5.0 x 3.2 x 1.2	3.7 x 2.5 x 0.9	3.2 x 1.5 x 0.8	2.0 x 1.2 x 0.7
				
 PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 1.2	 h = 0.9	 h = 0.8	 h = 0.7
Lid Material	Glass	Metal	Metal	Metal

Standard RTC Modules

Product Type	Interface	Special Feature	Time Accuracy ppm		Supply V _{DD} V	Current I _{DD} nA	T _{OPR} °C	Offset Comp.	Backup Switch	Trickle Charge	Event Input	RAM Bytes	EEPROM Bytes
			@ 25°C	-40 to +85°C									
RV-3028-C8	I ² C	Ultra-Small	±1		1.1 to 5.5	75	-40 to +85	✓	✓	✓	✓	2	43
RV-8263-C8	I ² C	Ultra-Small	±20		0.9 to 5.5	190	-40 to +85	✓				1	
RV-3028-C7	I ² C	Lowest Power	±1		1.1 to 5.5	45	-40 to +85	✓	✓	✓	✓	2	43
RV-4162-C7	I ² C	Small Package	±20		1.0 to 4.4	350	-40 to +85	✓					
RV-8263-C7	I ² C	Low Power	±20		0.9 to 5.5	190	-40 to +85	✓				1	
RV-8564-C2	I ² C		±20		1.2 to 5.5	250	-40 to +85						
RV-8564-C3	I ² C		±20		1.2 to 5.5	250	-40 to +85						
RV-8523-C3	I ² C	Low Power	±20		1.2 to 5.5	130	-40 to +85	✓	✓				
RV-3032-C7	I ² C	Highest Accuracy 12-bit T-Sensor		±2.5	1.3 to 5.5	160	-40 to +105	✓	✓	✓	✓	16	32
RV-8803-C7	I ² C	Highest Accuracy		±3.0	1.5 to 5.5	240	-40 to +105	✓			✓	1	
RV-3129-C3	I ² C	Highest Accuracy 8-bit T-Sensor		Opt. A: ±6 Opt. B: ±25	1.3 to 5.5	800	-40 to +125		✓	✓		8	2
RV-8063-C8	SPI	Ultra-Small	±20		0.9 to 5.5	190	-40 to +85	✓				1	
RV-8063-C7	SPI	Low Power	±20		0.9 to 5.5	190	-40 to +85	✓				1	
RV-2123-C2	SPI	Low Power	±20		1.1 to 5.5	130	-40 to +85	✓					
RV-3149-C3	SPI	Highest Accuracy 8-bit T-Sensor		Opt. A: ±6 Opt. B: ±25	1.3 to 5.5	800	-40 to +125		✓	✓		8	2

Applications

System power consumption can be greatly reduced by using Micro Crystal's small, high-accuracy and low-power RTC Modules for:

- IoT
- Telemetry
- Smart Metering
- POS, SPS Control
- Energy Harvesting Solutions
- Battery Management Systems
- Automotive, GPS and Drive Recorders
- IP Cameras, Alarm and Building Control
- Door Lock and Access Control Systems
- Industrial, Computing, Embedded Systems
- Wearables, Activity Bands, Fitness Trackers
- Healthcare, Medical and Medical Implantable

Ordering Information

RV - 3129 - C3	Option A	TA	QC
RTC Module			Qualification
Product type			QC = Commercial Grade (Standard)
Package size			QA = Automotive Grade AEC-Q200
C2 = 5.0 x 3.2 x 1.2 mm			QM = Medical Grade (see page 6)
C3 = 3.7 x 2.5 x 0.9 mm			Temperature range
C7 = 3.2 x 1.5 x 0.8 mm			TA = -40 to +85°C (Standard)
C8 = 2.0 x 1.2 x 0.7 mm			TB = -40 to +125°C
Time accuracy			
Option A = ±6 ppm @ -40°C to +85°C			
Option B = ±25 ppm @ -40°C to +85°C			

 **Linux Drivers available**

 **Demo Boards available**



Micro Crystal: RTC Modules








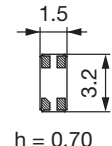
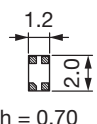
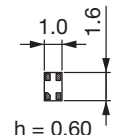
Temperature Sensor Module in Ceramic Package

12-bit Temperature Sensor Module with RTC

Product Type	Dimensions (l x w x h) mm	Accuracy -40 to 85°C	Readable Resolution	Supply V _{DD} V	Current I _{DD} nA	T _{OPR} °C	T-Threshold Alarms	Time Stamps	RTC Time -40 to 85°C	Interface
TS-3032-C7 ¹⁾	3.2 x 1.5 x 0.80	±1°C	0.0625°C	1.3 to 5.5	160	-40 to +105	✓	✓	±2.5 ppm	I ² C

