

World's smallest kHz-band timing device

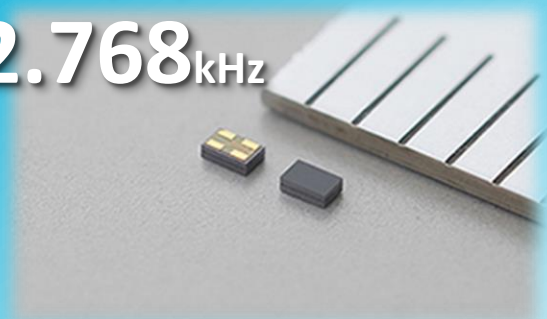


# Murata MEMS Resonator

Part Number : WMRAG32K76CS1C00R0

Oscillation frequency:

## 32.768kHz



### Specifications:

Item	Specifications
Package Size	0.95 x 0.60 x 0.30mm
Operating Temp	-30 to +85°C
Nominal frequency	32.7680kHz
Frequency Tolerance (at +25°C)	+/-20ppm
Frequency Stability (-30 to +85C)	-150 to +10ppm
Motional Resistance (ESR)	75k ohm max.
Frequency Aging	+/-3ppm
Drive Level	0.2uW max.

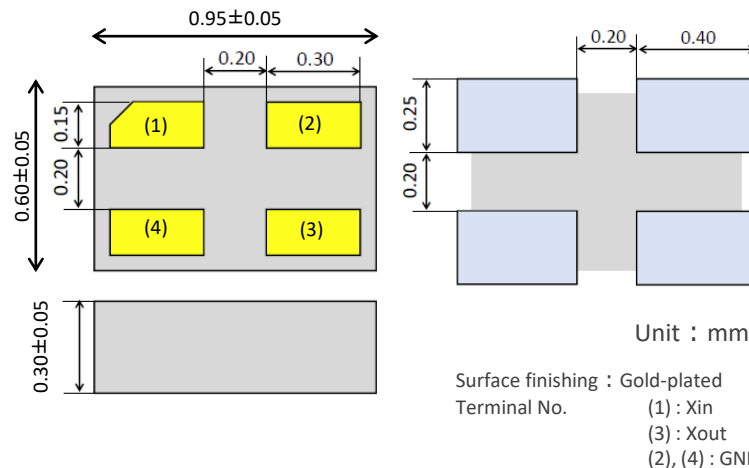
### Application:

- Real Time Clock, Wearable watch,
- Bluetooth earbuds, Smart card,
- CGM patch, Sip module,
- PLC, Heating pump, Smart metering etc...

### Features:

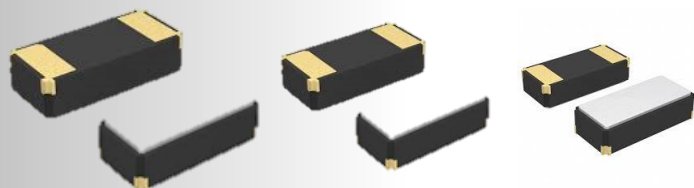
- World's smallest size
- Low profile
- No external loading capacitance needed
- High performance
- High reliability

