

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	-25	–	+25	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	Vdd	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	Vdd = 1.8 V, Voltage at which maximum deviation is guaranteed.
		2.4	–	–	V	Vdd = 2.5 V, Voltage at which maximum deviation is guaranteed.
		2.7	–	–	V	Vdd = 2.8 V, Voltage at which maximum deviation is guaranteed.
		3.2	–	–	V	Vdd = 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	Idd	–	34	36	mA	No load condition, f = 100 MHz, Vdd = 2.5 V, 2.8 V or 3.3 V
		–	30	33	mA	No load condition, f = 100 MHz, Vdd = 1.8 V
Standby Current	I_std	–	–	70	µA	All Vdds, ST = GND, output is Weakly Pulled Down
Duty Cycle	DC	45	–	55	%	f ≤ 165 MHz, all Vdds.
		40	–	60	%	f > 165 MHz, all Vdds.
Rise/Fall Time	Tr, Tf	–	1.5	2	ns	Vdd = 1.8, 2.5, 2.8 or 3.3 V, 10% - 90% Vdd level
Output Voltage High	VOH	90%	–	–	Vdd	OH = -7 mA, IOL = 7 mA, (Vdd = 3.3 V) IOH = -4 mA, IOL = 4 mA, (Vdd = 2.8 V and Vdd = 2.5 V) IOH = -2 mA, IOL = 2 mA, (Vdd = 1.8 V)
Output Voltage Low	VOL	–	–	10%	Vdd	
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 Vdds. 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, Vdd = 2.5 V, 2.8 V or 3.3 V
		–	2	3	ps	f = 156.25 MHz, Vdd = 1.8 V
RMS Phase Jitter (random)	T_phj	–	0.6	1	ps	f = 156.25 MHz, Integration bandwidth=12kHz to 20MHz, All Vdds

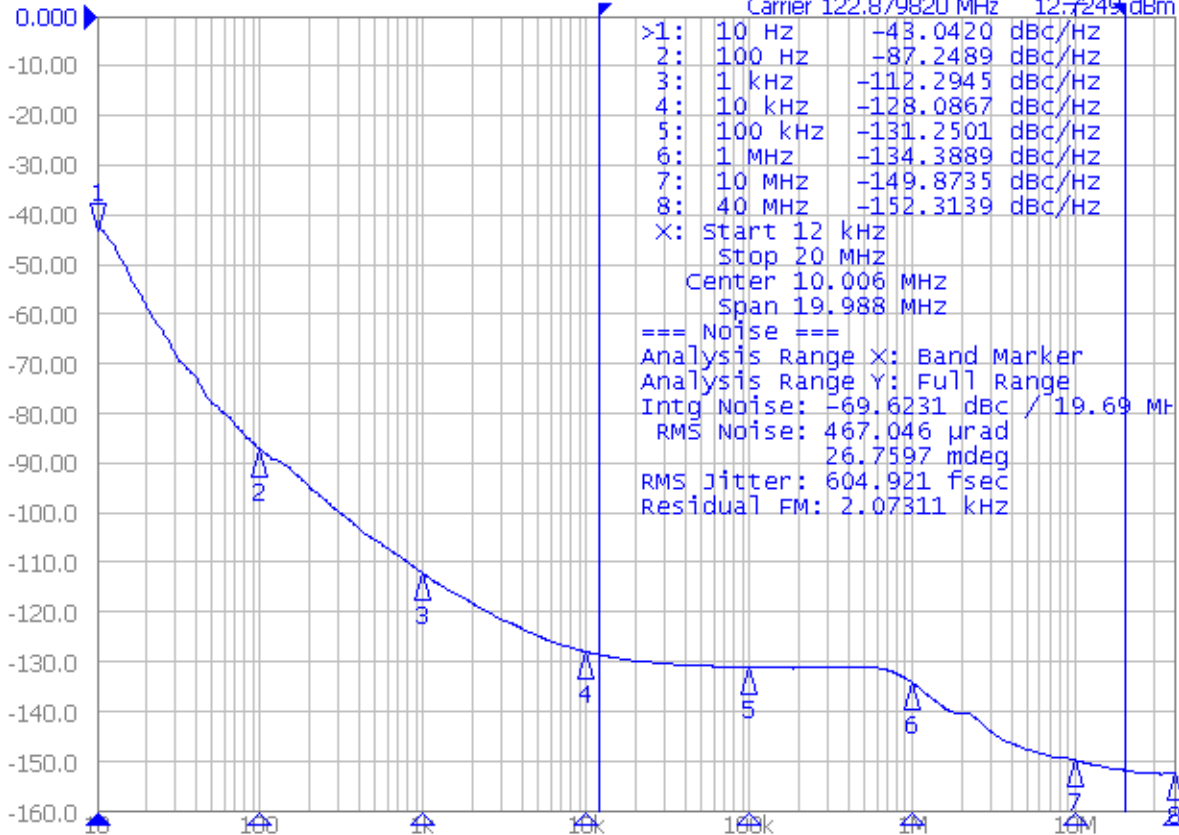
# Typical Phase Noise

Agilent E5052B Signal Source Analyzer

Vectron International

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

Carrier 122.879820 MHz 12.7249 dBm



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>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 µrad
           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

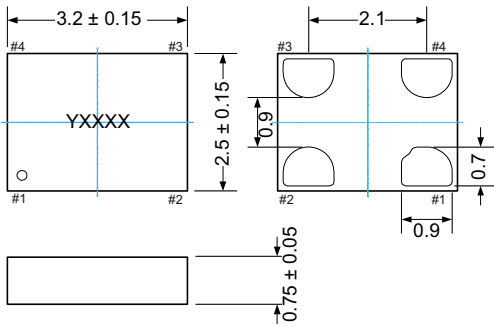
Help ...