1) For RTC functionality, see RV-3032-C7 on page 4.

kHz Oscillators in Ceramic Packages

Product Type	OM-xxxx-C7	OM-xxxx-C8	OM-xxxx-C9
Dimensions (l x w x h) mm	3.2 x 1.5 x 0.70	2.0 x 1.2 x 0.70	1.6 x 1.0 x 0.60
			
 PCB Symbol, Footprint & 3D Model available on product pages on website	 h = 0.70	 h = 0.70	 h = 0.60
Lid Material	Metal	Metal	Metal

Standard kHz Oscillators

Product Type	Dimensions (l x w x h) mm	Frequency kHz	ΔF/F @ 25°C ppm	Supply V _{DD} V	Current I _{DD} nA	T _{OPR} °C	Duty Cycle %	CLKOE Input	Δf/V ppm/V	Aging 1Y @ 25°C ppm
OM-7604-C7	3.2 x 1.5 x 0.70	32.768	±20 ¹⁾	1.2 to 5.5	300	-40 to +125	40 to 60	✓	±1.5	±3.0
OM-7605-C8	2.0 x 1.2 x 0.70	32.768	±20 ¹⁾	1.6 to 5.5	450	-40 to +125	40 to 60	✓	±3.0	±3.0
OM-7605-C9	1.6 x 1.0 x 0.60	32.768	±20 ¹⁾	1.6 to 5.5	450	-40 to +125	40 to 60	✓	±3.0	±3.0
OM-0100-C7	3.2 x 1.5 x 0.70	100.000	±20 ¹⁾	1.2 to 5.5	650	-40 to +85	40 to 60	✓	±1.5	±3.0
OM-0100-C8	2.0 x 1.2 x 0.70	100.000	±20 ¹⁾	1.6 to 5.5	550	-40 to +85	40 to 60	✓	±3.0	±3.0

1) Tighter and wider frequency tolerances on request.

Applications

Lowest current, smallest package and high accuracy make Micro Crystal's oscillators ideal for:

- IoT
- Smart Pens
- Industrial Computing
- Wearables and Activity Bands
- Automotive, Driver Assistance
- Driving Recorders, Camera Systems
- Navigation and Emergency Call Systems
- Bluetooth Low Energy (BLE) Applications
- Tire Pressure Monitoring Systems (TPMS)
- Healthcare, Medical and Medical Implantable

Ordering Information

O M - 7604 - C7 ±20 ppm TA QC	
Product O = Oscillator	Qualification QC = Commercial Grade (Standard) QA = Automotive Grade AEC-Q200 QM = Medical Grade (see page 6)
Package lid M = Metal lid V = Ceramic lid (see page 6)	Temperature range TA = -40 to +85°C (Standard) TB = -40 to +125°C
Frequency 0100 = 100.000 kHz 7604 = 32.768 kHz 7605 = 32.768 kHz	Frequency tolerance¹⁾
Package size C7 = 3.2 x 1.5 mm C8 = 2.0 x 1.2 mm C9 = 1.6 x 1.0 mm	










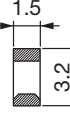
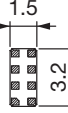
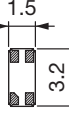
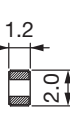
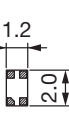
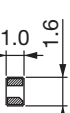
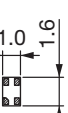


Micro Crystal: T-Sensor Module



Micro Crystal: kHz Oscillators

Medical Implantable Products

Product Type	CC7	RV-xxxx-C7	OV-xxxx-C7	CC8	OV-xxxx-C8	CC9	OV-xxxx-C9
Dimensions (l x w) mm	3.2 x 1.5			2.0 x 1.2		1.6 x 1.0	
							
Full Ceramic Packages  PCB Symbol, Footprint & 3D Model available on product pages on website							
	Crystal	RTC	Oscillator	Crystal	Oscillator	Crystal	Oscillator

kHz Tuning Fork Crystals

Product Type	Height mm	Frequency kHz	Frequency Tol. @ 25°C
CC7V-T1A Medical	0.90	32 - 100	±20 ppm
CC8V-T1A Medical	0.67	32 - 102.4	±20 ppm
CC8V-T1A Thin Medical	0.48	32.768	±20 ppm
CC9V-T1A Medical	0.55	32.768	±20 ppm

MHz AT-Cut Crystals

Product Type	Height mm	Frequency MHz	Frequency Tol. @ 25°C
CC7A-T1A Medical	0.75	14 - 50	±30 ppm
CC8A-T1A Medical	0.60	24 - 50	±30 ppm
CC9A-T1A Medical ¹⁾	0.50	32 - 50	±30 ppm

1) In qualification.

