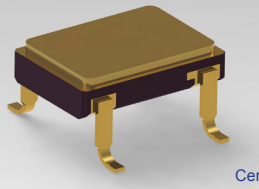
FMI Model Number

S88

SERIES - 100 krad (Si) TID
Element Evaluation MIL-PRF-38534, Class K

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



5x7 mm
Gull Wing Leaded
Ceramic SMD Package

Features

- Ruggedized Design
- High-Shock & Vibration
- Industry Standard Package
- Shortest Lead Time
- Small Hi-Rel SMD Package
- ECCN - EAR 99
- Best Stability Over Temperature
- Customer Support & Service
- See S89 Datasheet for 5V Operation
- Robust, Rugged, High Shock Crystal Support (3 or 4 point Crystal Mount)

Electrical SPECIFICATIONS

Dash Number EM	Dash Number EQM	Dash Number FM	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 Range -55ºC to +125ºC (ppm)	-55ºC to +125ºC (ppm)	-40ºC to +85ºC (ppm)	-20ºC to +70ºC (ppm)
CODE	CODE	CODE						CODE A*	CODE B	CODE C	CODE D
01	02	03	0.25 to 0.9	6	3	48/52	±10	±50	±65	±40	±30
04	05	06	1 to 7.9	6	3	48/52	±10	±50	±65	±40	±30
07	08	09	8 to 15.9	10	3	45/55	±10	±50	±65	±40	±30
11	12	13	16 to 49.9	15	3	45/55	±10	±50	±65	±40	±30
14	15	16	50 to 64.9	15	2	40/60	±10	±50	±65	±40	±30
17	18	19	65 to 84.9	27	2	40/60	±10	±50	±65	±40	±30
21	22	23	85 to 135	27	2	40/60	±10	±50	±65	±40	±30

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

CMOS Output, 10 kΩ || 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

Max change over 30 days	±1.5 ppm
Max change over 90 days	±3 ppm

**Code A, total overall stability vs. temperature of ±60 ppm includes ±20 ppm accuracy at +23°C*

* Enable, Logic 1 | Disable, Logic 0

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

Standard MODEL TYPES

Model	Description
EM: Engineering Models	Same as FM, not with Class K radiation tolerant die commercial screening only
EQM: Engineering Qualification Models	Same as FM with Class K radiation tolerant die*, B or C level screening only
FM: Flight Models	Class K radiation tolerant die*, screening & Group A
	*unless specified otherwise

Standard PIN CONFIGURATION

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

How To ORDER

S88 S 16 A - 50M000000

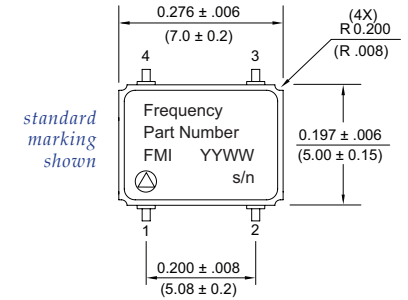
- S88 → model series
- S → screening code S, B or C *(see back side of data sheet)*
- 16 → electrical specifications within frequency range / tristate option code
- A → operating temperature range and frequency stability code
- 50M000000 → output frequency

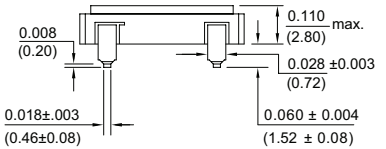
example: **S88S16A-50M00000**

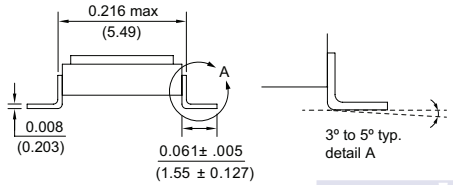
MIL-STD-790 Certified
QPL per MIL-PRF-55310
ISO 9001:2015
Pb-free RoHS Certified

Mechanical SPECIFICATIONS

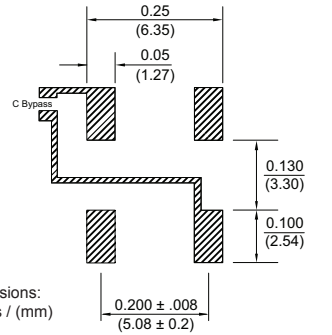
standard marking shown







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

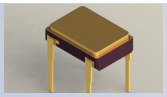
FREQUENCY MANAGEMENT | International
15302 Bolsa Chica Street
Huntington Beach, CA 92649

FrequencyManagement.com

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

S88

FMI


S78


S83

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

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


S53

Please request our General Specification for Class S Oscillators Document # QP1100100

Screening- S, B & C LEVELS *(per FMI General Specification for Class S Oscillators)*

Screening	Method	Level:	CODE S	B	C
Non-Destruct Bond Pull	MIL-STD-883, Method 2023		•	•	•
Internal Visual	MIL-STD-883, Method 2017, Class K; Method 2032		•		
	MIL-STD-883, Method 2017, Class H; Method 2032			•	•
Stabilization (Vacuum) Bake	MIL-STD-883, Method 1008, Condition C, 150ºC, 48 hours min		•		
	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.

Options Available for FLIGHT MODELS

- Screening, Groups A, B, C, & D per MIL-PRF-38534 (QCI or Qualification)
- Screening, Groups A, B & C per MIL-PRF-55310
- Data Packages
- Swept Quartz Crystals
- Single Lot Date Code
- Source Inspection
- HiRes Photography

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

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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