Microsemi

a **MICROCHIP** company

MX-600

Features

- Ultra High Stability MCXO
- Low Power Consumption
- Meets Stratum 3 acc. GR-1244
- ROHS 6 Compliant
- Frequency Range[1]: 8 - 40 MHz
- Standard Frequencies : 10, 12.8, 16.384, 19.2, 20, 22.1184, 24.576, 25 MHz
- Uses Vectron's Ultra Smooth Compensation (USC) Algorithm
- Excellent Phase Noise and Allan Deviation

Applications

- 1588 Application
- Test Equipment
- Small Cell
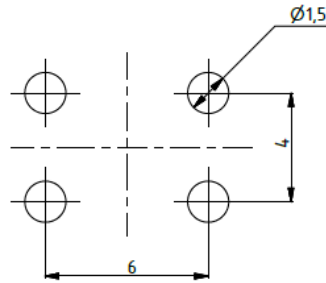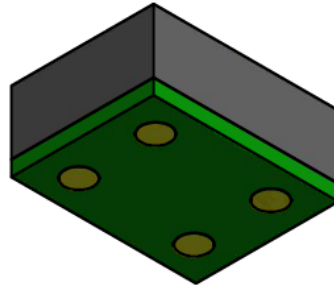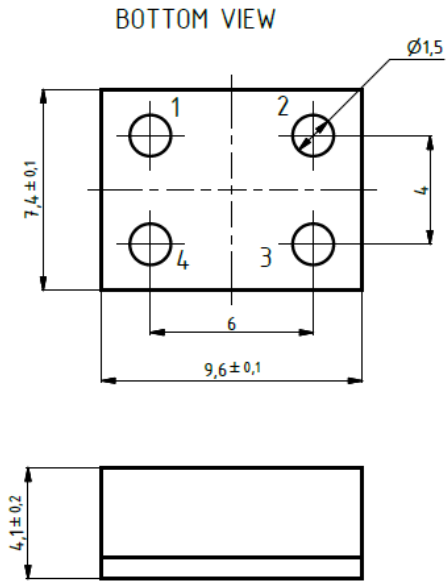- Communication Equipment
- Military

Performance Specifications

Frequency Stabilities[1,3] (Standard - 8 to 26 MHz)						
Parameter	Min	Typical	Max	Units	Condition[2]	
vs. operating temperature range referenced to (dFmax+dFmin)/2	-30 -20		+30 +20	ppb ppb	-40 to +85°C -20 to +70°C	Options[3]
In a 24h period at constant temperature	-5		+5	ppb	after 7 days of continous operation	
Frequency vs. temperature slope		±1.0 ±1.5		ppb/°C ppb/°C	-30 to +80°C, 10 & 20MHz -40 to +85°C, 10 & 20MHz	
Initial tolerance vs. supply voltage change vs. load change vs. aging / 1. year vs. aging / 10 years	-0.5 -10 -10 -0.8 -2.5		+0.5 +10 +10 +0.8 +2.5	ppm ppb ppb ppm ppm	V_s ±5% static Load ±10% static after 30 days of operation after 30 days of operation	

Performance Specifications

Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Units	Condition[2]
Supply Voltage (standard)	3.135	3.3	3.465	V	8 - 40MHz
Current Consumption			12	mA	

RF Output					
Signal [standard]	HCMOS				
Load		15		pF	
Signal Level (Vol)			0.3	V	Vs = 3.3V
Signal Level (Voh)	3			V	Vs = 3.3V
Duty Cycle	45		55	%	@ V_s/2
Rise and Fall time			5	ns	10 to 90 %

Frequency Tuning (EFC) 8 to 40						
Tuning Range	Fixed frequency; No adjust					Option[3]
Tuning Range	±3.5		+10	ppm		
Linearity			2	%	10 & 20MHz	
Tuning Slope	Positive					
Control Input Impedance	20			kOhm		
Control Voltage (V_c) Range	0.0	1.65	3.3	V		

