

# Ultra-Miniature Crystals

**Series**  
**CM1**  
**CM4**  
**CM5**

Cardinal's ultra-miniature crystals are a smaller alternative to the standard HC-49 package where applications require compact board space. They are perfect for applications requiring tight tolerances over wide temperature ranges.

**Part Numbering Example: CM1 Z - A1 - B2 - C2 50 - 7.0 D18 - 3**

CM1	Z	A1*	B2	C2	50	7.0	D18	- 3
SERIES	ADDED FEATURES	OPERATING TEMP.	STABILITY	TOLERANCE	RESISTANCE	FREQUENCY	LOAD CAP.	OVERTONE
CM1	BLANK = BULK PACK	A0 = -10°C ~ +60°C	B1 = ±100	C1 = ±100	SEE CHART		D16,18,20,ETC.	BLANK: FUND.
CM4	Z = TAPE AND REEL	A1 = -10°C ~ +70°C	B2 = ± 50	C2 = ± 50	BELOW		DS = SERIES	-3: 3rd OT
CM5		A2 = -40°C ~ +85°C	B3 = ± 30	C3 = ± 30				-5: 5th OT
		A3 = -55°C ~ +125°C	B4 = ± 10	C4 = ± 10				-7: 7th OT
								-BT: BT Cut

*\*NOTE: The above ABC combinations cover basic specification options. We tailor our crystal specifications to meet customer requirements. Please contact our sales department if you don't see exactly what you need.*

## Specifications:

<b>Frequency Range:</b>	10.000 ~ 175.000 MHz
<b>Operating Temperature:</b>	-10°C ~ + 70°C <i>Standard</i> -40°C ~ + 85°C -55°C ~ + 125°C
<b>Frequency Stability:</b>	±100 ppm ± 50 ppm <i>Standard</i> ± 30 ppm ± 10 ppm
<b>Frequency Tolerance:</b> (at 25°C)	±100 ppm ± 50 ppm <i>Standard</i> ± 30 ppm ± 10 ppm
<b>Load Capacitance:</b>	Standard 18 pF or series. Please specify your required load.
<b>Resistance:</b>	Maximum resistance corresponds to frequency. See chart below.
<b>Standard:</b>	Mode: Fundamental, 3rd, 5th, or 7th Overtone Shunt Capacitance: 7 pF Max Aging: ± 5 ppm/year Drive Level: 1.0 mW Max
<b>Optional Features:</b>	Third lead Insulator pads Tape and Reel (1K per Reel)

Note 1: Not all combinations of the above tolerances, stabilities, and temperature ranges are available. Consult the factory if your requirement is not standard.

## Resistance Chart: All resistances are maximum values.

EQUIVALENT SERIES RESISTANCE (ESR), MODE OF OPERATION (MODE), AND CUT					
CM1			CM4 & CM5		
Frequency MHz	ESR(Ω)	Mode	Frequency MHz	ESR (Ω)	Mode/cut
7.000~15.999	50 Max	Fund.	10.000~15.999	60 Max	Fundamental
16.000~40.000	40 Max	Fund.	16.000~40.000	50 Max	Fundamental
30.000~90.000	70 Max	Third OT	30.000~90.000	80 Max	Third Overtone
70.000~150.000	100 Max	Fifth OT	70.000~175.000	120 Max	Fifth Overtone

