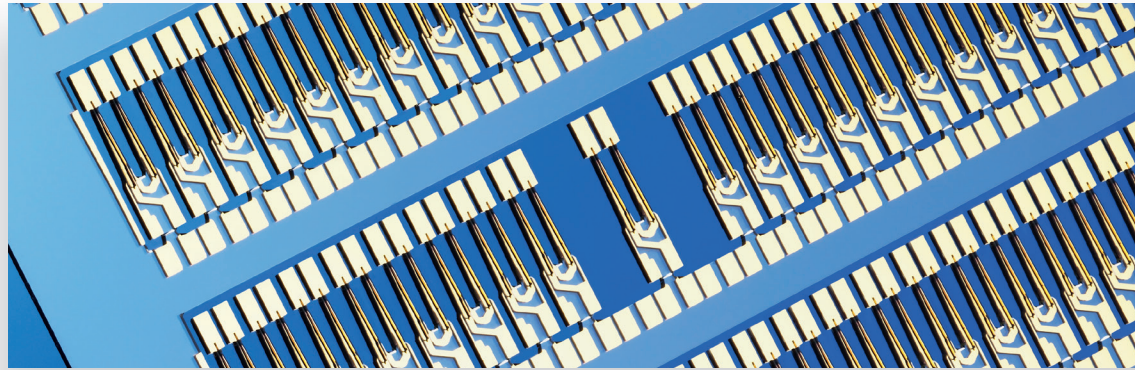


Micro Crystal

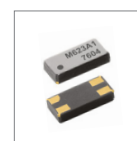
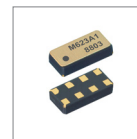
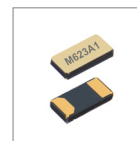
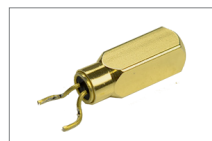
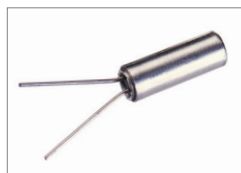


kHz Tuning Fork Crystals

MHz AT-Cut Crystals

Real-Time Clocks

Low Frequency Oscillators



Short Form Catalog 2018

Micro Crystal - Where timing begins!

Company

Micro Crystal is a company fully owned by the Swatch Group, the worldwide leader in watchmaking. Micro Crystal uses a high tech Swiss MEMS technology for the ultrahigh precision manufacturing of Quartz Crystal Resonators, Oscillators and Real-Time Clock Modules. Focused on mass production of high quality components, Micro Crystal serves not only high volume consumer applications, but also high reliability automotive and medical implantable applications. Using its manufacturing facilities in Switzerland and Thailand, Micro Crystal produces the smallest Quartz Crystal Resonators, Oscillators and Real-

Time Clock Modules. Micro Crystal's products achieving the world lowest power consumption, are perfectly suited for the IoT and wearables applications. Most of our products are also AEC-Q200 rev. D qualified. Micro Crystal and its production facilities are ISO 9001 and ISO 14001 qualified, and fulfill all social and environmental regulations.

Micro Crystal, as a major player in this field, offers cost competitive products using its worldwide operation, distribution and support networks.

