

Helping Customers Innovate, Improve & Grow

Features

- Any frequency between 80 MHz and 220 MHz with 6 decimal places of accuracy
- CMOS compatible output
- Industrial and extended commercial temperature ranges
- Industry-standard packages: 3.2 mm x 2.5 mm (4-pin), 5.0 mm x 3.2 mm (6-pin), 7.0 mm x 5.0 mm (6-pin)

Applications

- Ideal for telecom clock synchronization, low bandwidth analog PLL, jitter cleaning, clock recovery, audio, video, FPGA, broadband and networking

Performance Specifications

Parameter and Conditions	Symbol	Min.	Typ.	Max.	Unit	Condition
Output Frequency Range	f	80	—	220	MHz	
Frequency Stability	F _{stab}	-20	—	+20	PPM	Inclusive of Initial tolerance at 25 °C, and variations over operating temperature, aging, supply voltage and load
		-50	—	+50	PPM	
Aging	F _{aging}	—	—	±5	PPM	10 years
Operating Temperature Range	T _{use}	-20	—	+70	°C	Extended Commercial
		-40	—	+85	°C	Industrial
Supply Voltage	V _{dd}	2.97	3.3	3.63	V	Contact Vectron for any other voltage support between 2.5V and 3.3V
		2.52	2.8	3.08	V	
		2.25	2.5	2.75	V	
		1.71	1.8	1.89	V	
Pull Range	PR	±50, ±80, ±100			PPM	
Upper Control Voltage	VC _U	1.7	—	—	V	V _{dd} = 1.8 V, Voltage at which maximum deviation is guaranteed.
		2.4	—	—	V	V _{dd} = 2.5 V, Voltage at which maximum deviation is guaranteed.
		2.7	—	—	V	V _{dd} = 2.8 V, Voltage at which maximum deviation is guaranteed.
		3.2	—	—	V	V _{dd} = 3.3 V, Voltage at which maximum deviation is guaranteed.
Lower Control Voltage	VC _L	—	—	0.1	V	Voltage at which minimum deviation is guaranteed.
Control Voltage Input Impedance	Z _{vin}	100	—	—	kΩ	For the voltage control pin
Linearity	Lin	—	0.1	1	%	
Frequency Change Polarity		Positive slope				
Control Voltage Bandwidth (-3dB)	V _{BW}	—	8	—	kHz	Contact Vectron for 16 kHz and other high bandwidth options
Current Consumption	I _{dd}	—	34	36	mA	No load condition, f = 100 MHz, V _{dd} = 2.5 V, 2.8 V or 3.3 V
		—	30	33	mA	No load condition, f = 100 MHz, V _{dd} = 1.8 V
Standby Current	I _{std}	—	—	70	μA	All V _{dds} , ST = GND, output is Weakly Pulled Down
Duty Cycle	DC	45	—	55	%	f ≤ 165 MHz, all V _{dds} .
		40	—	60	%	f > 165 MHz, all V _{dds} .
Rise/Fall Time	T _r , T _f	—	1.5	2	ns	V _{dd} = 1.8, 2.5, 2.8 or 3.3 V, 10% - 90% V _{dd} level
Output Voltage High	VOH	90%	—	—	V _{dd}	OH = -7 mA, IOL = 7 mA, (V _{dd} = 3.3 V) IOH = -4 mA, IOL = 4 mA, (V _{dd} = 2.8 V and V _{dd} = 2.5 V) IOH = -2 mA, IOL = 2 mA, (V _{dd} = 1.8 V)
Output Voltage Low	VOL	—	—	10%	V _{dd}	
Input Pull-up Impedance	Z _{in}	—	100	250	kΩ	For the OE/ST pin if available
Start-up Time	T _{start}	—	6	10	ms	
OE Enable/Disable Time	T _{oe}	—	—	150	ns	f=100 MHz, all V _{dds} . For other freq, T _{oe} = 100 ns + 3 cycles
Resume Time	T _{resume}	—	—	10	ms	Measured from the time ST pin crosses 50% threshold
RMS Period Jitter	T _{jitt}	—	1.5	2	ps	f = 156.25 MHz, V _{dd} = 2.5 V, 2.8 V or 3.3 V
		—	2	3	ps	f = 156.25 MHz, V _{dd} = 1.8 V
RMS Phase Jitter (random)	T _{phj}	—	0.6	1	ps	f = 156.25 MHz, Integration bandwidth=12kHz to 20MHz, All V _{dds}

