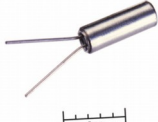


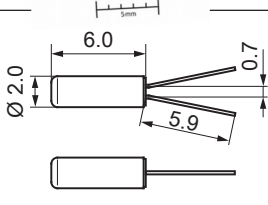
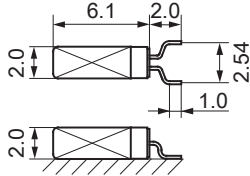
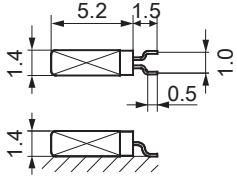


kHz Tuning Fork Crystals in Metal Packages

Crystal Type		Watch Crystal	30 kHz to 200 kHz SMT Package Crystal		Units
Product Type		DS26-L3N	MS1V-T1K	MS3V-T1R	
Dimensions (w × h × l) mm		∅ 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

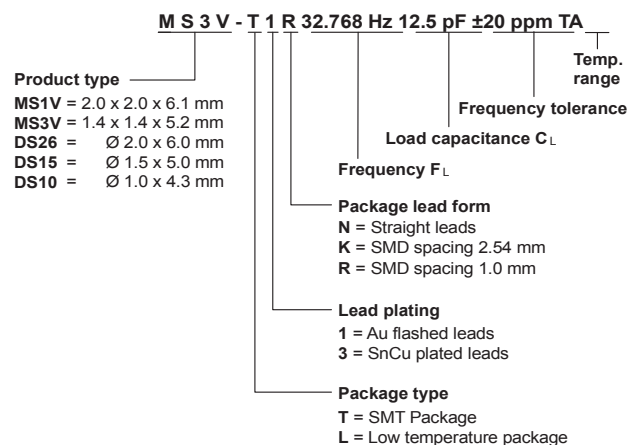
Frequency	F_L	32.768	32.768	32.768	kHz
Standard Load Capacitance ¹⁾	C_L	8.2	7 / 9 / 12.5	7 / 9 / 12.5	pF
Frequency Tolerance @ 25°C ²⁾	$\Delta F/F$	±20	±20	±20	ppm
Series Resistance typ./max.	R_s	30 / 42	45 / 60	50 / 65	kΩ
Motional Capacitance typ.	C_1	2.25	2.25	2.25	fF
Static Capacitance typ.	C_0	0.9	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.









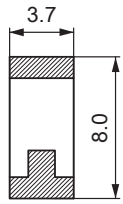
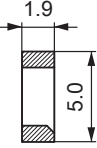
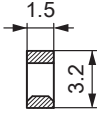
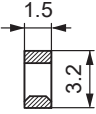
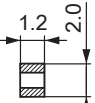
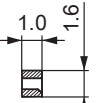
Applications

- 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



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 × w × 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).

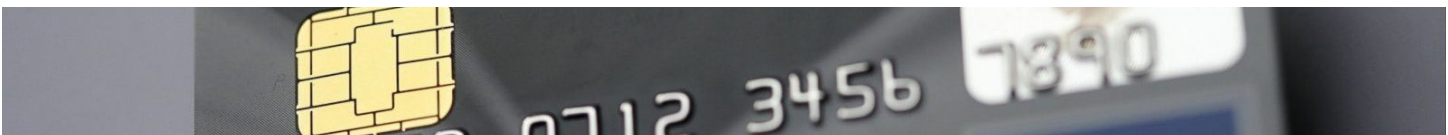
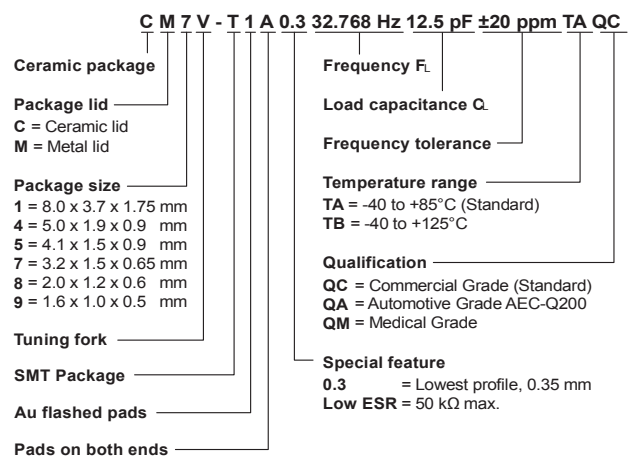
2) Other load capacitance on request.