### Dimensions:



# Downsizing

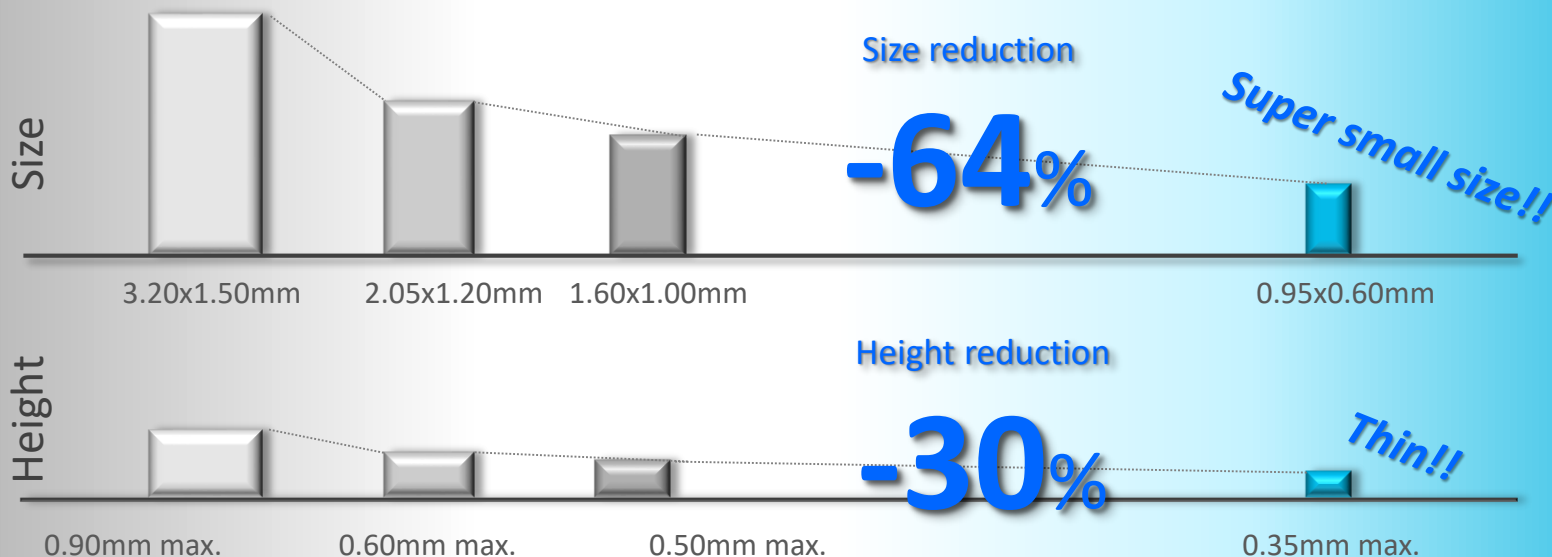
Conventional SMD kHz  
Tuning fork crystal unit



