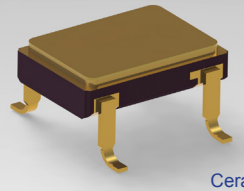
FMI Model Number

C88 SERIES, < 50 KRad/Si - TID, Commercial Space

Crystal Oscillator | 3.3V | CMOS | 5x7mm Gull Wing Leads | SmallSat-CubeSat



5x7 mm
Gull Wing Leaded
Ceramic SMD Package

Features

- Hi-Rel Design and Manufacture
- Proven High Shock Crystal Support
- ECCN - EAR 99
- Customer Support & Service
- High-Shock & Vibration Configuration
- Small Hi-Rel Package
- Mission Life Duration Choice
- Designed for > 20,000 Hours Life at +125ºC
- Mission Success | Life Options 6 Months to 5 Years

Electrical SPECIFICATIONS

Mission Life / Screening Code A (6 Months to 1 year) CODE	B (1 Year to 2 years) CODE	C (3 Years to 5 years) CODE	Frequency Range (MHz)	Supply Current @ 3.3V ±10% (mA)	Rise/Fall Time (tr/tf) max (nsec)	Symmetry min / max (%)	Aging per year max 1/ (ppm)	Frequency Stability Vs. Temperature -55ºC to +125ºC (ppm) CODE A	-55ºC to +125ºC (ppm) CODE B	-40ºC to +105ºC (ppm) CODE C	-40ºC to +85ºC (ppm) CODE D
01	02	03	0.5 to 0.9	1	3	48/52	±10	±100	±75	±60	±50
04	05	06	1 to 7.9	1.2	3	48/52	±10	±100	±75	±60	±50
07	08	09	8 to 15.9	3	3	45/55	±10	±100	±75	±60	±50
11	12	13	16 to 49.9	6	3	45/55	±10	±100	±75	±60	±50
14	15	16	50 to 79.9	8	2	40/60	±10	±100	±75	±60	±50
17	18	19	80 to 94.9	10	2	40/60	±10	±100	±75	±60	±50
21	22	23	95 to 130	25	2	40/60	±10	±100	±75	±60	±50

stability vs. temperature code

See reverse side for screening details

CMOS Output, 15 pF Load

Output Voltage - Logic "0" is Vcc x 0.1 Vdc
Output Voltage - Logic "1" is Vcc is 0.9 Vdc
Start-up Time: 10 msec max

1/ Frequency Aging Limit

Max change over 30 days	±1.5 ppm
Projected max change for 1 year after 30 days	±10 ppm

Please Contact Us for Specification Options that are Outside of or beyond those Shown in the Table Above

Standard PIN CONFIGURATION

* Enable, Logic 1 | Disable, Logic 0

Terminate any unused leads, (they are not terminated internally).

Pin Number	Function
1	Ourput Enable (Tri-state)*
2	Ground (case)
3	Output
4	Supply V (Vcc)

How To ORDER

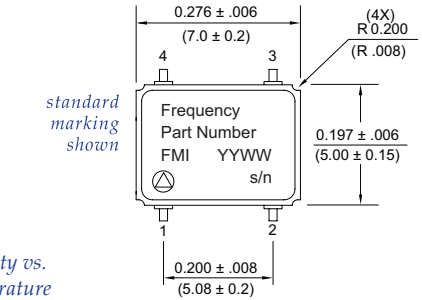
C88 — A — 04 — D — - — 1M000000

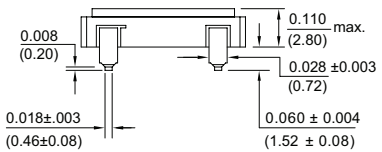
- C88: model series
- A: mission life/ screening, code A, B or C
- 04: electrical specifications within frequency range / tristate option code
- D: frequency stability vs. operating temperature range code
- 1M000000: output frequency

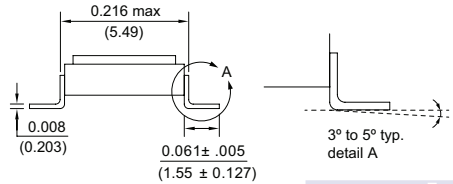
example: **C88A04D-1M000000**

MIL-STD-790 Certified
QPL per MIL-PRF-55310
ISO 9001:2015
Pb-free RoHS Certified

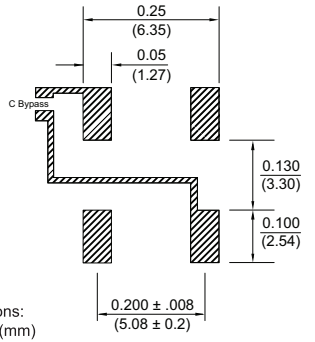
Mechanical SPECIFICATIONS







Leads are integral to the ceramic header. They are **not** added on to the package in a post manufacturing process.



land pattern

dimensions: inches / (mm)

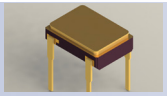
Pad 1, ESD Symbol

An external bypass capacitor 0.01µF is required between Vdd and GND

FREQUENCY MANAGEMENT | International
15302 Bolsa Chica Street
Huntington Beach, CA 92649

FrequencyManagement.com

Ph. 714 373 8100
Fx. 714 373 8700
Sales@FrequencyManagment.com



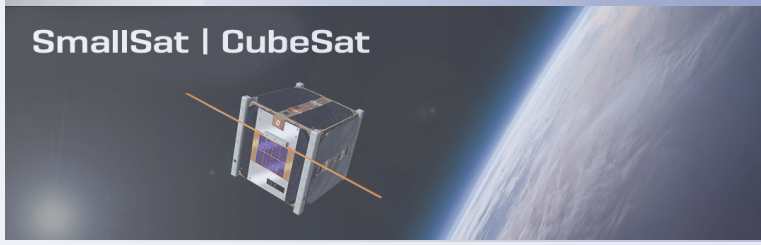
C78

Other Thru-hole Leaded 5x7 mm Ceramic SMD for Space, Please Inquire!