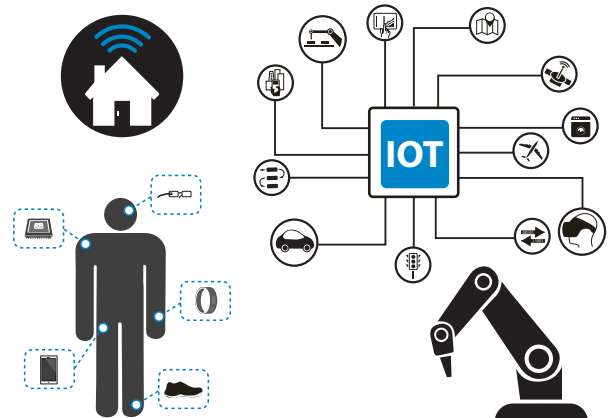


Applications and Markets

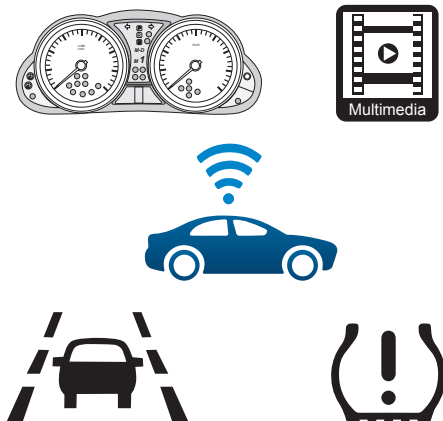
Telecommunications and Industrial



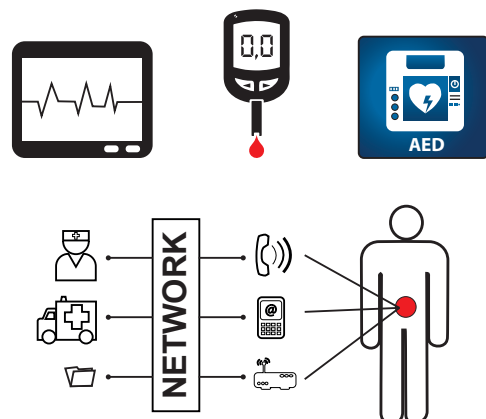
Wearables and IoT







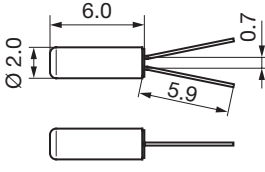
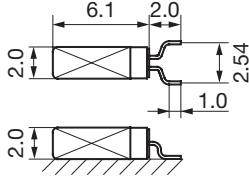
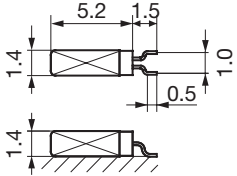
Automotive



Medical and Health Care / Implantable



kHz Tuning Fork Crystals in Metal Packages

Crystal Type		Watch Crystal	30 kHz to 200 kHz SMT Package Crystal		Units
Product Type		DS26-L3N	MS1V-T1K	MS3V-T1R	
Dimensions (w x h x l) mm		Ø 2.0 x 6.0	2.0 x 2.0 x 6.1	1.4 x 1.4 x 5.2	
					
					
Package Form		Round	Square	Square	
Leads		Straight	SMD Formed Leads	SMD Formed Leads	
Operating Temp. Range TA		-10 to +60	-40 to +85	-40 to +85	°C

Frequency	F_L	32.768	32.768	32.768	kHz
Standard Load Capacitance ¹⁾	C_L	8.2	7 / 9 / 12.5	7 / 9 / 12.5	pF
Frequency Tolerance @ 25°C ²⁾	$\Delta F/F$	±20	±20	±20	ppm
Series Resistance typ./max.	R_s	30 / 42	45 / 60	50 / 65	kΩ
Motional Capacitance typ.	C_1	2.25	2.25	2.25	fF
Static Capacitance typ.	C_0	0.9	0.9	0.9	pF
Drive Level max.	P	1.0	1.0	1.0	μW
Aging max. 1st Year @ 25°C	$\Delta F/F$	±3	±3	±3	ppm
Turnover Temperature	T_0	25 ±5	25 ±5	25 ±5	°C
Frequency vs. Temperature	$\Delta F/F$	-0.035 ppm/°C ² (T-T ₀) ² ±10%			ppm

1) Other load capacitance on request.
2) Tighter and wider frequency tolerances on request.

Applications








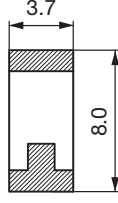
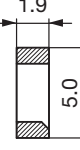




- IoT
- White Goods
- Cellular Phones
- Gaming Electronics
- Wearables, Watches
- TV and Set Top Boxes
- ATM and POS Systems
- Medical and Health Care
- Security and Access Control
- Industrial and Consumer Electronics
- Data Logger, Home and Factory Automation
- E-Meter, Heating Counter, Smart Meter, PV Converter

Ordering Information

	MS3V-T1R	32.768 Hz	12.5 pF	±20 ppm	TA
				Temp. range	
Product type	MS1V = 2.0 x 2.0 x 6.1 mm MS3V = 1.4 x 1.4 x 5.2 mm DS26 = Ø 2.0 x 6.0 mm DS15 = Ø 1.5 x 5.0 mm DS10 = Ø 1.0 x 4.3 mm			Frequency tolerance	
				Load capacitance C_L	
				Frequency F_L	
				Package lead form N = Straight leads K = SMD spacing 2.54 mm R = SMD spacing 1.0 mm	
				Lead plating 1 = Au flashed leads 3 = SnCu plated leads	
				Package type T = SMT Package L = Low temperature package	