3) Tighter and wider frequency tolerances on request.





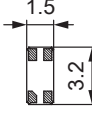
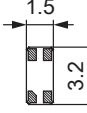
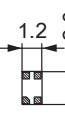
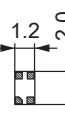
Applications

- 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



Low Frequency Oscillators in Ceramic Packages

Product Type	OV-xxxx-C7	OM-xxxx-C7	OV-xxxx-C8	OM-xxxx-C8
Dimensions (l × w × 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
				
	 h = 1.0	 h = 0.7	 h = 0.85	 h = 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	3	± 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	3	± 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	± 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	± 3.0	± 3.0	25 ± 5	

100 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 -0100-C7	100.000	± 20 ¹⁾	1.2 to 5.5	650	-40 to +85	40 to 60	3	± 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	3	± 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	± 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	± 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	



RFWD6S



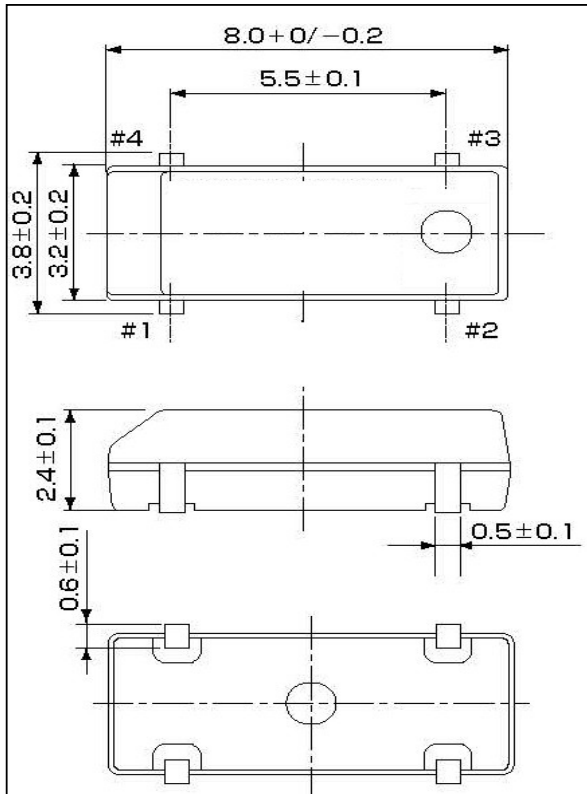
Features

- Frequency Range:30-200KHz
- Suited for automatic mounting and reflow soldering
- For a clock source in digital equipments

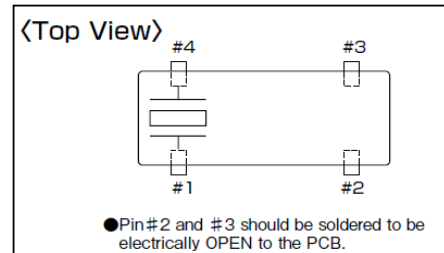
STANDARD SPECIFICATIONS

Frequency Range	頻率範圍	32.768KHz	Need to specify
Load Capacitance	負載電容	6pF	Need to specify
Drive Level	激勵電	1.0μW Max	
Frequency Tolerance	調整頻差	±20ppm	at 25 °C Need to specify
Series Resistance	諧振電阻	50Kohm Max	at 25 °C Depend on frequency
Turnover Temperature	拐點溫度	25±5 °C	
Temperature Coefficient	二次溫度係數	[-0.035±0.01]ppm/ °C ²	
Operating Temperature Range	工作溫度範圍	-40~+85 °C	
Storage Temperature Range	保存溫度範圍	-55~+125 °C	
Motional Capacitance	動態電容	0.0030pF Typical	Depend on frequency
Shunt Capacitance	靜態電容	1.45pF Typical	Depend on frequency
Aging[first year]	第一年老化率	±5ppm Max	25 °C ±3 °C
Insulation Resistance	絕緣阻抗	500Mohm Min.	DC100V±15V(Pin to Pin,Pin to case)

