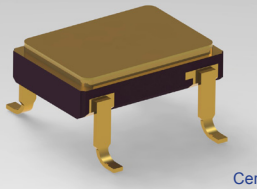
FMI Model Number

M88 SERIES

Crystal Oscillator | 3.3V | CMOS | 5x7mm Gull Wing Leads* | Military Grade



*5x7 mm
Gull Wing Leaded
Ceramic SMD Package

Features

- Ruggedized Design
- High-Shock & Vibration
- Industry Standard Package
- ECCN - EAR 99
- Shortest Lead Time
- Smallest Hi-Rel Package
- Radiation Tolerant to 30 krad TID
- Robust, Rugged, High Shock Crystal Support (3 or 4 point Crystal Mount)
- Best Stability Over Temperature
- Customer Support & Service
- See M89 Datasheet for 5V Operation

Electrical SPECIFICATIONS

Dash Number No TriState	Dash Number With TriState	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)	Stability over Operating Temperature -55ºC to +150ºC (ppm)	-55ºC to +125ºC (ppm)	-55ºC to +105ºC (ppm)	-20ºC to +70ºC (ppm)
CODE	CODE						CODE H	CODE A	CODE B	CODE C
04	05	0.25 to 0.9	2	5	48/52	±5	±70	±50	±40	±25
06	07	1 to 7.9	2	5	48/52	±5	±70	±50	±40	±25
08	09	8.0 to 15.9	3	4	45/55	±5	±70	±50	±40	±25
10	11	16 to 49.9	3	4	45/55	±5	±70	±50	±40	±25
12	13	50 to 64.9	4	3	40/60	±5	±70	±50	±40	±25
14	15	65 to 84.9	6	3	40/60	±5	±70	±50	±40	±25
16	17	85 to 99.9	8	3	40/60	±5	±70	±50	±40	±25
18	19	100 to 120	12	3	40/60	±5	±70	±50	±40	±25

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

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 Limits	5 ppm per year	10 ppm per year
Max change over 30 days	±0.7 ppm	±1.5 ppm
Projected max change for 1 year after 30 days	±0.7 ppm	±1.5 ppm

Standard PIN CONFIGURATION

Pin Number	Function
1	No Connect or TriState Enable
2	Ground (case)
3	Output
4	Supply V (Vcc)

How To ORDER

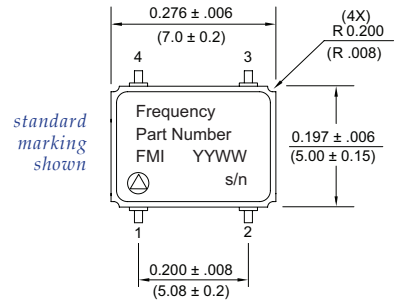
M88 B 06 A - 1M000000

- M88 → model series
- B → screening code B or C *(see back side of data sheet)*
- 06 → electrical specifications within frequency range / tristate option code
- A → operating temperature range and frequency stability code
- 1M000000 → output frequency

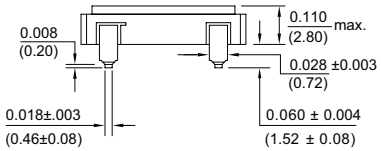
example: **M88B06A-1M000000**

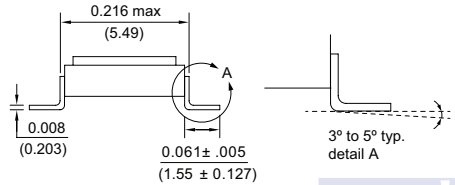
MIL-STD-790 Certified
QPL per MIL-PRF-55310
ISO 9001:2008
Pb-free RoHS Certified

Mechanical SPECIFICATIONS

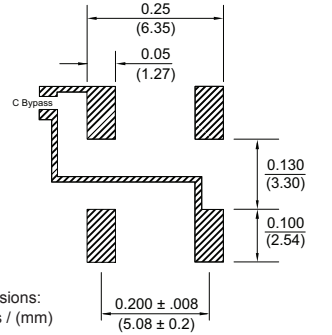


standard marking shown





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



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

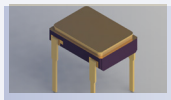
FrequencyManagement.com

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

Screening, B & C LEVELS

Screening	Method	Level:	CODE B	CODE C
Non-Destruct Bond Pull	MIL-STD-883, Method 2023		•	•
Internal Visual	MIL-STD-883, Method 2017, Class H; Method 2032, Class H		•	•
Stabilization (Vacuum) Bake	MIL-STD-883, Method 1008, Condition C, 150ºC, 24 hours min		•	•
Temperature Cycling	MIL-STD-883, Method 1010, Condition B		•	
Constant Acceleration	MIL-STD-883, Method 2001, Condition A (Y1 only, 5000 g's)		•	
Seal: Fine Leak	MIL-STD-883, Method 1014, Condition A1		•	
Seal: Gross Leak	MIL-STD-202, Method 112, Condition D		•	•
Electrical Test	Functional Test Only		•	•
Marking & Serialization	MIL-STD-1285		•	•
Electrical Test	Nominal Vcc & Extremes and Nominal Temp and Extremes		•	
Burn-in (no-load)	+125ºC, Nominal Supply Voltage and Burn-in load, 48 hours min			•
Burn-in (load)	+125ºC, Nominal Supply Voltage and Burn-in load, 160 hours min		•	
External Visual & Mechanical	MIL-STD-883, Method 2009.10		•	•
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 #			•	•

note: other screening levels and custom test plans available.


M78


M83

Other Leaded 5x7 mm Ceramic SMD for Military Applications, Please Inquire!

Features

- Ruggedized Design
- High-Shock & Vibration
- Made in the USA
- ECCN - EAR 99
- Industry Standard Packages
- Highest Temperature Ranges
- Wider Frequency Ranges
- Higher Reliability
- Smaller Packages
- Lowest Current
- Best Service

Applications

- Mobile and Stationary Systems
- Aircraft Engine
- Radar DSP
- Vision Systems
- Aircraft Control
- Position Sensors
- Drone
- Smart Ammunition
- Deep Space Robotic
- Navigation Systems
- Guidance Systems
- Short & Long Earth Orbit Missions
- Commercial Satellites
- Reusable Rockets

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	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 9001:2008
Pb-free RoHS Certified

Military 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. External Lead Plating Material:
   Gold plated Kovar, 0.15 µm (60 µ inch) min, over 2.0 µm (80 µ inch) min Nickel

Products for Space Applications

Contact us for assistance with your specification. We will provide you with the technical support and the required documentation.

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