**muRata**  
**MEMS resonator**

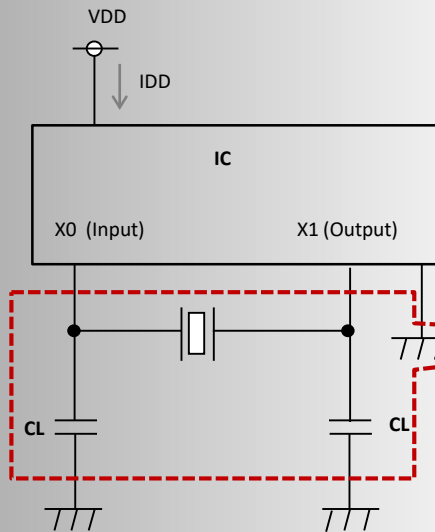
Murata Part Number : WMRAG32K76CS1C00R0

**VS**



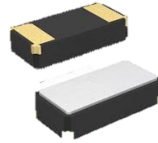
*Realized by Murata's MEMS technology.*

# Area Saving

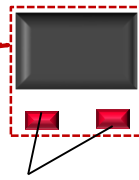


Oscillation circuit

Conventional SMD kHz  
Tuning fork crystal unit



1.60x1.00mm  
Crystal



Cap. 0402 x 2pcs

Area size:  
Approx. **2.0mm<sup>2</sup>**

**VS**

**muRata**  
**MEMS resonator**

Murata Part Number : WMRAG32K76CS1C00R0



0.95x0.60mm  
MEMS



Area reduction

**-71%**

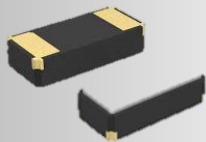
**No** external  
loading capacitance

Area size:  
**0.57mm<sup>2</sup>**

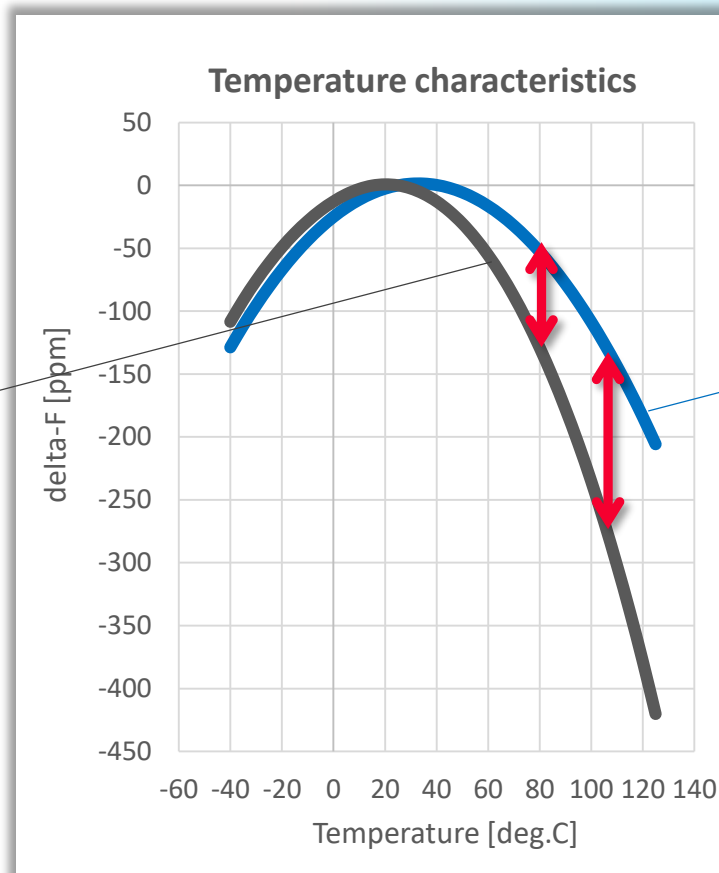
*Realized by Murata's MEMS technology.*