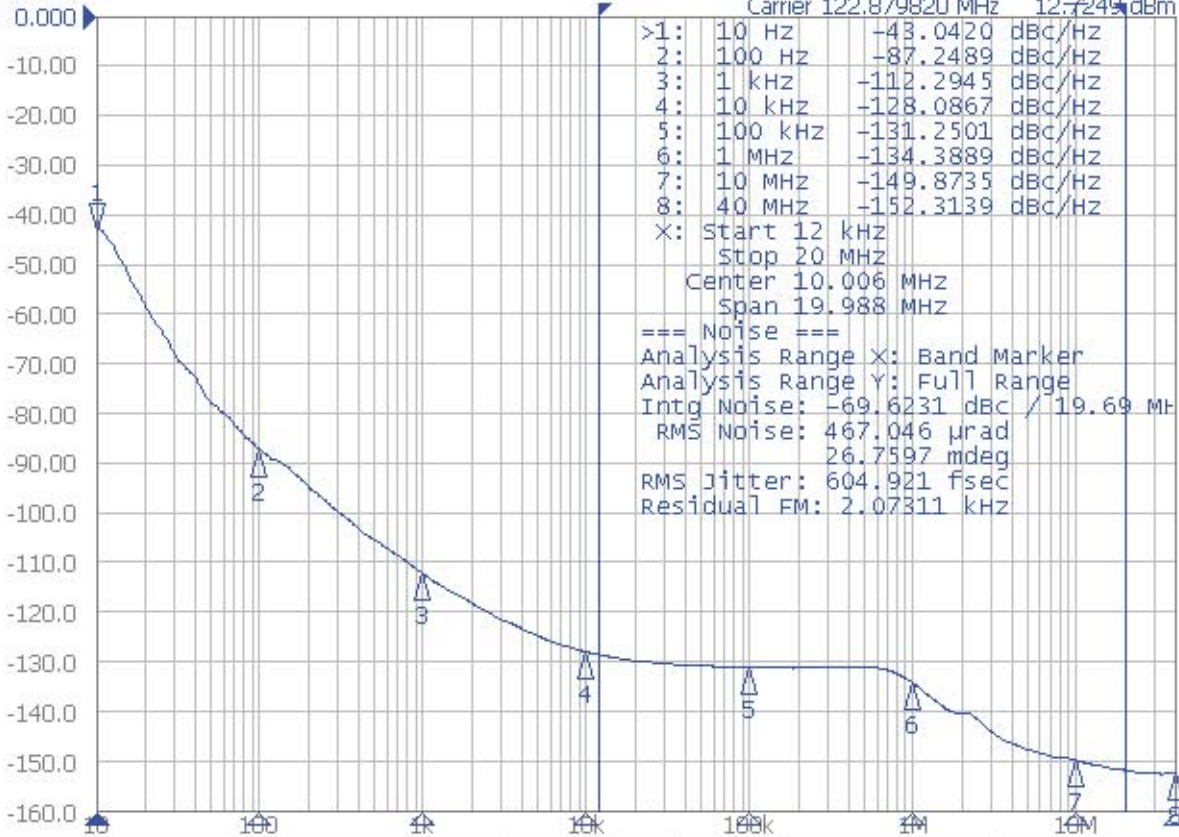
Typical Phase Noise

Agilent E5052B Signal Source Analyzer

Vectron International

Phase Noise 10.00dB/ Ref 0.000dBc/Hz [Smo]

Carrier 122.879820 MHz 12.7249 dBm



>1: 10 Hz -43.0420 dBc/Hz
 2: 100 Hz -87.2489 dBc/Hz
 3: 1 kHz -112.2945 dBc/Hz
 4: 10 kHz -128.0867 dBc/Hz
 5: 100 kHz -131.2501 dBc/Hz
 6: 1 MHz -134.3889 dBc/Hz
 7: 10 MHz -149.8735 dBc/Hz
 8: 40 MHz -152.3139 dBc/Hz
 X: Start 12 kHz
 Stop 20 MHz
 Center 10.006 MHz
 Span 19.988 MHz
 === Noise ===
 Analysis Range X: Band Marker
 Analysis Range Y: Full Range
 Intg Noise: -69.6231 dBc / 19.69 MHz
 RMS Noise: 467.046 μ rad
 26.7597 mdeg
 RMS Jitter: 604.921 fsec
 Residual FM: 2.07311 kHz