kHz Tuning Fork Crystals in Ceramic Packages

Crystal Type	32.0 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) mm		8.0 x 3.7 x 1.75	5.0 x 1.9 x 0.9	3.2 x 1.5 x 0.65	3.2 x 1.5 x 0.65	2.0 x 1.2 x 0.6	1.6 x 1.0 x 0.5	
				 h = 0.35 on request				
		 h = 1.75	 h = 0.9	 h = 0.65	 h = 0.65	 h = 0.6	 h = 0.5	
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	7 / 9 / 12.5	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	37 / 60	50 / 65	50 / 70	40 / 50	55 / 75	75 / 90	kΩ
Motional Capacitance typ.	C ₁	2.1	2.1	3.7	4.7	4.0	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).

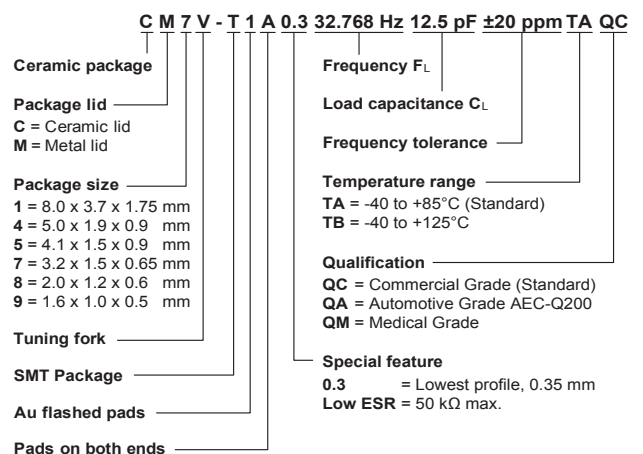
2) Other load capacitance on request.

3) Tighter and wider frequency tolerances on request.



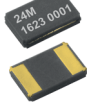



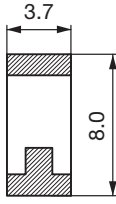
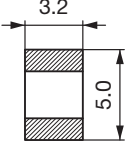
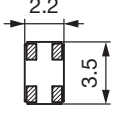
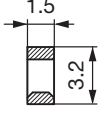
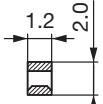
Applications

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

Ordering Information



MHz AT-Cut Crystals in Ceramic Packages

Crystal Type	MHz AT-Cut Crystals				
Product Type	CC1A/F	CC2A	CC6A/F	CC7A	CC8A
Dimensions (l x w x h) mm	8.0 x 3.7 x 1.75	5.0 x 3.2 x 1.2	3.5 x 2.2 x 0.9	3.2 x 1.5 x 0.9	2.0 x 1.2 x 0.63
			 4 or 2 pads available		
	 h = 1.75	 h = 1.2	 h = 0.9	 h = 0.9	 h = 0.63

Standard

Product Type	Dimensions (l x w x h) mm	Frequency MHz	Operating Temp. °C	R _s typ. Resistance at F _{min} and F _{max}	C ₁ typ. Capacitance at F _{min} and F _{max}	C ₀ typ. Capacitance at F _{min} and F _{max}	Features
CC1A-T1A	8.0 x 3.7 x 1.75	8 - 30	-55 to +125	60 to 30 Ω	4.0 to 11 fF	2.0 to 4.0 pF	
CC1F-T1A	8.0 x 3.7 x 1.75	30 - 250	-55 to +125	50 to 15 Ω	4.0 to 6.0 fF	2.4 to 6.0 pF	
CC2A-T1A	5.0 x 3.2 x 1.2	12 - 70	-55 to +125	60 to 10 Ω	3.0 to 12 fF	2.0 to 5.0 pF	
CC6A-T1A	3.5 x 2.2 x 0.9	16 - 70	-55 to +125	60 to 20 Ω	2.0 to 5.0 fF	1.5 to 3.0 pF	
CC6F-T1A	3.5 x 2.2 x 0.9	70 - 250	-55 to +125	60 to 15 Ω	2.7 to 5.6 fF	2.4 to 2.9 pF	
CC6F-T1AF	3.5 x 2.2 x 0.9	70 - 200	-55 to +125	60 to 35 Ω	2.0 to 3.0 fF	2.4 to 2.9 pF	Filter Applications Low Spurious
CC7A-T1A	3.2 x 1.5 x 0.9	24 - 50	-55 to +125	100 to 50 Ω	1.0 to 3.0 fF	0.5 to 2.0 pF	Med. Implantable
CC8A-T1A	2.0 x 1.2 x 0.63	24 - 50	-55 to +125	120 to 50 Ω	1.0 to 3.0 fF	0.5 to 2.0 pF	Med. Implantable