Additional Parameters					
Phase Noise[4]		-65		dBc/Hz	1 Hz
		-93		dBc/Hz	10 Hz
		-118		dBc/Hz	100 Hz
		-140		dBc/Hz	1 kHz
		-154		dBc/Hz	10 kHz
		-156		dBc/Hz	100 kHz
Jitter		0.2		ps RMS	@ 10 kHz to 5 MHz
ADEV			80	E-12	@ 1sec.
			80	E-12	@10sec
Weight			2.0	g	
Processing & Packing	Handling & Processing Note				
Reflow Profile	IPC / JEDEC J-STD-020 (latest version)				

Absolute Maximum Ratings					
Supply Voltage (Vs)	-0.6		6.0	V	
Output Load			50	pF	
Operable Temperature Range	-40		+85	°C	
Storage Temperature Range	-40		+90	°C	

Environmental Conditions	
Rapid Temperature Changes	MIL-883-1010 Cond B 500 cycles -55/125C
Vibration	MIL-STD-883 Meth 2007 Cond A 20G 20-2000Hz 4x in each 3axis 4 min
Shock	MIL-STD-202 Meth 213B Cond. F; 1500g 0,5ms 6 shocks in each direction
Solderability	J_STD_002C Cond A, Through hole device/ Cond. B, SMD 255C (diving time 50,5sec.) Dip+Look with 8h damp pre-treatment: solder wetting >95%
Solvent Resistance	MIL-STD-883 Meth 2015 Solv. 1,3,4
ESD	JESD22-A114F Class 1B; 10* 2000V
Moisture Sensitivity	Level 1 JESD22-A113-B
RoHS Compliance	100% ROHS Compliant

G349

BOTTOM VIEW

Ø1,5

7,4 ± 0,1

9,6 ± 0,1

6

4

4,1 ± 0,2

Ø1,5

6

4

Recommended Pad
Layout

MX-600	
Height "H"	Pin Length "L"
4.1	NA

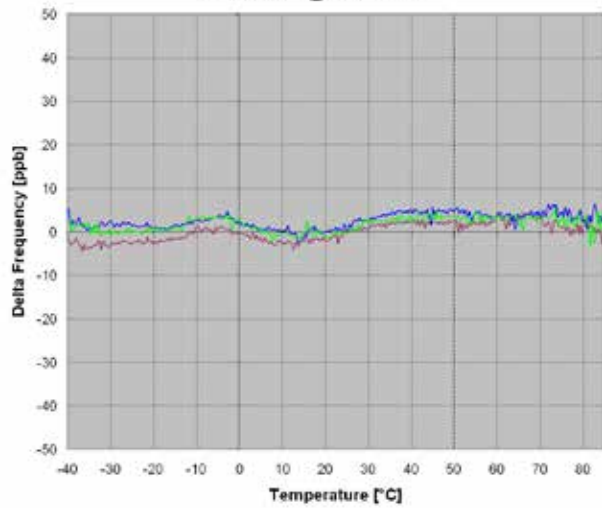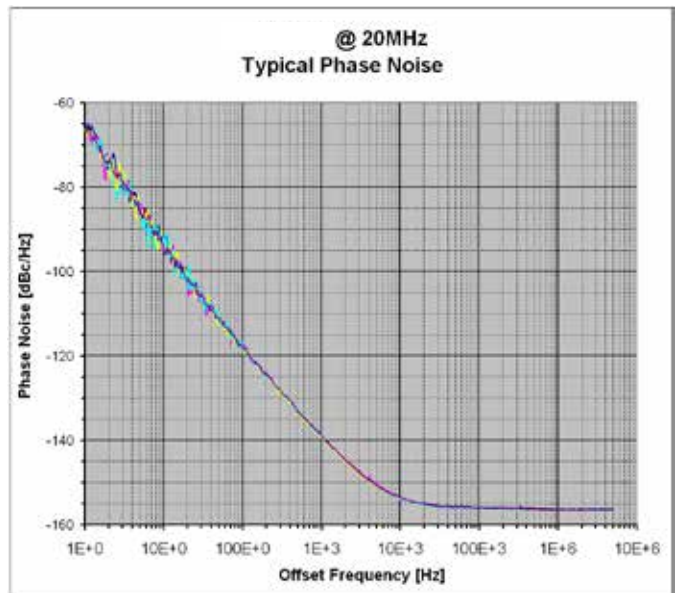| Pin Connections	
1	Control Voltage Input (Vc) / N.C.
2	Ground (Case)
3	RF-Output
4	Supply Voltage Input (Vs)