# High Performance Temperature characteristics

Conventional SMD kHz  
Tuning fork crystal unit



1.60 x 1.00 mm



**muRata**  
MEMS resonator



0.95 x 0.60 mm

**Good temperature  
characteristics!!**

**Realized by Murata's MEMS technology.**

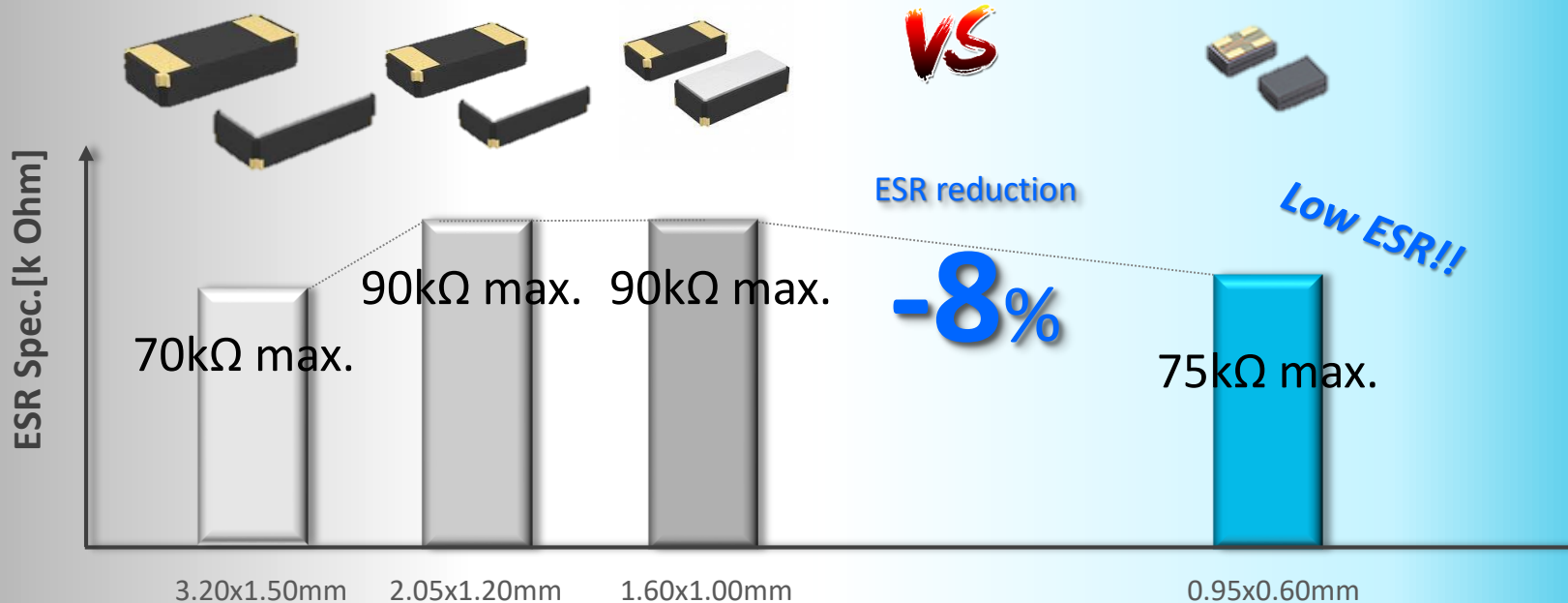
# High Performance

## ESR: Equivalent Series Resistance

Conventional SMD kHz  
Tuning fork crystal unit

**muRata**  
**MEMS resonator**

Murata Part Number : WMRAG32K76CS1C00R0



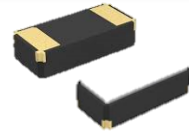
*Realized by Murata's MEMS technology.*

# High Reliability

## High Temperature Operation Test

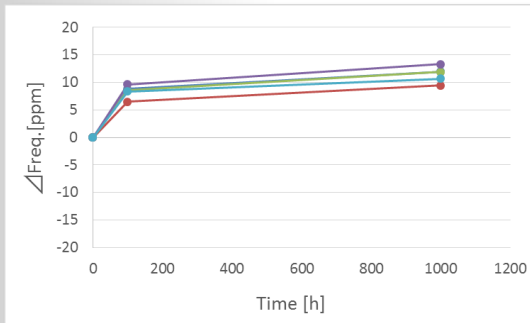
Test condition : Temperature **125°C** + Continuous driving **0.2 $\mu$ W**