High Temperature

CC1A-T1AH	8.0 x 3.7 x 1.75	8 - 24	-55 to +200	100 to 50 Ω	4.0 to 9.0 fF	2.0 to 3.2 pF	Harsh Environment
CC2A-T1AH	5.0 x 3.2 x 1.2	12 - 40	-55 to +200	70 to 40 Ω	5.0 to 10 fF	2.5 to 4.0 pF	Harsh Environment
CC6A-T1AH	3.5 x 2.2 x 0.9	16 - 40	-55 to +200	80 to 50 Ω	2.0 to 9.0 fF	1.5 to 3.0 pF	Harsh Environment

Applications

Products are screened and specially tested.

- Telemetry
- Optical Network
- Airborne Equipment
- Medical Implantable
- Radio Communications
- Health Care and Medical
- Down Hole and Well Drilling

Description

This SMT quartz crystal in ceramic package has been specially designed for surface mounting using vapor phase soldering, epoxy assembling technology, and standard reflow soldering.




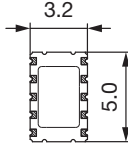
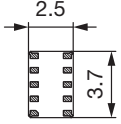
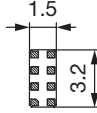
All quartz crystals are in fundamental mode frequency range up to 250 MHz.

Specially designed for harsh environmental shock and vibration.

Extremely wide operating temperature range up to 200°C, with an ultra low internal moisture level.



RTC Modules in Ceramic Packages

Product Type	RV-xxxx-C2	RV-xxxx-C3	RV-xxxx-C7
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
			
			
Lid Material	Glass	Metal	Metal

I²C-Bus Interface

Product Type	Main Feature	Bus	Time Accuracy	Supply V _{DD} V	Current I _{DD} nA	T _{OP} °C	Offset Comp.	Temp. Comp.	Backup Switch	Trickle Charge	Event Input	RAM Bytes	EEPROM Bytes
RV-4162-C7	Standard	I ² C	±20 ppm @ 25°C	1.0 to 4.4	350	-40 to +85	✓						
RV-8564-C2	Standard	I ² C	±20 ppm @ 25°C	1.2 to 5.5	250	-40 to +85							
RV-8564-C3	Standard	I ² C	±20 ppm @ 25°C	1.2 to 5.5	250	-40 to +85							
RV-2251-C3	Power Management	I ² C	±20 ppm @ 25°C	0.9 to 5.5	210	-40 to +85	✓		✓	✓		1	
RV-8523-C3	Ultra Low Power	I ² C	±20 ppm @ 25°C	1.2 to 5.5	130	-40 to +85	✓		✓				
RV-1805-C3	X-Treme Low Power	I ² C	±2 ppm @ 25°C Factory calibrated	1.5 to 3.6	60	-40 to +85	✓		✓	✓	✓	256	
RV-3029-C2	Temperature Comp.	I ² C	A ±6 ppm @ -40°C to +85°C B ±25 ppm @ -40°C to +85°C	1.3 to 5.5	800	-40 to +125		✓	✓	✓		8	2
RV-3029-C3	Temperature Comp.	I ² C	A ±6 ppm @ -40°C to +85°C B ±25 ppm @ -40°C to +85°C	1.3 to 5.5	800	-40 to +125		✓	✓	✓		8	2
RV-8803-C7	Temperature Comp.	I ² C	±3 ppm @ -40°C to +85°C	1.5 to 5.5	240	-40 to +85	✓	✓			✓	1	

SPI-Bus Interface

Product Type	Main Feature	Bus	Time Accuracy	Supply V _{DD} V	Current I _{DD} nA	T _{OP} °C	Offset Comp.	Temp. Comp.	Backup Switch	Trickle Charge	Event Input	RAM Bytes	EEPROM Bytes
RV-8063-C7	Standard	SPI	±20 ppm @ 25°C	0.9 to 5.5	190	-40 to +85	✓					1	
RV-2123-C2	Ultra Low Power	SPI	±20 ppm @ 25°C	1.1 to 5.5	130	-40 to +85	✓						
RV-3049-C2	Temperature Comp.	SPI	A ±6 ppm @ -40°C to +85°C B ±25 ppm @ -40°C to +85°C	1.3 to 5.5	800	-40 to +125		✓	✓	✓		8	2
RV-3049-C3	Temperature Comp.	SPI	A ±6 ppm @ -40°C to +85°C B ±25 ppm @ -40°C to +85°C	1.3 to 5.5	800	-40 to +125		✓	✓	✓		8	2

