

VFOV650

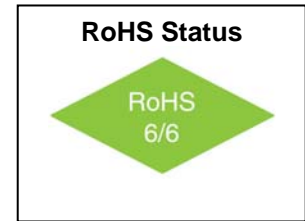
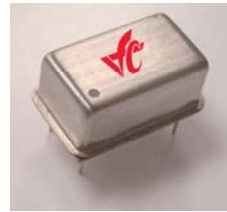
Oven Controlled Crystal Oscillator

High Stability - Miniature Package



Features

- High stability in small package
- Low power consumption - fast warm-up time
- Low drift – tight holdover
- Very low phase noise (-170dBc/Hz typ)
- HCMOS/TTL output
- 10 MHz to 52 MHz frequencies available
- Accurate clock with no tuning required
- Voltage control function available



Applications

- IEEE 1588 clock
- Stratum 3 holdover
- Wireless base stations
- Timing over packet

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Frequency Range			10.0		52.0	MHz	See Available Frequency List
Frequency Stability	$\Delta F/F$	Initial Calibration ($\Delta F/F_{nom}$)		± 300	± 500	ppb	For fixed tuning option only
		Vs. Operating Temperature (Ref to +25°C Frequency)		± 10		ppb	See "How to Order" Chart for Available Options
		Vs. Supply Voltage		± 1.0		ppb	Vcc $\Delta \pm 5\%$
Aging	$\Delta F/F$	Per day First year 10 years		± 1.0 ± 0.2 ± 1.5	ppb ppm ppm	After 30 days	
Total Free Run Accuracy		Over all conditions for 10 year life			± 2.5	ppm	For fixed tuning option only
Operating Temperature Range	T		-40°		+85°	°C	See "How to Order" Chart for Available Options
SSB Phase Noise	L(f)	10 Hz 100 Hz 10 KHz 100 KHz 1 MHz		-110 -140 -160 -168 -170		dBc/Hz	At 20 MHz - Performance is dependent on frequency
Jitter		12KHz to 20 MHz		0.15		ps RMS	
Supply Current	Icc	Steady state, 25°C still air Steady state, -40°C still air Start-up Current		160 350 500	180 550	mA	Vcc=3.30V

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Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	Vcc		3.13	3.3	3.46	V	
Output Waveform/Load		HCMOS/TTL Compatible Square Wave	10KOhm 15pF				
Symmetry			45		55	%	
Rise/Fall Time	Tr, Tf	10KOhm // 15pf load		1.2		ns	
Control Voltage Range	Vc		0.0		3.3	V	For voltage control option only
Deviation Range		From Fnominal		±2.0		ppm	For voltage control option only
Warm-up time	τ	To +/-10 ppb of 30 minute frequency		1		min	at +25°C

Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Break Down Voltage	Vcc		-0.5		4.0	V	
Storage Temperature	Ts		-50		90	°C	
Control Voltage	Vc		-1		6	V	

Environmental and Mechanical

Parameter	Specification
Mechanical Shock	Per Mil-Std-202, 30G, 11ms
Sine Vibration	Mil-Std-202, 5Gs Peak to 2000 Hz
Random Vibration	Mil-Std-202F Method 214 5 Gs RMS 20 to 500Hz
Soldering/Processing	Hand/Wave Solder Compatible - Washable Hermetic Enclosure
Seal	Fully Hermetic
Moisture Sensitivity Level	MSL Level 1
Marking Permanency	Mil-Std-202F, Method 215
RoHS	Lead Free RoHS 6/6 compliant
Packaging	Antistatic Tubes

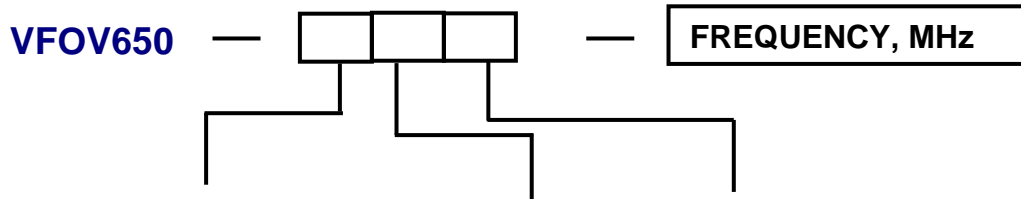
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How to Order



Temperature Stability	
Code	Specification
R	$\pm 1 \times 10^{-7}$
T	$\pm 5 \times 10^{-8}$
U	$\pm 2 \times 10^{-8}$
V	$\pm 1 \times 10^{-8}$

Temperature Range	
Code	Specification
A	0°C to 50°C
B	0°C to 70°C
C	-10°C to 60°C
D	-20°C to 70°C
G	-40°C to 85°C

Tuning	
Code	Specification
	Fixed
V	Voltage Control

Available Stability Combinations

Code	Specification	0°C to 50°C	0°C to 70°C	-10°C to 60°C	-20°C to 70°C	-40°C to 85°C
R	$\pm 1 \times 10^{-7}$	x	x	x	x	x
T	$\pm 5 \times 10^{-8}$	x	x	x	x	x
U	$\pm 2 \times 10^{-8}$	x	x	x	x	x
V	$\pm 1 \times 10^{-8}$	x	O	O	O	

X = Available O = Available depending on Frequency – Consult Factory

Standard Available Frequencies:

10.0 MHz, 10.24 MHz, 12.5 MHz, 12.8 MHz, 13.0 MHz, 20.0 MHz,
20.48 MHz, 25.0 MHz, 25.6 MHz, 26.0 MHz, 40.0 MHz, 40.96 MHz,
50.0 MHz, 51.2 MHz, 52.0 MHz

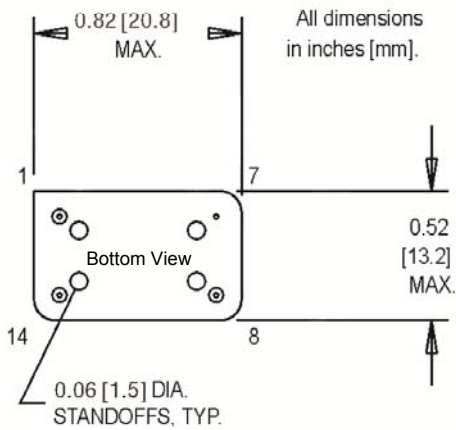
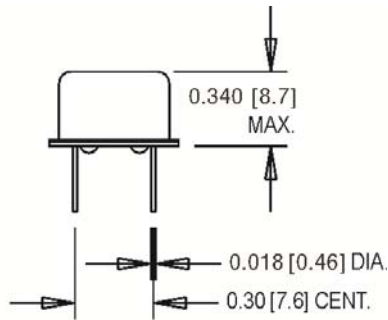
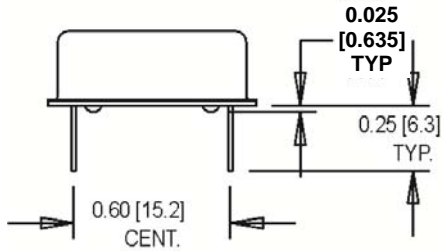
Consult Factory for Additional Available Frequencies.



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Outline Drawing



Pin #	Connection
1	N/C (fixed frequency models) Vc (voltage control option models)
7	GND & Case
8	Output
14	Vcc