

Helping Customers Innovate, Improve & Grow



EX-401

Description

The EX-401 provides exceptionally low aging rates and tight temperature stabilities in an extremely small package over a wide range of environmental conditions. This EMXO series bridges the gap between current large, high precision OCXO's and smaller TCXO's. The EX-401 Series becomes the most economical choice where there is a need for spectral purity, short and long term stability, along with small size and dramatically reduced power consumption.

Features

- Low Power Consumption Precision Oscillator
- Fast Warm-up
- Low Phase Noise
- Good Aging
- Small Form Factor
- SMD and Thru-Hole Mounting Option
- RoHS Compliant *
- Standard Frequencies: 10MHz, 20MHz and 100MHz
- Design/Material Sourcing/Manufacture/Test in MHS,PA COO:USA
- No ITAR Restriction for importing EAR99
- Previous Model Number: EX-380, EX-400 series

Applications

- Mobile Data Communications
- Military Portable Radio
- Satellite Communications
- Airborne Equipment
- Avionics
- Instrumentation
- Marine/Land Seismic



* (Except parts with Sn-Pb Solder Coated Option)

Performance Specifications

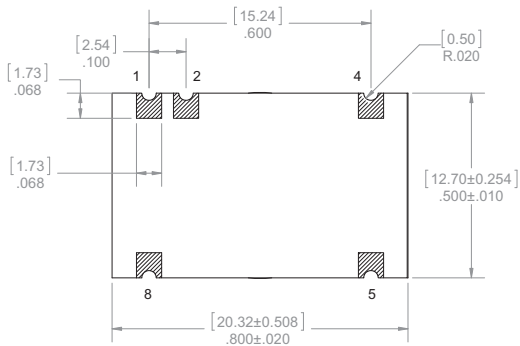
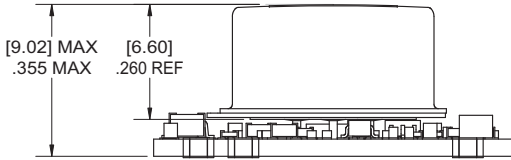
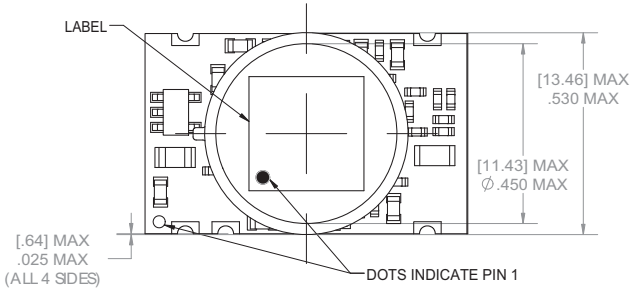
Frequency Stabilities ¹					
Parameter	Min	Typ	Max	Units	Condition
vs. operating temperature range (See temperature & stability table)			±10	ppb	0... +50°C
			±20	ppb	-20... +70°C
			±30	ppb	-40... +85°C
vs. aging / day (See aging table)			±1.0	ppb	after 30 days of operation
vs. aging / per year			±100	ppb	
vs. aging / 10 years			±1	ppm	
Initial Accuracy	-0.2		+0.2	ppm	at time of shipment
vs. supply voltage change	-5		+5	ppb	VS ± 5%
vs. load change	-5		+5	ppb	Load ± 5%
Warm-up Time			45	sec.	to ± 1 ppm of final frequency (1 hour)
			60	sec.	to ± 100 ppb of final frequency (1 hour)
Supply Voltage (Vs)					
Supply voltage (Standard)	4.75	5.0	5.25	VDC	
Supply voltage (Option)	3.14	3.3	3.46	VDC	
Power Consumption			1.5	Watts	during warm-up
			0.25	Watts	steady state @ +25°C / 3.3 Vdc
			0.30	Watts	steady state @ +25°C / 5.0 Vdc