Dimensions in mm

TDEV-without filter
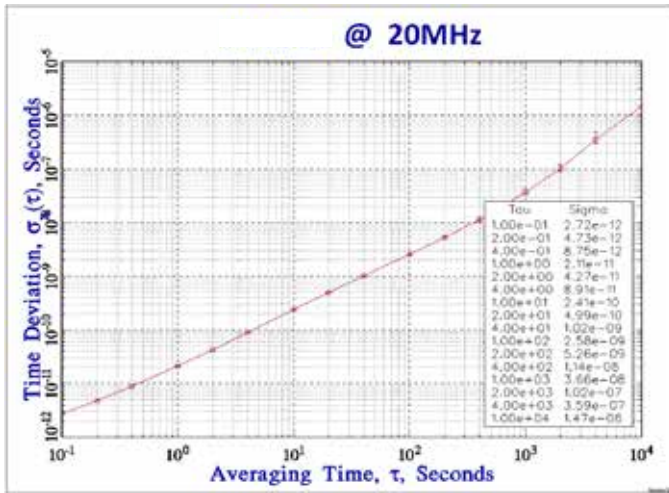
ADEV
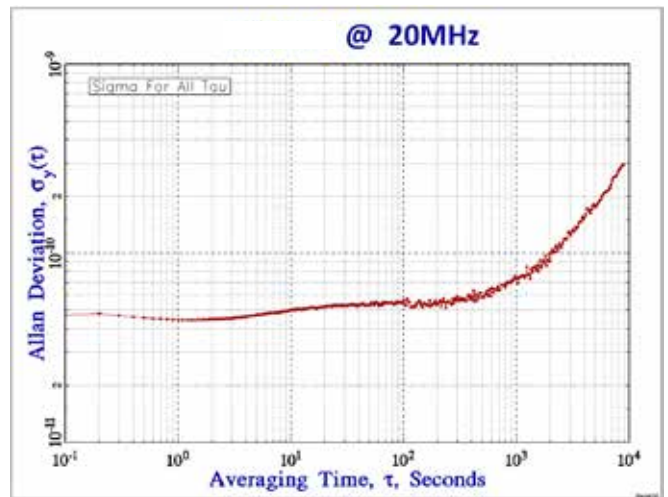
Temperature Stability

Phase Noise[4]