IF Gain 20dB Freq Band [99M-1.5GHz] Omit LO Opt [<150kHz] 853pts

Phase Noise Start 10 Hz Stop 40 MHz 6/6

Phase Noise: Meas Cor Ctrl 1.65V Pow 3.3V Attn 10dB ExtRef1 ExtRef2 Stop Svc 2012-12-19 08:41

System

Print

Abort Printing

Printer Setup ...

Invert Image

ON

Dump
Screen Image ...

Misc Setup

Backlight

ON

Instrument Setup

Service Menu

Product
Information

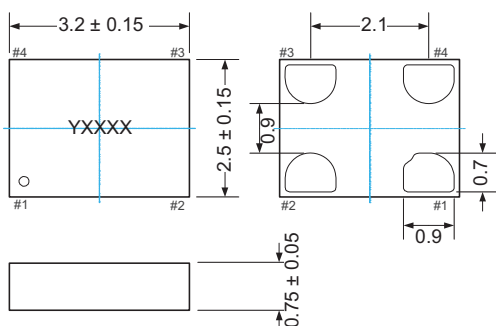
Help ...

Return

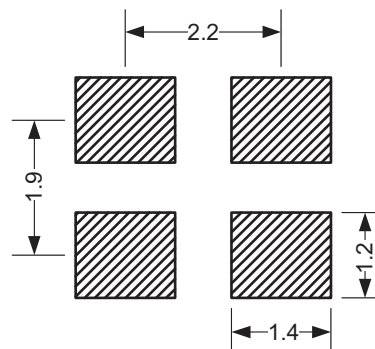
Packaging and Pinout

Package Outline & Dimensions (Unit: mm)

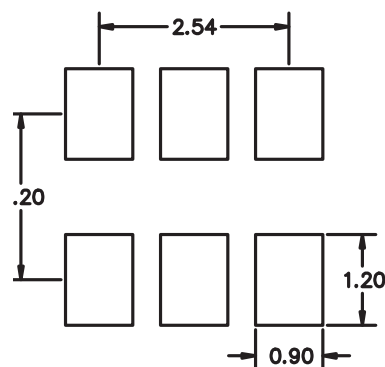
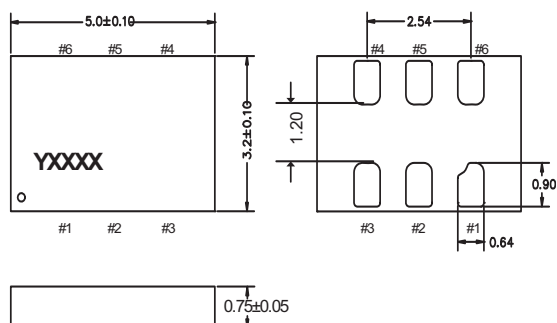
3.2 x 2.5 x 0.75 mm



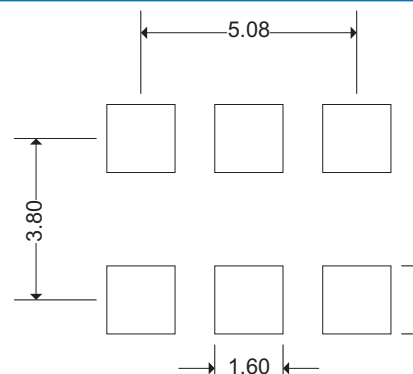
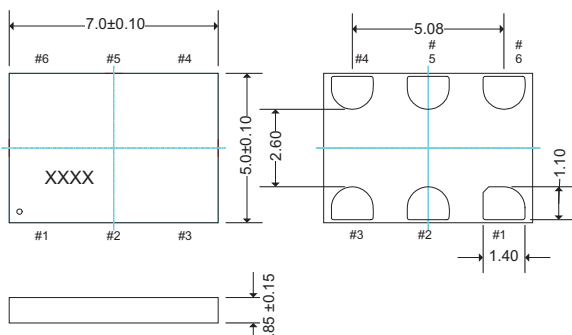
Recommended Land Pattern (Unit: mm)