Performance Specifications

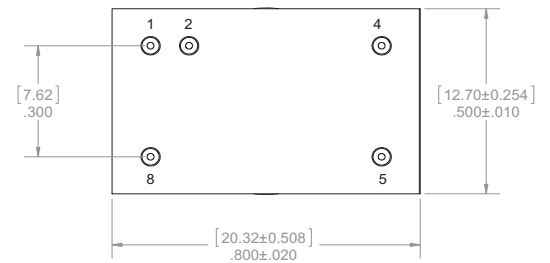
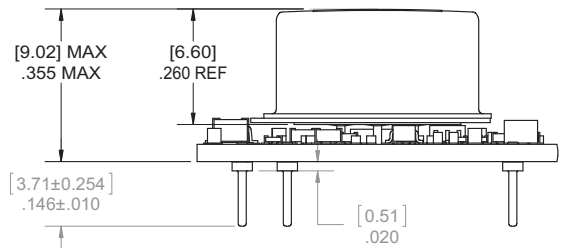
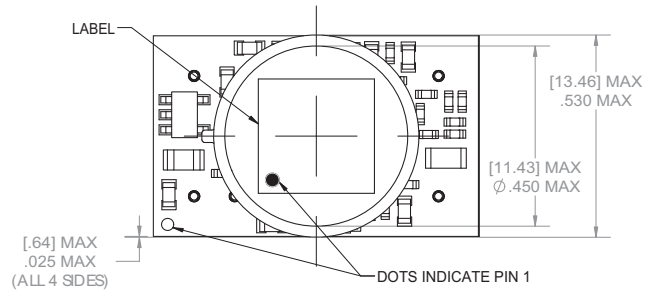
Parameter	Min	Typ	Max	Units	Condition
Signal [Standard]	HCMOS				
Load		15		pF	
Signal Level (Vol)			0.1 Vs	VDC	
Signal Level (Voh)	0.8 Vs 0.8 Vs			VDC VDC	Vs = 3.3 Vdc Vs = 5.0 Vdc
Rise \ Fall Time			5	ns	(10 - 80 %)
Duty cycle	45		55	%	
Signal [Standard]	Sinewave				
Load		50		ohm	
Output Power [Standard]	0		+4	dBm	50 Ohm load
Output Power [Option]	+3		+7	dBm	50 Ohm load
Harmonics			-30	dBc	50 Ohm load
Frequency Tuning (EFC)					
Reference Voltage (Vref)	2.7 4.2		2.9 4.4	Vdc Vdc	Vs = 3.3 Vdc Vs = 5.0 Vdc
Tuning Voltage	0		+Vref	VDC	
Tuning Range	See tuning range table				
Tuning Slope	Positive				
Additional Parameters					
Phase Noise (10 MHz)		-90 -125 -145 -160 -165		dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	1 Hz 10 Hz 100 KHz 1 KHz 10 KHz
Phase Noise (100 MHz)		-95 -125 -150 -160 -165		dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	10 Hz 100 Hz 1 KHz 10 KHz 100 KHz
Allan Deviation (10 MHz)			0.02	ppb	Tau = 1 sec
Acceleration Sensitivity			1.0	ppb/g	Total Gamma
Weight			5	g	
Absolute Maximum Ratings					
Supply Voltage			5.5	VDC	
Output Load			50	pF	
Operable temperature range	-55		+85	°C	
Storage temperature range	-55		+85	°C	

Vibration Sine	MIL-STD-202, Method 204, Condition G (30g peak, 10Hz-2000Hz)
Vibration Random	MIL-STD-202, Method 214, Condition I-H (30g RMS, 10Hz-2000Hz)
Shock	MIL-STD-202, Method 213, Condition E (1000g, 0.5ms, 1/2 sine)
Solderability	MIL-STD-883, Method 2003

Surface Mount



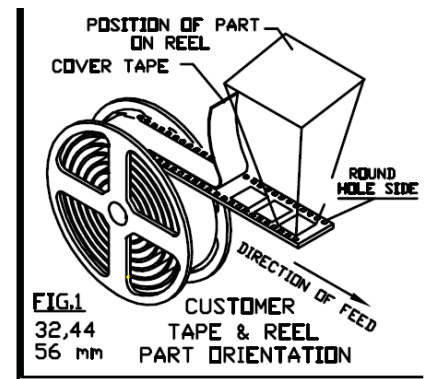
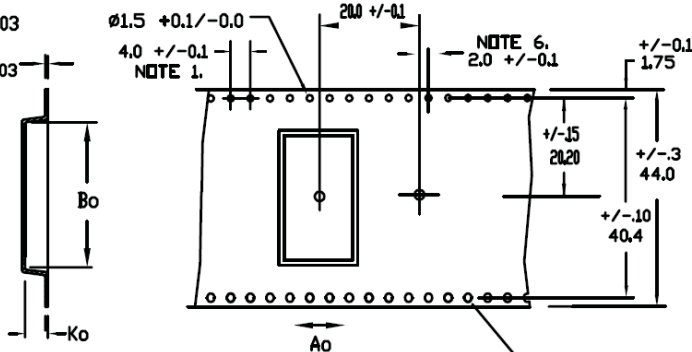
Thru-hole