Conventional SMD kHz  
Tuning fork crystal unit

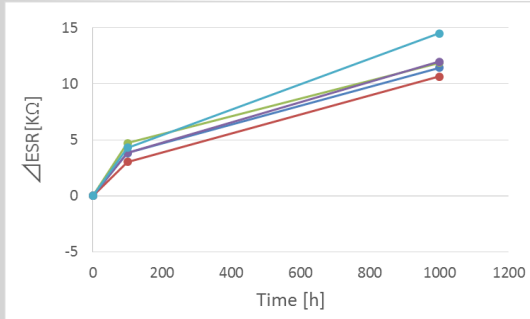


1.60 x 1.00 mm

$\Delta$ Oscillation frequency



$\Delta$ ESR



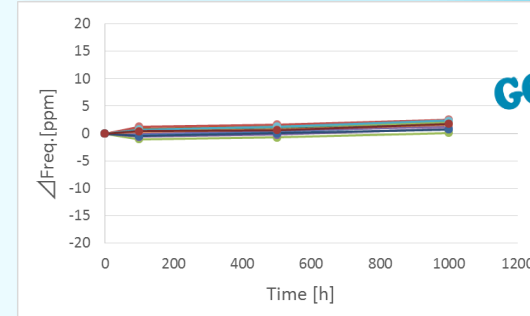
**muRata**

**MEMS resonator**



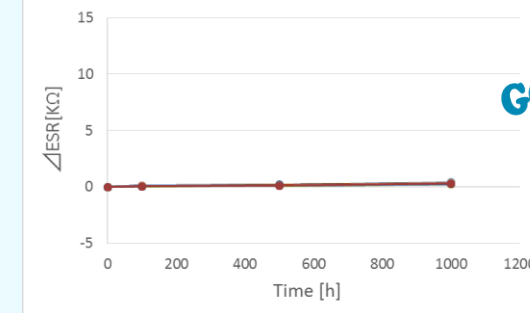
0.95 x 0.60 mm

$\Delta$ Oscillation frequency



**VS**

$\Delta$ ESR



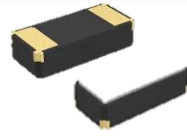
*Realized by Murata's MEMS technology.*

# High Reliability

## High Accelerated Stress Test (HAST)

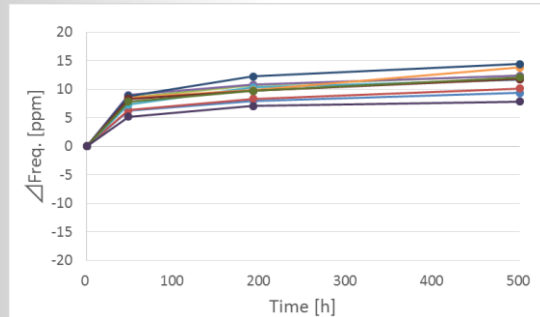
Test condition : Temperature **120°C** + Humidity: **85%** + Air pressure: **1.7 atm**

Conventional SMD kHz  
Tuning fork crystal unit

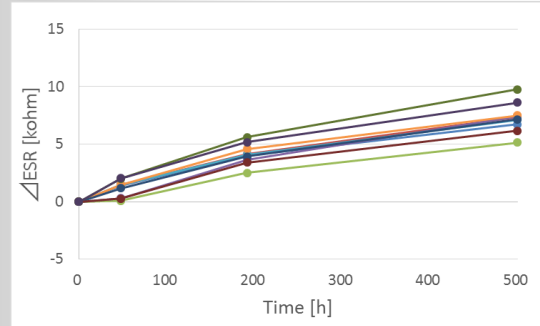


1.60 x 1.00 mm

ΔOscillation frequency



ΔESR



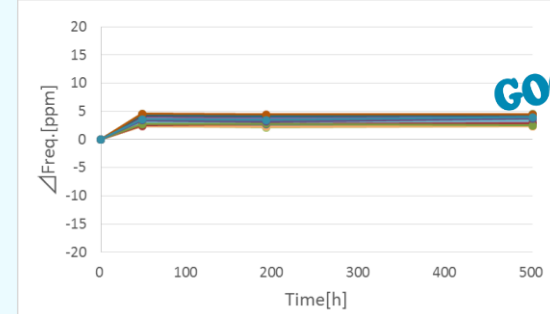
**muRata**

**MEMS resonator**



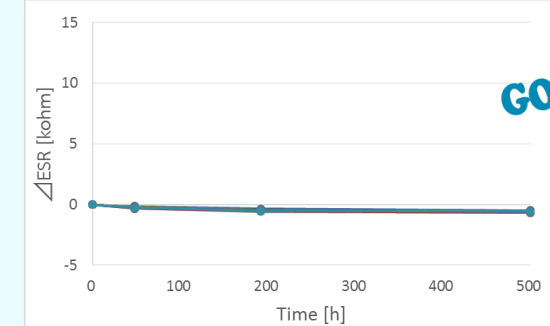
0.95 x 0.60 mm

ΔOscillation frequency



**VS**

ΔESR



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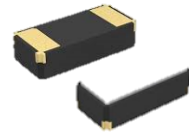
# High Reliability



## Drop Test

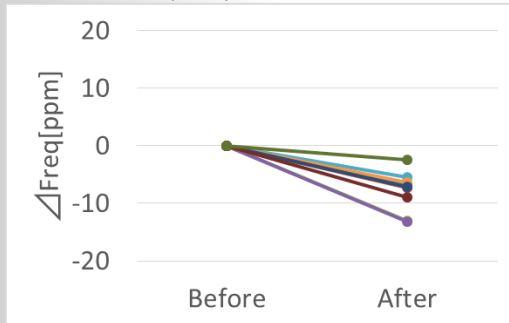
Test condition : Height:1.5m, Jig weight:150g, 3 times x 6 direction