Applications

System power management can be greatly enhanced using Micro Crystals high precision, low power RTC modules:

- IoT
- POS, SPS Control
- Metering, Smart Meter
- Battery Management System
- Automotive, GPS and Drive Recorder
- Industrial, Computing, Embedded Systems
- Wearables, Activity Bands, Sports Monitors
- Health Care, Glucose Meters, Drug Dispensers
- IP Cameras, Alarm and Building Control, Telemetry

Ordering Information

RV - 3029 - C3 Option A TA QC

RTC module

Product type

Package size
 C2 = 5.0 x 3.2 x 1.2 mm
 C3 = 3.7 x 2.5 x 0.9 mm
 C7 = 3.2 x 1.5 x 0.8 mm

Time accuracy
 Option A = ±6 ppm @ -40°C to +85°C
 Option B = ±25 ppm @ -40°C to +85°C





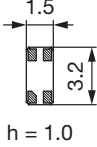
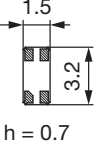
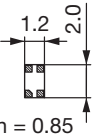
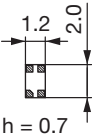
Qualification
 QC = Commercial Grade (Standard)
 QA = Automotive Grade AEC-Q200

Temperature range
 TA = -40 to +85°C (Standard)
 TB = -40 to +125°C

Linux Drivers available



Low Frequency Oscillators in Ceramic Packages

Product Type	OV-xxxx-C7	OM-xxxx-C7	OV-xxxx-C8	OM-xxxx-C8
Dimensions (l x w x h) mm	3.2 x 1.5 x 1.0	3.2 x 1.5 x 0.7	2.0 x 1.2 x 0.85	2.0 x 1.2 x 0.7
				
				
Lid Material	Ceramic	Metal	Ceramic	Metal

32.768 kHz Oscillators

Product Type	Frequency kHz	$\Delta F/F$ @ 25°C ppm	Supply V _{DD} V	Current I _{DD} nA	T _{OP} °C	Duty Cycle %	CLKOE Input	$\Delta f/V$ ppm/V	Aging 1Y @ 25°C ppm	T ₀ °C	Frequency vs. Temperature ppm
OV -7604-C7	32.768	± 20 ¹⁾	1.2 to 5.5	300	-40 to +125	40 to 60	✓	± 1.5	± 3.0	25 ± 5	-0.035 ppm/°C ² (T-T ₀) ² $\pm 10\%$
OM -7604-C7	32.768	± 20 ¹⁾	1.2 to 5.5	300	-40 to +125	40 to 60	✓	± 1.5	± 3.0	25 ± 5	
OV -7605-C8	32.768	± 20 ¹⁾	1.6 to 5.5	450	-40 to +85	40 to 60	✓	± 3.0	± 3.0	25 ± 5	
OM -7605-C8	32.768	± 20 ¹⁾	1.6 to 5.5	450	-40 to +85	40 to 60	✓	± 3.0	± 3.0	25 ± 5	

100 kHz Oscillators

OV -0100-C7	100.000	± 20 ¹⁾	1.2 to 5.5	650	-40 to +85	40 to 60	✓	± 1.5	± 3.0	18 ± 5	-0.035 ppm/°C ² (T-T ₀) ² $\pm 10\%$
OM -0100-C7	100.000	± 20 ¹⁾	1.2 to 5.5	650	-40 to +85	40 to 60	✓	± 1.5	± 3.0	18 ± 5	
OV -0100-C8	100.000	± 20 ¹⁾	1.6 to 5.5	550	-40 to +85	40 to 60	✓	± 3.0	± 3.0	28 ± 5	
OM -0100-C8	100.000	± 20 ¹⁾	1.6 to 5.5	550	-40 to +85	40 to 60	✓	± 3.0	± 3.0	28 ± 5	

1) Tighter and wider frequency tolerances on request.

Applications

High precision, low current, and small package sizes make Micro Crystal Oscillators ideal for:

- IoT
- Smart Pens
- Industrial Computing
- Wearables and Activity Bands
- Health Care, Medical and Medical Implantable
- Clock Source (i.e., for sleep mode Bluetooth LE)
- Automotive, Emergency Call Units, Remote Keyless Entry

Ordering Information

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



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