Pin Connections	
Pin	Function
1	EFC Input
2	Vref Output
4	Ground (Case)
5	RF Output
8	Supply Voltage Input

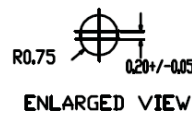
Standard Shipping Method

0.30 ± 0.03
 OR
 0.35 ± 0.03
 $A_0 = 13.72 \pm 0.13$
 $A_0 = .540 \pm 0.005$
 $B_0 = 21.08 \pm 0.13$
 $B_0 = .830 \pm 0.005$
 $K_0 = 9.14 \pm 0.13$
 $K_0 = .360 \pm 0.005$

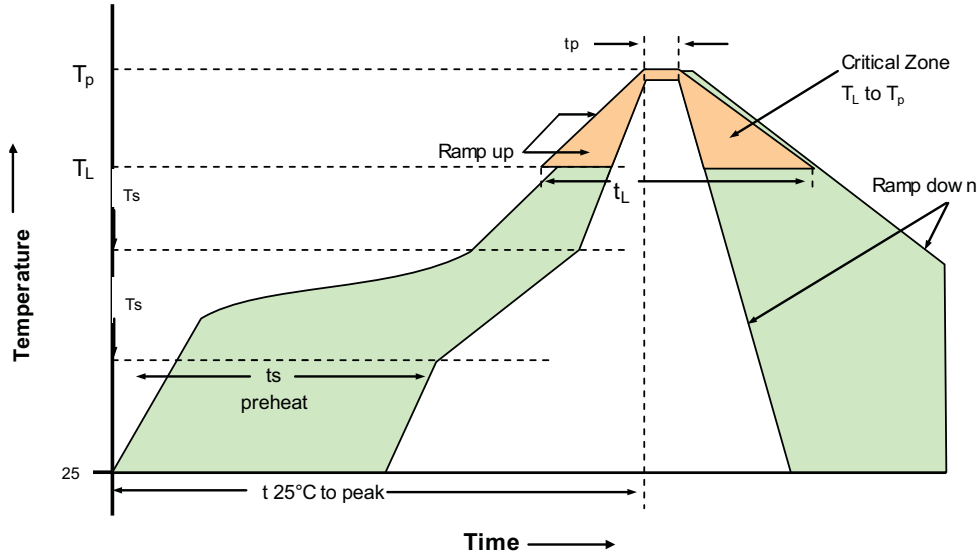


GENERAL NOTES

1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE +/-0.2MM
2. CAMBER NOT TO EXCEED 1MM IN 100MM
3. MATERIAL: STATIC DISSIPATIVE STYRENIC ALLOY
4. A0 AND B0 MEASURED FROM A PLANE 0.3MM ABOVE THE BOTTOM OF THE POCKET.
5. K0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER.
6. POCKET POSITION RELATIVE TO THE SPROCKET HOLE MEASURED AS TRUE POSITION OF THE POCKET, NOT THE POCKET HOLE.



Recommended Reflow Profiles for Pb-Free & Sn-Pb



230°C Reflow Profile

Profile Feature	Sn-Pb Assembly	Profile Feature	Sn-Pb Assembly
Average ramp-up rate (TL to TP)	3°C/seconds max.	Time 25°C to Peak Temperature	4 minutes max.
Preheat - Temperature min T _{smin} - Temperature Min T _{smax} - Time (min to max) (ts)	135°C 155°C 60-90 seconds	Time maintained above - Temperature (TL) - Time (tL)	183°C 45-60 seconds
T _{smax} to TL -Ramp-up Rate	3°C/seconds max.		
Time maintained above - Temperature (TL) - Time (TL)	183°C 40-60 seconds	Time within 5°C of actual Peak Temperature (tp)	10-20 seconds max.
Peak Temperature (Tp)	max 230°C	Ramp-down Rate	6°C/seconds max.