5.0 x 3.2 x 0.75 mm



7.0 x 5.0 x 0.90 mm



4 pin package: Pin Connections

Pin	Symbol	Functionality
1	VIN	0-Vdd: Produces voltage dependent frequency change
2	GND	VDD Power Supply Ground
3	CLK	Oscillator output
4	Vdd	Power supply voltage

6 pin package: Pin Connections

Pin	Symbol	Functionality
1	VIN	0-Vdd: Produces voltage dependent frequency change
2 (options)	NC	H or L or Open: No effect on output frequency or other device functions
	OE	H or Open: specified frequency output, L: output is high impedance
	ST	H or Open: specified frequency output, L: output is low level (weak pull down). Oscillation stops
3	GND	VDD Power Supply Ground
4	CLK	Oscillator output
5	NC	Do Not Connect; Leave it floating
6	Vdd	Power supply voltage

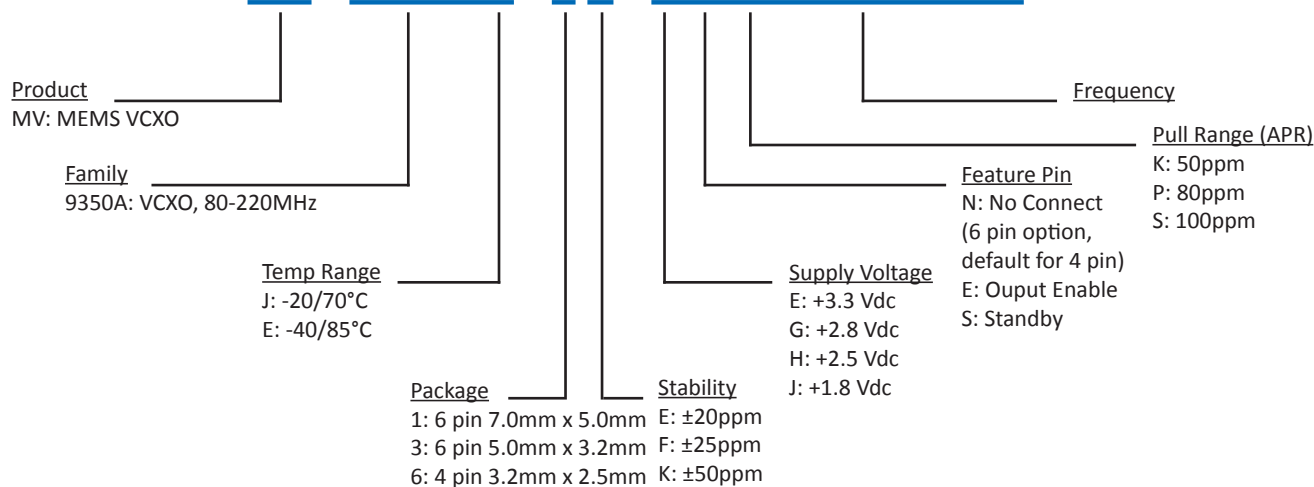
Absolute Maximum Ratings and Test Compliance

Maximum Ratings			
Parameter	Min.	Max.	Unit
Storage Temperature	-65	150	°C
VDD	-0.5	4	V
Electrostatic Discharge	–	6000	V
Soldering Temperature (follow standard Pb free soldering guidelines)	–	260	°C
Program Retention over -40 to 125°C, Process, Vdd (0 to 3.65 V)	1,000+	-	Years

Environmental Compliance	
Parameter	Condition/Test Method
Mechanical Shock	MIL-STD-883F, Method 2002
Mechanical Vibration	MIL-STD-883F, Method 2007
Temperature Cycle	JESD22, Method A104
Solderability	MIL-STD-883F, Method 2003
Moisture Sensitivity Level	MSL1 @ 260°C

Ordering Information

MV - 9350A E - 1 F - E E K 156M250000



Notes:

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Unless otherwise stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
3. Subject to technical modification.
4. Contact factory for availability.

Revision History

Revision	Change Summary	Date
1.0	Product Release	June 2013
1.1	Knowles logo and address change	Feb 2014
1.2	Add ± 20 ppm temperature stability	Aug 2014

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