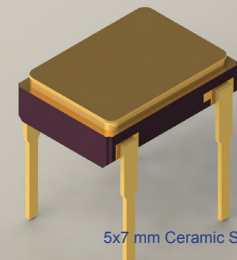


# S78

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

Crystal Oscillator | 3.3V | CMOS | Space Grade | 5x7mm Ceramic Straight-Lead



5x7 mm Ceramic Straight-Lead Package



**Features**

- Ruggedized Design
- High-Shock & Vibration
- Industry Standard Package
- Shortest Lead Time
- Small Hi-Rel Package
- ECCN - EAR 99
- Robust, Rugged, High Shock Crystal Support (3 or 4 point Crystal Mount)
- Best Stability Over Temperature
- Customer Support & Service
- See S79 Datasheet for 5.0V Operation

**Electrical SPECIFICATIONS**

EM	Dash Number			Frequency Range (MHz)	Supply Current @ 5.0V ±10% (mA)	Rise/Fall Time (tr/tf) max (nsec)	Symmetry min / max (%)	Aging per year max 1/ (ppm)	Stability over Operating Temperature Range			
	EQM	FM	CODE						-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

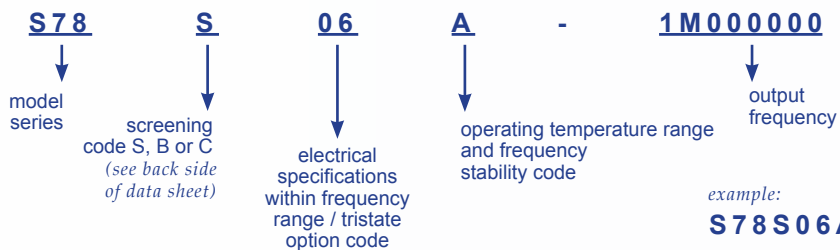
**Standard MODEL TYPES**

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**

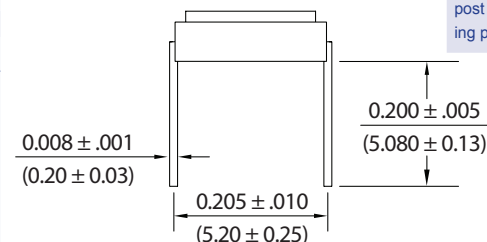
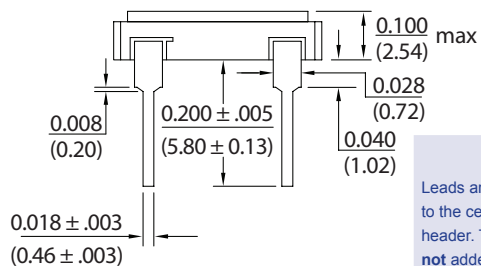
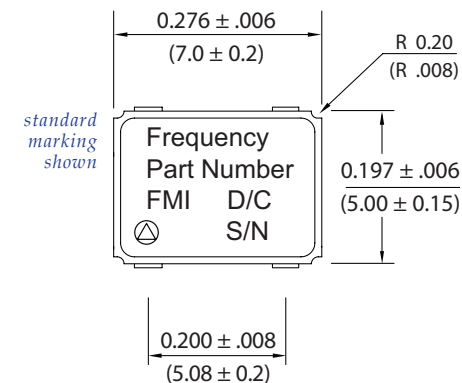
Pin Number	Function
1	No Connect
2	Ground (case)
3	Output
4	Supply V (Vcc)

**How To ORDER**



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

**Mechanical SPECIFICATIONS**



dimensions: inches / (mm)

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

Pad 1, ESD Symbol





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

- Package Materials:  
Ceramic, Alumina 90% min
- 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 specification. We will provide you with the technical support and the required documentation.

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