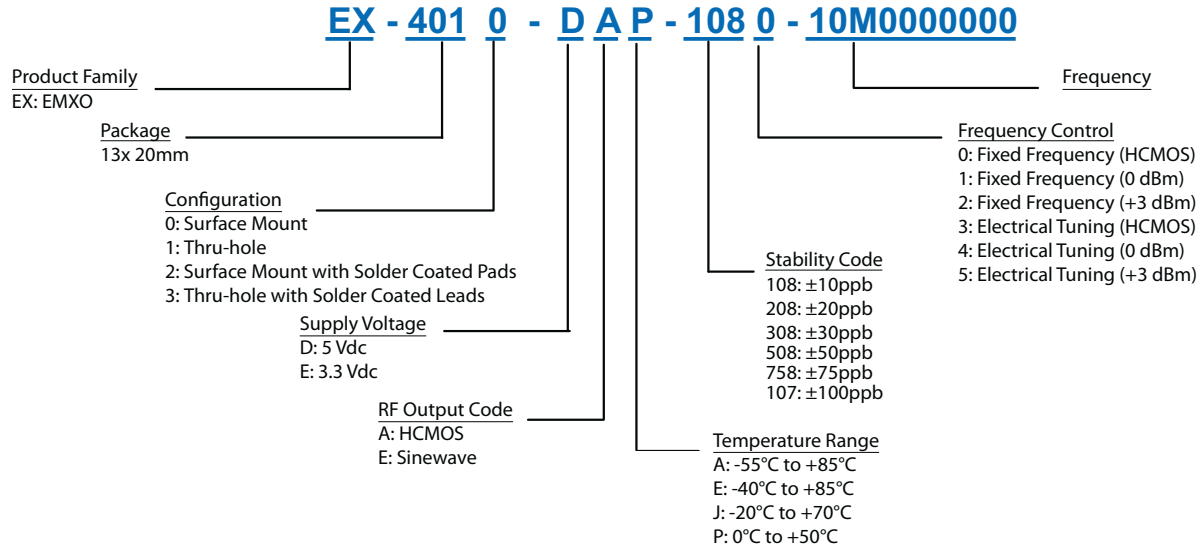
Note: All temperatures refer to topside of the package, measured on the package body surface.

260°C Reflow Profile

Profile Feature	Pb-Free Assembly	Profile Feature	Pb-Free Assembly
Average ramp-up rate (TL to TP)	3°C/seconds max.	Time 25°C to Peak Temperature	8 minutes max.
Preheat - Temperature min T _{smin} - Temperature min T _{smax} - Time (min to max) (ts)	150°C 200°C 60-180 seconds	Time maintained above - Temperature (TL) - Time (tL)	217°C 60-150 seconds
T _{smax} to TL -Ramp-up Rate	3°C/seconds max.		
Time maintained above - Temperature (TL) - Time (TL)	217°C 60-150 seconds	Time within 5°C of actual Peak Temperature (tp)	20-40 seconds max.
Peak Temperature (Tp)	max 260°C	Ramp-down Rate	6°C/seconds max.

Note: All temperatures refer to topside of the package, measured on the package body surface.

Ordering Information



Temperature Range and Stability Table				
(Temperature Stability Reference to $(F_{max}-F_{min})/2$)				
Stability/Temperature	A: -55°C to +85°C	E: -40°C to +85°C	J: -20°C to +70°C	P: 0°C to +50°C
108 (+/-10ppb)				10-20MHz
208 (+/-20ppb)			10-20MHz	10-20MHz
308 (+/-30ppb)	10-20MHz	10-20MHz	10-20MHz	10-20MHz
508 (+/-50ppb)	10-50MHz	10-50MHz	10-50MHz	10-50MHz
758 (+/-75ppb)	10-80MHz	10-100MHz	10-100MHz	10-100MHz
107 (+/-100ppb)	10-100MHz			

Aging Table			
Frequency Range	Daily Rate (ppb/day)	Yearly Rate (ppb/year)	Tuning Range (ppm)
10MHz to 15MHz	± 1	± 100	± 1
>15MHz to 100MHz	± 2	± 200	± 2

Notes:

- Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
- Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
- Phase noise degrades with increasing output frequency.
- Subject to technical modification.
- Contact factory for availability.

For Additional Information, Please Contact

USA:

Vectron International
267 Lowell Road, Unit 102
Hudson, NH 03051
Tel: 1.888.328.7661
Fax: 1.888.329.8328

Europe:

Vectron International
Landstrasse, D-74924
Neckarbischofsheim, Germany
Tel: +49 (0) 3328.4784.17
Fax: +49 (0) 3328.4784.30

Asia:

Vectron International
68 Yin Cheng Road(C), 22nd Floor
One LuJiaZui
Pudog, Shanghai 200120, China
Tel: 86.21.6194.6886
Fax: 86.21.6194.6699

Disclaimer

Vectron International reserves the right to make changes to the product(s) and or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.