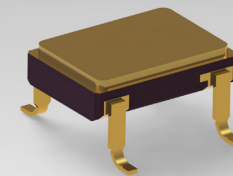


# S88

**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
- Robust, Rugged, High Shock Crystal Support (3 or 4 point Crystal Mount)
- Best Stability Over Temperature
- Customer Support & Service
- See S89 Datasheet for 5V Operation

## Electrical SPECIFICATIONS

EM	Dash Number		Frequency Range (MHz)	Supply Current @ 3.3V ±10% (mA)	Rise/Fall Time (tr/ff) max (nsec)	Symmetry min / max (%)	Aging per year max 1/ (ppm)	Stability over Operating Temperature Range			
	EQM	FM						-55°C to +125°C (ppm)	-55°C to +125°C (ppm)	-40°C to +85°C (ppm)	-20°C to +70°C (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

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

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

### Standard MODEL TYPES

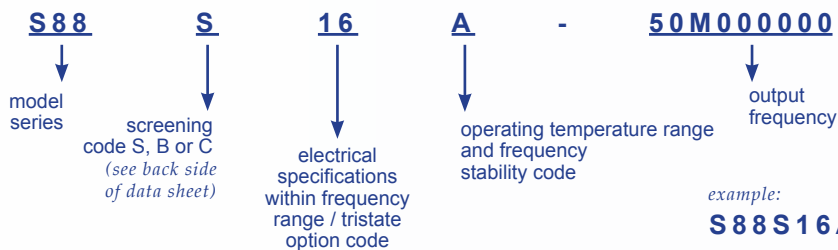
Model	Description
EM: Engineering Models	Same as FM, not with Class K radiation tolerant die commercial screening only
EQM: Engineering Qualification Models	Same as FM with Class K radiation tolerant die*, B or C level screening only
FM: Flight Models	Class K radiation tolerant die*, screening & Group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

\*unless specified otherwise

### Standard PIN CONFIGURATION

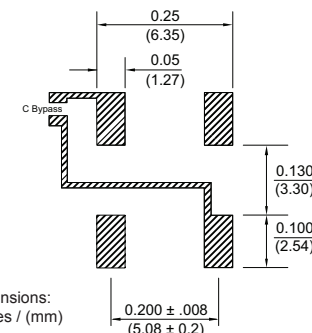
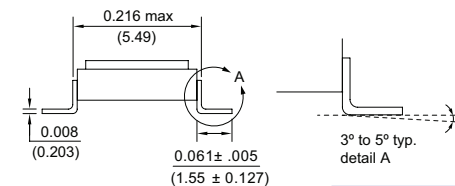
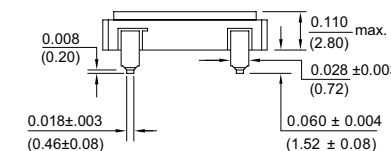
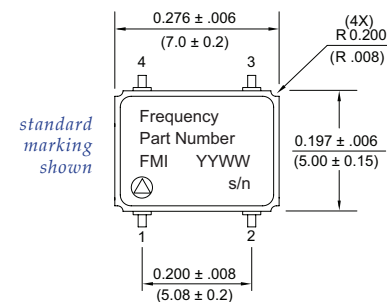
Pin Number	Function
1	No Connect
2	Ground (case)
3	Output
4	Supply V (Vcc)

## How To ORDER



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

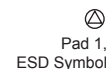
## Mechanical SPECIFICATIONS



dimensions:  
inches / (mm)

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

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



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

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

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

Screening- S, B & C LEVELS (per FMI General Specification for Class S Oscillators)			CODE		
Screening	Method	Level:	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, 150°C, 48 hours min		•		
	MIL-STD-883, Method 1008, Condition C, 150°C, 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 +23°C		•	•	•
Marking & Serialization	MIL-STD-1285		•	•	•
Electrical Test	Nominal Vcc & Extremes and Nominal Temp and Extremes		•	•	
Burn-in (load)	+125°C, Nominal Supply Voltage and Burn-in load, 160 hours min		•	•	
Burn-in (no-load)	+125°C, Nominal Supply Voltage and Burn-in load, 48 hours min				•
Interim Electrical	Functional Test Only		•		
Burn-in (load)	+125°C, Nominal Supply Voltage and Burn-in load, 160 hours min		•		
Final Electrical Test	a) Input current, output frequency, output waveform, are tested at +23°C ±2°C b) Frequency stability is tested over the specified temperature range; at both extremes and at +25°C 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, +70°C 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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