Frequency vs. Load

Frequency vs. Supply Voltage
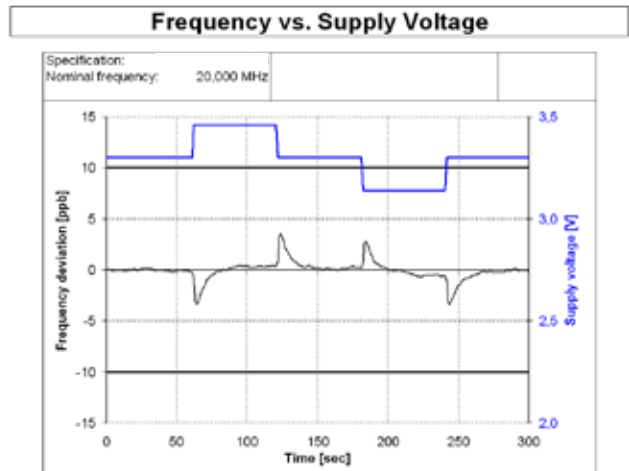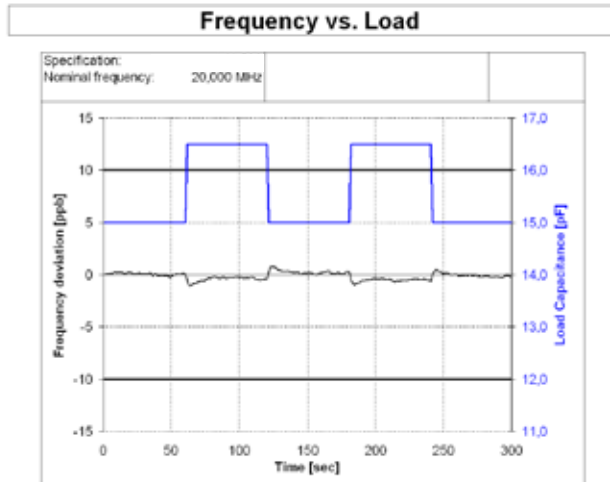
Aging
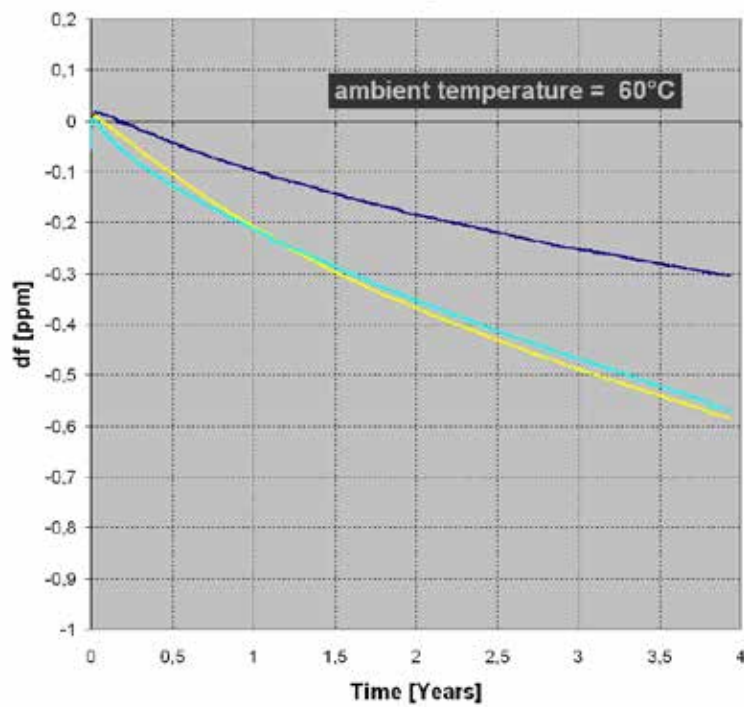
TP: max 250°C (@ solder joint, customer board level)

T_P: max: 10…30 sec

Additional Information:

This SMD oscillator has been designed for pick and place reflow soldering

SMD oscillators must be on the top side of the PCB during the reflow process.
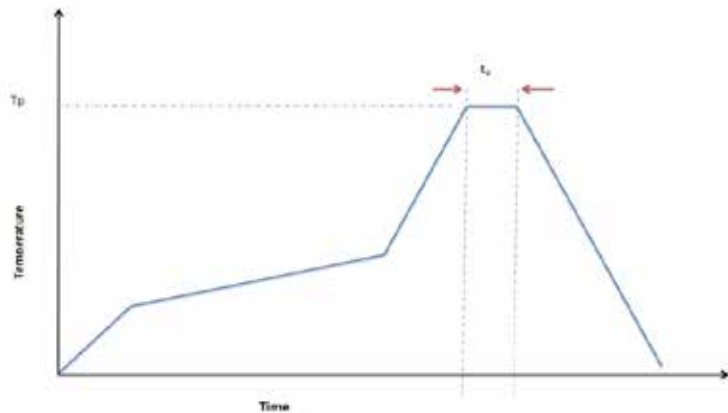
Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly	Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.	Time 25°C to Peak Temperature	8 minutes max.
Preheat -Temperature Min T_{Smin} -Temperature Min T_{Smax} -Time (min to max) t_s	150°C 200°C 60-180 seconds	Time maintained above -Temperature (T_L) -Time (t_L)	217°C 60-150 seconds
TSmax to TL -Ramp-up Rate	3°C/second max		
Time maintained above -Temperature (T_L) -Time (t_L)	217°C 60-150 seconds	Time within 5°C of actual Peak Temperature (t_p)	20-40 seconds
Peak Temperature (T_P)	max 260°C	Ramp-down Rate	6°C/ second max

Note: All temperatures refer to topside of the package, measured on the package body surface.
SMD oscillators must be on the top side of the PCB during the reflow process.