Low Frequency Clock Oscillators

Product Type	Height mm	Frequency kHz	Supply V _{DD} V	Current I _{DD} nA
OV-7604-C7 Medical	1.0	32.768	1.2 to 5.5	300
OV-7605-C8 Medical	0.80	32.768	1.6 to 5.5	450
OV-7605-C9 Medical	0.65	32.768	1.6 to 5.5	450
OV-0100-C8 Medical	0.80	100.000	1.6 to 5.5	550

Real-Time Clock Module

Product Type	Height mm	Time Acc. @ 25°C	Supply V _{DD} V	Current I _{DD} nA
RV-5028-C7 Medical	1.0	±1 ppm	1.1 to 5.5	45

Key Features

- Hermetic full ceramic package
- Non-magnetic
- Safe for Helium environment
- Proprietary manufacturing and testing processes
- Full traceability records retained

Applications

- Pacemakers
- Defibrillators
- Infusion Pumps
- Neurostimulators
- Cochlear Implants
- Smart Orthopedic Implants
- Cardiac Monitoring Devices
- Implantable Drug Delivery Pumps



Micro Crystal: Medical Implantable



www.microcrystal.com

Micro Crystal – The Art of Timing

Company

Micro Crystal AG is a company of the Swatch Group Inc. Switzerland, the world's leading watchmaker. Micro Crystal applies high-tech Swiss MEMS technology for the manufacture of ultra-high precision Quartz Crystal Resonators, Oscillators and Real-Time Clock Modules. Focused on mass production of high-quality components, Micro Crystal supports not only large volume consumer applications, but also high-reliability automotive and medical implantable components. Using its manufacturing facilities in Switzerland and Thailand, the company produces the smallest available Quartz Crystal Resonators, Oscillators

and Real-Time Clock Modules. Micro Crystal timing devices, offering the world's lowest power consumption, are perfectly suited for today's IoT and wearables applications. Most of its products are AEC-Q200 qualified. Micro Crystal's production facilities are ISO 9001, ISO 14001 and IATF 16949 certified; and comply with all social and environmental regulations.

Micro Crystal, a leading player in this market, offers cost competitive products through its worldwide distribution and customer support networks.



Applications and Markets

Telecommunications and Industrial

Wearables and IoT

Automotive

Healthcare and Medical Implantable



Europe

Headquarters Switzerland

Micro Crystal AG
Muehlestrasse 14
CH-2540 Grenchen
Switzerland
Phone +41 32 655 82 82
sales@microcrystal.com
www.microcrystal.com

Central and Southern Europe

Micro Crystal
Swatch Group (Deutschland) GmbH
Wagenbacher Weg 11
74924 Neckarbischofsheim
Germany
Phone +49 72 68 91 12 53
sales.germany@microcrystal.com

Northern Europe

Micro Crystal
The Swatch Group (UK) Ltd.
Building 1000
The Royals Business Park
Dockside Road
London, United Kingdom E16 2QU
Phone +44 7483 449 531
sales.nordic@microcrystal.com

America

Western US

Micro Crystal
The Swatch Group (U.S.) Inc.
Fremont, CA
USA
Phone +1 510 767 8539
sales.us@microcrystal.com

Southern US

Micro Crystal
The Swatch Group (U.S.) Inc.
Spring Hill, TN
USA
Phone +1 949 231 0972
sales.us@microcrystal.com

Northeastern US

Micro Crystal
The Swatch Group (U.S.) Inc.
Pepperell, MA
USA
Phone +1 978 302 3135
sales.us@microcrystal.com

Asia

China (Shanghai)

Micro Crystal
The Swatch Group (China) Ltd.
20/F, THREE itc Tower A
No. 183 Hongqiao Road
Shanghai 200030
China
Phone +86 21 2412 5280
sales.shanghai@microcrystal.com

China (Shenzhen)

Micro Crystal
The Swatch Group (China) Ltd.
6F, Hubei Baofeng Building
No. 1054 Baoan South Road, Luohu
District, Shenzhen 518001
China
Phone +86 755 8832 0687
sales.shenzhen@microcrystal.com

Korea

Micro Crystal
The Swatch Group (Korea) Ltd.
10F, National Pension Service Building
36 Chungjeongno
Seodaemun-gu, Seoul 03741
Korea
Phone +82 2 3149 8290
sales.korea@microcrystal.com

Taiwan

Micro Crystal
The Swatch Group (Taiwan) Ltd.
14F, No. 8, Sec. 7, Civic Blvd.,
Nangang Dist. Taipei (115)
Taiwan
Phone +886 2 2652 3689
sales.taiwan@microcrystal.com



Micro Crystal: Contacts



www.microcrystal.com