CR131/U-Series Specifications

19.23L x 8.95W x 19.70H (mm)

PDI *HC-48 Series* MIL-PRF-3098 Qualified Product List (QPL) crystal is available in standard or custom frequencies. PDI provides quick-turn sampling for your proto-typing needs, mass production capability, and competitive pricing.

ex) **CR—131—/U—7M000000**

COMPONENT	**NUMBER**	**BASIC INDICATOR**	**XXXXXXXX**
Crystal Unit	Type of Crystal	General Utility	Specified Nominal Frequency

Parameter		Frequency Range		Units
		2.250000 to 20.000000		MHz
Frequency Tolerance	Operating Temp. Range	±20.0		ppm
Frequency Stability	Ref. Temp. +75°C ±1°C	±5.0		ppm
Oscillation Mode	Fundamental			
Operating Temperature Ranges /1	Operable	-55 to +70 and +80 to +90		°C
	Operating (Controlled)	+70 to +80		
Drive Level	(Max.)	1.0		mW
Shunt Capacitance (Co)	(Max.)	7.0		pF
Load Capacitance (Cl)	±0.5	30.0		pF
Aging	Per Year	±5.0		ppm
		0.8 MHz to 2.0 MHz	>2.0 MHz to 20.0 MHz	
Shock	Frequency	±5.0		ppm
	Resistance	±15.0	±10.0	%
Vibration — Method 201, MIL-STD-202	Frequency	±5.0		ppm
	Resistance	±15.0	±10.0	%
Thermal Shock	Frequency	±5.0		ppm
	Resistance	±15.0		%

Frequencies – MHz	Series Resistance – Max.	Units	Frequencies – MHz	Series Resistance – Max.	Units
0.800000 – 0.850000	630	Ohms	>2.120000 – 2.250000	250	Ohms
>0.850000 – 0.900000	600		>2.250000 – 2.600000	200	
>0.900000 – 1.000000	580		>2.600000 – 3.000000	150	
>1.000000 – 1.120000	540		>3.000000 – 3.400000	110	
>1.120000 – 1.250000	490		>3.400000 – 3.750000	90	
>1.250000 – 1.370000	450		>3.750000 – 4.000000	75	
>1.370000 – 1.500000	410		>4.000000 – 5.000000	60	
>1.500000 – 1.620000	380		>5.000000 – 7.000000	35	
>1.620000 – 1.750000	330		>7.000000 – 10.000000	24	
>1.750000 – 1.870000	300		>10.000000 – 15.000000	22	
>1.870000 – 2.000000	290		>15.000000 – 20.000000	20	
>2.000000 – 2.120000	270				

MIL-PRF-3098 w/Amendment 1 Table I, Screening (100%)		
Test Inspection	**Product Level S Method Condition**	**Product Level B Method Condition**
Pre-seal visual examination	4.10.2.2	4.10.2.2
PIND	4.10.16	N/A
Thermal frequency repeatability	4.10.15, 10 cycles	N/A
Frequency	4.10.6; Frequency and resistance shall be measured at the specified reference temperature.	4.10.18
Unwanted modes	4.10.9	N/A
Capacitance	4.10.7	N/A
Shunt	4.10.7.1	N/A
Motional	4.10.7.2	N/A
Quality factor	4.10.8	N/A
Aging	4.10.27.3, 30 days at 85°C, $\Delta f/f \leq 2$ ppm	N/A
Drive sensitivity (Frequency, resistance)	4.10.11, $\Delta f/f \leq 2$ ppm; R ≤ ± 10% or ± 3 Ω whichever is greater	N/A
Vibration	4.10.14, $\Delta f/f \leq 1$ ppm	N/A
Thermal shock	4.10.19.2, $\Delta f/f \leq 1$ ppm	N/A
Insulation resistance	4.10.10	N/A
Coupled modes	4.10.6.2; Resistance shall not exceed the maximum value specified and the frequency shall not deviate from a fourth order equation curve best fit by more than: a) 1 ppm when accompanied by a reversal of slope. b) 1.5 ppm when not accompanied by a reversal of slope.	N/A
Frequency and equivalent resistance at reference temperature	4.10.6; Frequency and resistance shall be measured at the specified reference temperature.	N/A
Frequency and resistance verses temperature (Static)	4.10.6.1	N/A
Seal	4.10.26	4.10.26
Radiographic inspection (When specified)	Per MSFC-STD-355	N/A
Visual (External) and mechanical inspection	4.10.2.1	4.10.2.1

MIL-PRF-3098 w/Amendment 1 Table III, Group A Inspection for Product Level S Crystals		
Inspection	**Requirement Paragraph**	**Method Paragraph**
Subgroup I		
Visual and mechanical inspection (External) 1/	3.5, 3.6, 3.35	4.10.2.2
Low temperature storage	3.22.3	4.10.18.4
Reduce drive level 2/	3.18	4.10.17
Frequency and resistance	3.22	4.10.18
Frequency stability (Controlled)	3.22.1	4.10.18.2
Operable temperature range (Controlled)	3.22.2	4.10.18.3
Capacitance, shunt (When specified)	3.11.1	4.10.7.1
Unwanted modes	3.13	4.10.9
Seal	3.24	4.10.26
Subgroup II		
Accelerated aging	3.29.1	4.10.27.2
1/ Two sample units only for external dimensions.	2/ Applicable to overtone units and, when specified, fundamental units.	