Standard Shipping Method (MX-600)

Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
G349	24	83,3	850	12

Ordering Information[1,3]

MX - 600 0 - E A J - 308 0 - 10M0000000

Product Family
MX: MCXO

Package
SMD version: 600

Height
0: 4.1 mm

Supply Voltage
E: 3.3V

RF Output Code
A: HCMOS

Temperature Range
J: -20°C to +70°C
E: -40°C to +85°C

Stability Code
208: ± 20 ppb
308: ± 30 ppb
508: ± 50 ppb
107: ±100 ppb

Frequency Control
0: No Tuning
1: ±3.5 ppm
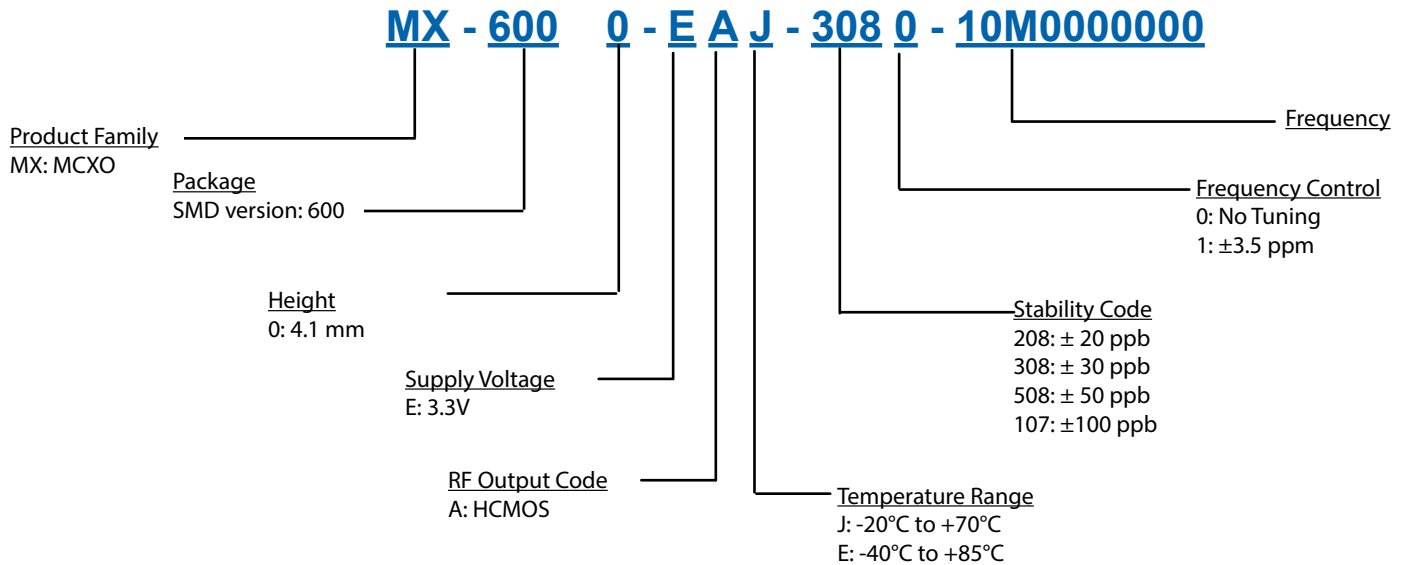
Frequency

Notes:
1. Contact factory for other frequencies. Not all options and codes are available at all frequencies.
2. Unless otherwise stated conditions are valid at F=20MHz; V_s=3.3V; V_c=1.65; T=25°C; Output Signal=HCMOS; load=15pF
3. Contact factory for availability.
4. Phase noise degrades with increasing output frequency.

Subject to technical modification.

Rev: 8/2018