Return

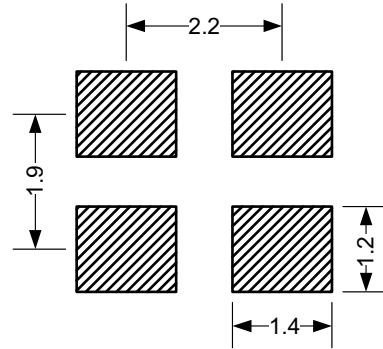
# Packaging and Pinout

## Package Outline & Dimensions (Unit: mm)

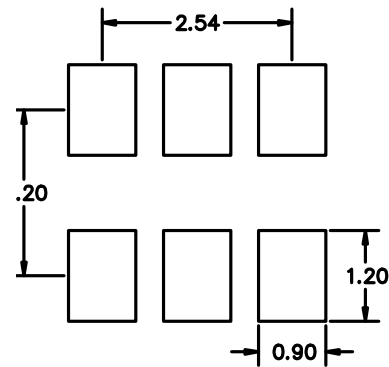
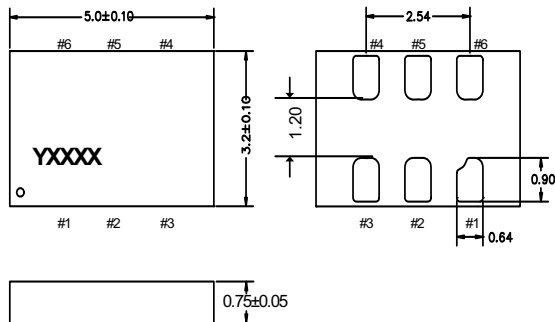
3.2 x 2.5 x 0.75 mm



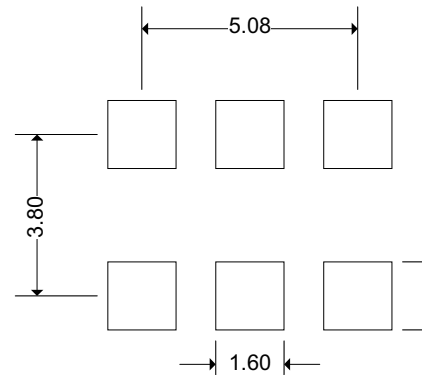
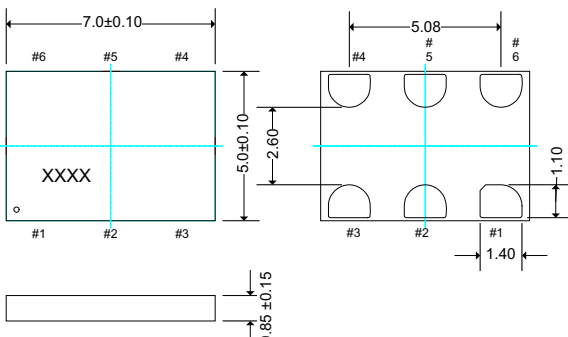
## Recommended Land Pattern (Unit: mm)



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

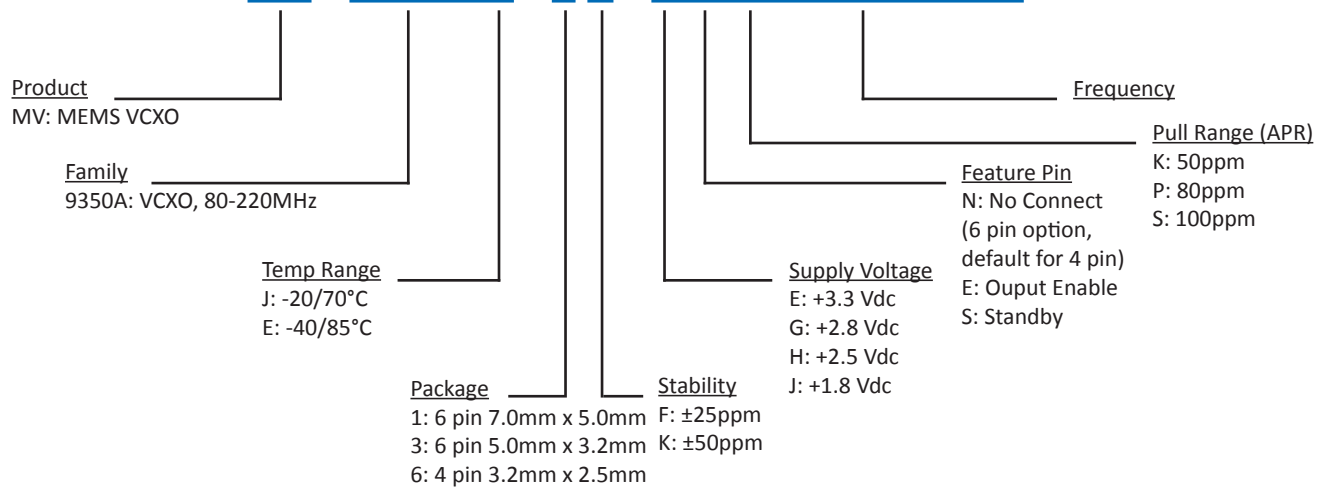
## Absolute Maximum Ratings and Test Compliance

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:

- Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
- 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).
- Subject to technical modification.
- Contact factory for availability.

## For Additional Information, Please Contact

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