MIL-PRF-3098 w/Amendment 1 Table III-A, Group A Inspection for Product Level S Crystals		
Inspection	**Requirement Paragraph**	**Method Paragraph**
Subgroup I		
Visual (External) and mechanical	3.5, 3.6, 3.35	4.10.2.2
Shock	3.17	4.10.13
Frequency and resistance	3.10	4.10.6
Resistance vs temperature (R vs T)	3.10.1	4.10.6.1
Frequency vs temperature (Static temperature run)	3.10.2	4.10.6.1
Coupled modes (Frequency-resistance anomalies)	3.10.3	4.10.6.2
Internal gas analysis	3.16	4.10.12
Unwanted modes	3.13	4.10.9
Capacitance	3.11	4.10.7
Capacitance, shunt (When specified)	3.11.1	4.10.7.1
Capacitance, motional (When specified)	3.11.2	4.10.7.2
Quality factor ("Q") (When specified)	3.12	4.10.8
Seal	3.24	4.10.26
Subgroup II		
Accelerated aging	3.29.1	4.10.27.4
Drive sensitivity (Of frequency and resistance)	3.15	4.10.11
1/ Two sample units only for external dimensions.	2/ Applicable to overtone units and, when specified, fundamental units.	

MIL-PRF-3098 w/Amendment 1	Table VI, Group B Inspection for Product Level S Crystals	
Subgroup I 1/		
Solderability	3.7	4.10.3
Resistance to solvents (4 sample units)	3.8	4.10.4
Shock (Specified pulse)	3.1.7	4.10.13
Vibration	3.19.1	4.10.15.1
Thermal shock	3.23	4.10.19.1
Seal	3.24	4.10.26
Salt atmosphere (Corrosion)	3.27	4.10.21
Moisture resistance	3.28	4.10.22
Terminal strength 2/	3.30	4.10.23
Visual and mechanical examination (Internal) 2/	3.5, 3.6, 3.35	4.10.2.2
Bond strength (When specified) 2/	3.31	4.10.24
Subgroup II 3/		
Insulation resistance	3.14	4.10.10
Aging	3.29	4.10.27.1

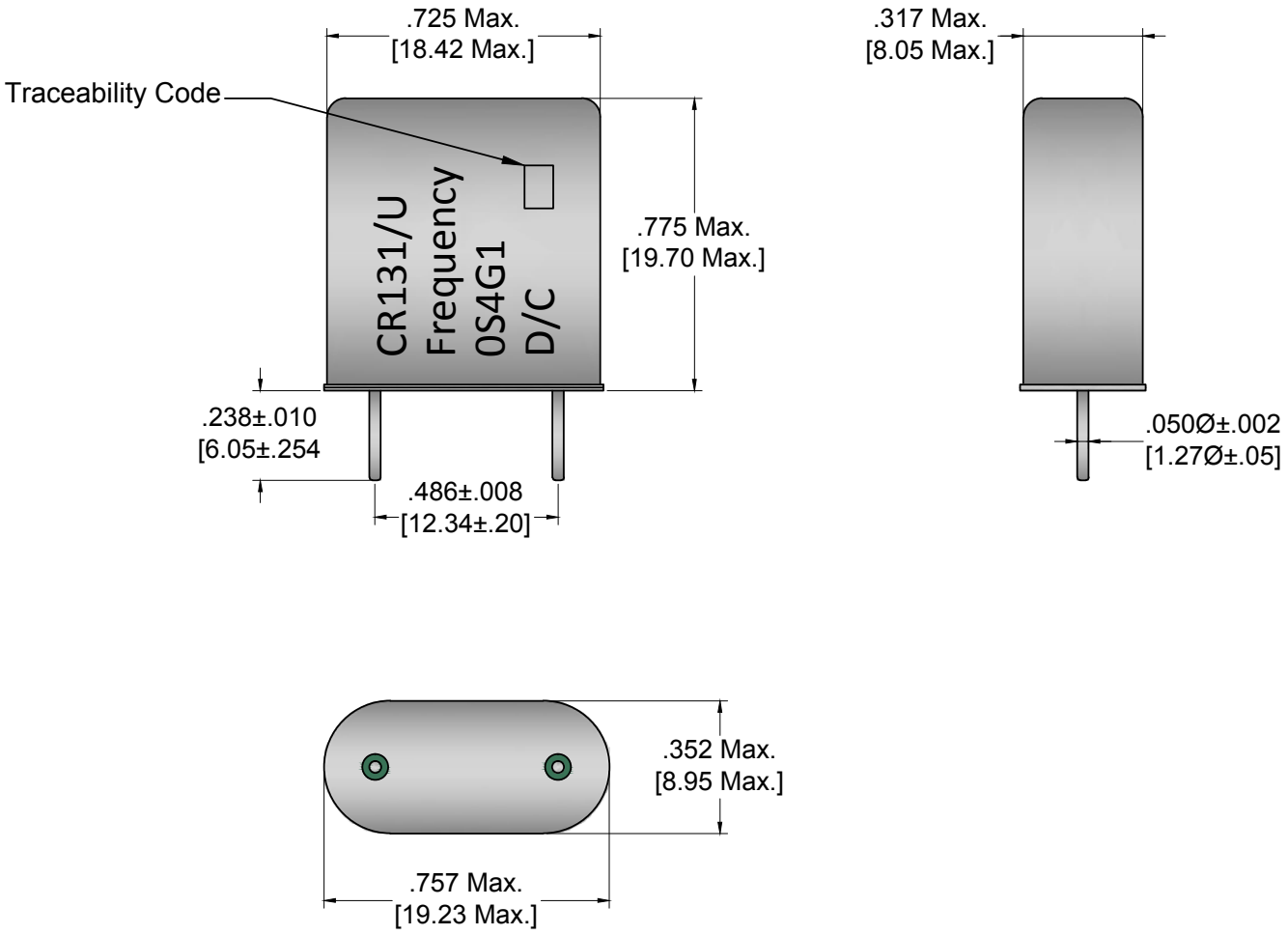
1/ If the contractor can demonstrate that any of these tests have been performed for three consecutive periods with zero failures, the frequency of this test, with the approval of the qualifying activity, can be performed every 36 months. If the design, material, construction, or processing of the crystal units change, or if there are any quality problems or failures, the qualifying activity may require resumption of the original test frequency.