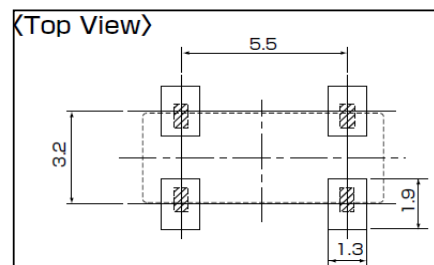
OUTLINE DIMENSIONS (unit:mm)



INTERNAL CONNECTIONS



RECOMMENDED LAND PATTEEN (unit:mm)



Remarks:

1. Do not connect terminals 2#,3# to external device and GND. These are dummy terminals.
2. The part of cylinder inside resin mold may be expos it does not affect the characteristics of crystal unit.

Feature

- 32.768KHz(32KHz to 100KHz)
- H=1.4mm Max.
- Fundamental
- Compatible with MC146
- Application: Small Communication Devices



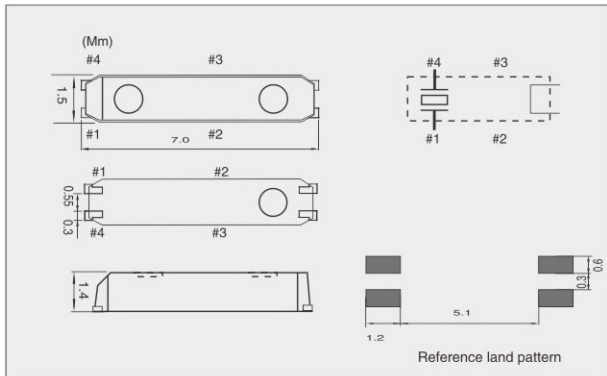
Specifications

RoHS Compliant REACH Compliant

Item	Model	RFWD7 Series
Frequency Range		32.768KHz
Oscillator Mode		Tuning Fork
Frequency Tolerance (25± 3°C)		±20PPM
Temperature Characteristics (with reference to +25°C)		±20PPM
Operating Temperature Range		-40 to 85°C
Load Capacitance		7pF,12.5pF
Storage Temperature Range		-55 to 125°C
Drive Level		1μW max.
Turnover Temperature		25°C± 5°C
Temperature Coefficient		-0.04ppm/°C ²
Series Resistance		65KΩ Max
Shunt Capacitance		0.8pF Typ.

The above specifications are standard for this RFW products. Custom-made Spec. such as CL and Temp. Stability are also available. Please contact us with your enquiries.

Outline Drawing



Ordering Information

Part Number Guide

RFW X'TAL	D7 Package Size (mm)	12 Load Capacitance (pF)	C Freq. Tol. @25°C (ppm)	H Frequency Stability (ppm)	C Temp. Range (°C)	T Oscillator Mode	- Dash	Freq. (Mhz)
	7.0*1.5*1.4	XX = xxpF 7 12.5	C: ± 20 E: ± 30	H: ± 100 K: ± 150	C: -20~70 L: -40~85	T: Tuning Fork		0.032768

Frequency Stability Vs. Temperature Range

Temp.(°C)	Ppm	±100	Over±150
-20 ~ +70		☺	☹
-40 ~ +85		☹	☺

☺ Standard ☹ Not Available

Example RFWD712CHCT-0.032768MHz
Crystal unit, RoHS Compliant. 7.0*1.5mm·CL=12.5pF ·Freq. Tolerance: +/- 20ppm;
Freq. Stability: +/- 100ppm; Operating Temp. Range: -20~70°C; Tuning Fork ;
Freq. 0.032768 MHz.
**Not all combinations of options are available.