Conventional SMD kHz  
Tuning fork crystal unit

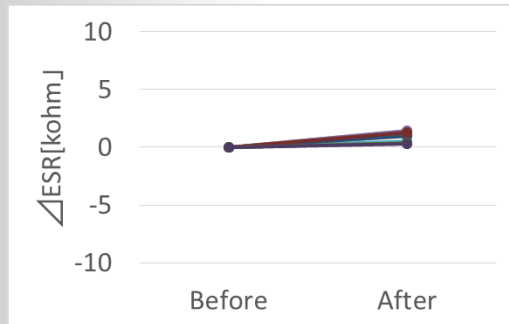


1.60 x 1.00 mm

ΔOscillation frequency



ΔESR



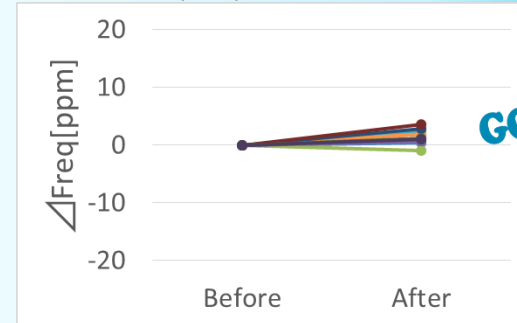
**muRata**

**MEMS resonator**



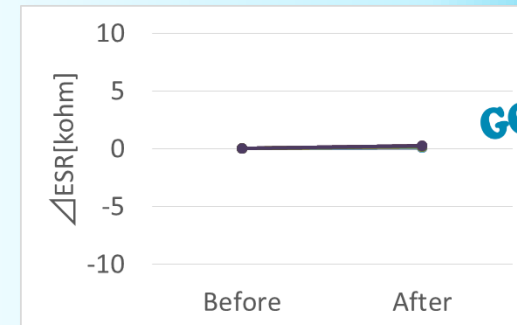
0.95 x 0.60 mm

ΔOscillation frequency



**VS**

ΔESR

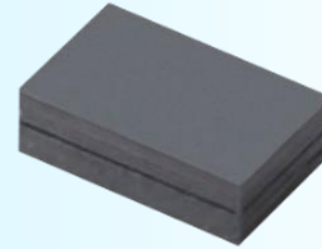


*Realized by Murata's MEMS technology.*



***Murata***

MEMS technology  
bring you



Murata Part Number : WMRAG32K76CS1C00R0  
Status: In production

**Innovation**

**INNOVATION**

We look forward to  
your sample request

# IC Reference List

Murata MEMS resonator has been qualified for the following IC.

IC maker	Function	IC P/N	Murata P/N	Operating Temp. Range	Load capacitance
TI	MCU	MSP432P401R (LFXTDRIIVE=10b)	WMRAG32K76CS1C00R0	-30 to +85° C	8pF
	MCU	MSP432E411Y (OSCDRV=0)	WMRAG32K76CS1C00R0	-30 to +85° C	8pF
Cypress	BLE	CYW20819	WMRAG32K76CS1C00R0	-30 to +85° C	8pF
u-blox	GNSS	ZOE-M8B / ZOE-M9	WMRAG32K76CS2C00R0	-40 to +85° C	8pF
			WMRAG32K76CS3C00R0	-40 to +105° C	8pF
ROHM	PMIC	BD71837	WMRAG32K76CS1C00R0	-30 to +85° C	8pF
	PMIC	BD71847	WMRAG32K76CS1C00R0	-30 to +85° C	8pF
SONY	PMIC for GPS	CXA3846GF	WMRAG32K76CS1C00R0	-30 to +85° C	8pF
Onsemi	BLE	RSL10	WMRAG32K76CS1C00R0	-30 to +85° C	8pF