2/ Only two units are required. These two samples units shall be subjected to terminal strength, visual and mechanical (Internal), and bond strength (When specified see 3.1).

3/ If the contractor can demonstrate that any of these tests have been performed for six consecutive periods with zero failures, the frequency of this test, with the approval of the qualifying activity, can be performed every 36 months. If the design, material, construction, or processing of the crystal units change, or if there are any quality problems or failures, the qualifying activity may require resumption of the original test frequency.

MIL-PRF-3098 w/Amendment 1	Table VI-A, Group B Inspection for Product Level S Crystals	
Subgroup I		
Solderability or lead attachment 1/	3.7	4.10.3
Ceramic package (When applicable)	3.7.1	4.10.3.1
Resistance to solvents (4 sample units)	3.8	4.10.4
Vibration, acceleration, and acoustical noise	3.19	4.10.14
Vibration (Frequency and resistance offset) (When specified)	3.19.1	4.10.14.1
Acceleration sensitivity (Vibration) (When specified)	3.19.2	4.10.14.2
Frequency and resistance offset (Steady state acceleration) (When specified)	3.19.3	4.10.14.3
Acceleration sensitivity (Steady state) (When specified)	3.19.4	4.10.14.4
Acoustical noise (When specified)	3.19.5	4.10.14.5
Thermal shock	3.23	4.10.19.2
Thermal time constant (When specified)	3.25	4.10.20
Frequency overshoot	3.25.1	4.10.20.1
Thermal frequency repeatability (When specified)	3.20	4.10.15
Thermal frequency hysteresis	3.20.1	4.10.15.2
Resistance to soldering heat	3.9	4.10.5
Moisture resistance	3.28	4.10.22
Salt atmosphere (Corrosion)	3.27	4.10.21
Particle impact noise detection (PIND) (When specified)	3.21	4.10.16
Terminal strength (Two sample units)	3.30	4.10.23
Terminal pull (When applicable)	3.30.1	4.10.23.1
Terminal bend (When applicable)	3.30.2	4.10.23.2
Wire-lead bend (When applicable)	3.30.3	4.10.23.3
Wire-lead twist (When applicable)	3.30.4	4.10.23.4
Visual (Internal) 1/	3.5, 3.6, 3.35	4.10.2.2
Subgroup II		
Insulation resistance	3.14	4.10.10
Aging	3.29	4.10.27.3
Radiation hardness	3.32	4.10.28
Total dose (When specified)	3.32.1	4.10.28.1
Dose rate (When specified)	3.32.2	4.10.28.2
Neutrons (When specified)	3.32.3	4.10.28.3
Accumulated time error (When specified)	3.32.4	4.10.28.4
1/ Six sample units other than those from terminal strength.		

PDI *HC-48 Series* MIL-PRF-3098 Qualified Product List (QPL) crystal is available in standard or custom frequencies. PDI provides quick-turn sampling for your proto-typing needs, mass production capability, and competitive pricing.



NOTES:
The product described in this spec. consist of this specification and MIL-PRF-3098.
Decimal XXX = ± .008, XX = ± .020 *Metric* [XXX = ± .20], [XX = ± .50]
Specifications subject to change without notice, last updated 4/1/1 3.