New 5x3.2 Radiation Tolerant Oscillator for Space, Please Inquire!

C53

Designed Specifically for Lower-cost Space Missions



Mission Life | Screening- A, B & C OPTIONS

Screening	Method	Options:	CODE A	B	C
Non-Destruct Bond Pull	MIL-STD-883, Method 2023		•	•	•
Internal Visual	MIL-STD-883, Method 2017		•	•	•
Stabilization (Vacuum) Bake	MIL-STD-883, Method 1008, Condition C, 150ºC, 24 hours min		•	•	•
Temperature Cycling	MIL-STD-883, Method 1010, Condition B, 10 Cycles		•	•	•
Constant Acceleration	MIL-STD-883, Method 2001, Condition A (Y1 only, 5000 g's)			•	•
PIND Test	MIL-STD-883, Method 2020, Condition B, 5 passes max				•
Seal: Fine Leak	MIL-STD-883, Method 1014, Condition A1				•
	MIL-STD-202, Method 112, Condition C, 111A			•	
Seal: Gross Leak	MIL-STD-202, Method 112, Condition D		•	•	•
Electrical Test	Functional Test Only at +23ºC		•	•	•
Marking & Serialization	MIL-STD-1285		•	•	•
Electrical Test	Nominal Vcc & Extremes and Nominal Temp and Extremes			•	•
Burn-in (load)	+125ºC, Nominal Supply Voltage and Burn-in load, 160 hours min			•	•
Burn-in (no-load)	+125ºC, Nominal Supply Voltage and Burn-in load, 48 hours min		•		
Interim Electrical	Functional Test Only				•
Burn-in (load)	+125ºC, Nominal Supply Voltage and Burn-in load, 160 hours min				•
Final Electrical Test a) Input current, output frequency, output waveform, are tested at +23ºC ±2ºC b) Frequency stability is tested over the specified temperature range; at both extremes and at +25ºC at a minimum of 5 temperature increments note: Recording of test data is by lot # and then serial #			•	•	•
Radiography	MIL-STD-883, Method 2012				•
Frequency Aging	MIL-PRF-55310, +70ºC Condition				•
Frequency/Temperature Stability	MIL-PRF-55310, Over temperature extremes, 20 points equally spaced				•
External Visual & Mechanical	MIL-STD-883, Method 2009		•	•	•

note: other options, screening levels and custom test plans available.

Environmental COMPLIANCE

Environmental	Specification	Method	Condition	
Vibration – Sine	MIL-STD-202	Method 204	Condition D	20g, 10 to 2 KHz
Vibration – Random	MIL-STD-202	Method 214	Condition 1	30g rms, 10 to 2 KHz Random
Shock	MIL-STD-202	Method 213	Condition I	100g, 6 ms, F:1500, 0.5 ms
Seal Test	MIL-STD-883	Method 1014	Condition A1	Fine Leak
Seal Test	MIL-STD-883	Method 1014	Condition C1	Gross Leak
Temperature Cycling	MIL-STD-883	Method 1010	Condition B	10 Cycles Minimum
Constant Acceleration	MIL-STD-883	Method 2001	Condition A	5000g, Y1 Axis
Thermal Shock	MIL-STD-202	Method 107	Condition B	

continued...

Environmental	Specification	Method	Condition
Ambient Pressure	MIL-STD-202	Method 105	Condition C
Resistance to Soldering Heat	MIL-STD-202	Method 210	Condition C
Moisture Resistance	MIL-STD-202	Method 106	with 7B Sub-cycle
Salt Atmosphere (corrosion)	MIL-STD-883	Method 1009	Condition A (24 hrs)
Terminal Strength	MIL-STD-202	Method 211	Test Condition D
Solderability	MIL-STD-883	Method 2003	
Resistance to Solvents	MIL-STD-202	Method 215	

MIL-STD-790 Certified
QPL per MIL-PRF-55310
ISO 9001:2015
Pb-free RoHS Certified

Helpful & Relevant Reference Specifications

MIL-PRF-55310	Oscillators, Crystal Controlled, General Specification For
MIL-PRF-38534	Hybrid Microcircuits, General Specification For
MIL-STD-202	Test Method Standard, Electronic and Electrical Components
MIL-STD-883	Test Methods and Procedures for Microelectronics
MIL-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment

Materials

1. Package Materials:
   Ceramic, Alumina 90% min
2. Pad Plating Material:
   Gold Plate 0.3 µm (12 µ inch)
   over 2 µm (80 µ inch) min. Nickel

Products for Space Applications

Contact us for assistance with your **higher level specifications**. We will provide you with the technical support and the required documentation.

Issue 11_12192023

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