

VFH230C Series

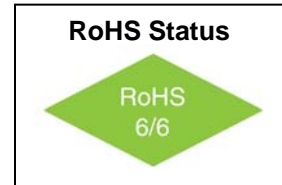
XO Low Jitter 3.3V

5x7mm SMD, LVPECL / LVDS



Features

- 750kHz to 800MHz frequency range
- <5.0 ps RMS jitter over 12kHz – 20MHz
- LVPECL or LVDS output with tristate
- SMD package (5x7 mm)
- Stability options from ± 25 ppm to ± 100 ppm
- Leadless chip carrier package is hermetically sealed for superior aging and field performance
- Crystal angle controlled to ± 0.5 for excellent temperature stability
- 168 hour Class B burn-in and extensive environmental testing for best performance in rugged field environments
- Serialized test data available
- Calculated MTBF is 3.8×10^6 hours at 125°C



Applications

- Optical Networking, SONET / SDH
- Gigabit Ethernet
- Fibre Channel
- DSL

Description

These high reliability oscillators provide LVPECL/LVDS outputs for applications subjected to the most stringent environmental conditions. They are mechanically robust and weigh less than 0.2 grams. This 5x7 mm SMD package has a hermetic seal, thus ensuring the integrity of each part. Each oscillator is burned-in at 125°C for 168 hours, temperature cycled and centrifuged then fully tested in accordance with Table 1. Reliability tests are performed per Table 2.

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Frequency Range	F		0.75		800	MHz	
Frequency Stability	$\Delta F/F$	Vs. Operating Temperature			± 100 ± 50 ± 25 ± 20	ppm	See "How to Order" chart
		Vs. Supply Voltage		± 1.5	± 3	ppm/V	First Year After first year
		Vs. Aging / Year		± 3 ± 1		ppm/y	
Operating Temperature	T		-55° -55°		+85° +125°	°C	Order Code A Order Code B
Output		LVPECL LVDS					See "How to Order" chart
Supply Voltage	V_{CC}		3.15	3.3	3.45	V	

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Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Period Jitter RMS		19.44MHz 77.76MHz 155.52MHz 622.08MHz		5 8 9 10		ps	
Integrated Jitter RMS 12kHz to 20MHz		155.52MHz		3	5	ps	
Symmetry		$(V_{DD}-1.3) V_{DC}$ $1.25 V_{DC}$			45/55	%	PECL LVDS
Phase Noise		10Hz		-60		dBc/Hz	@19.44MHz
		100Hz		-90			
		1kHz		-112			
		10kHz		-140			
		100kHz		-140			
		10Hz		-60		dBc/Hz	@106.25MHz
		100Hz		-90			
		1kHz		-112			
		10kHz		-127			
		100kHz		-125			
		10Hz		-60		dBc/Hz	@155.52MHz
		100Hz		-90			
		1kHz		-112			
		10kHz		-125			
		100kHz		-123			
		10Hz		-60		dBc/Hz	@622.08MHz
		100Hz		-90			
		1kHz		-109			
		10kHz		-110			
		100kHz		-109			
Supply Current	I_{CC}	0.75 – 24MHz			25	mA	PECL
		24 – 160MHz			65		
		160 – 800MHz			100		
		0.75 – 24MHz			25	mA	LVDS
		24 – 96MHz			45		
		96 – 800MHz			80		
Load	50 Ohms to $V_{DD}-2V$ (PECL) 100 Ohms (LVDS)						
Output High Voltage	V_{OH}			$V_{DD}-1.025$ 1.4	1.6	V	PECL LVDS
Output Low Voltage	V_{OL}		0.9	1.1	$V_{DD}-1.620$	V	PECL LVDS
Output Differential Voltage	V_{OD}		247	355	454	mV	LVDS
Offset Voltage	V_{OS}		1.125	1.2	1.375	V	LVDS
Rise / Fall Time	T_r/T_f	20% to 80%		0.6 0.7	1.5 1.0	ns	PECL LVDS
Tristate	"1": Output Enable – Pin 1 may float or 2.8V min ($3.3V V_{DD}$) "0": Tristate – Pin 1 requires 0.4V max ($3.3V V_{DD}$)						

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Environmental and Mechanical Conditions

Parameter	Specification
Shock	MIL-STD 883, Method 2002, Cond. B (1500 peak g, 0.5 ms duration, ½ sine wave, 5 shocks in 6 planes)
Humidity	Resistant to 85% R.H. at 85°C
Vibration	MIL-STD 883, Method 2007, Cond. A (20-2000 Hz of 0.06" d.a. or 20 Gs, whichever is less)
Leak	MIL STD 883, Method 1014, Cond. A and C
Case	Hermetically sealed ceramic LCC
Pads	Solderable gold over nickel
Marking	Epoxy ink or laser engraved
Resistance to Solvents	MIL STD 202, Method 215

Table 1

Each unit undergoes screening for product level B class 2 oscillators by MIL-PRF-55310

Internal Visual	
Stabilization Bake	MIL-STD-883 Method 1008, COND. B
Temperature Cycling	MIL-STD-883 Method 1010, COND. B
Constant Acceleration	MIL-STD-883 Method 2001, COND. A
Fine Leak	MIL-STD-883 Method 1014, COND. A
Gross Leak	MIL-STD-883 Method 1014, COND. C
Burn-in	MIL-STD-883 Method 1015, COND. B (125°C for 160 hours with bias)
Electrical test at 25°C	
Current	Frequency at max V _{DD}
Rise Time	Frequency at min V _{DD}
Fall Time	"Zero" logic level
Duty Cycle	"One" logic level
Tristate	
Frequency at 25°C and frequency verification at temperature extremes	

Serialized test data on each unit available upon request for additional cost.

Thermal Characteristics

Thermal Resistance

From Junction to Case, R_{θjc} 16 °C/Watt

Surface Mount Application

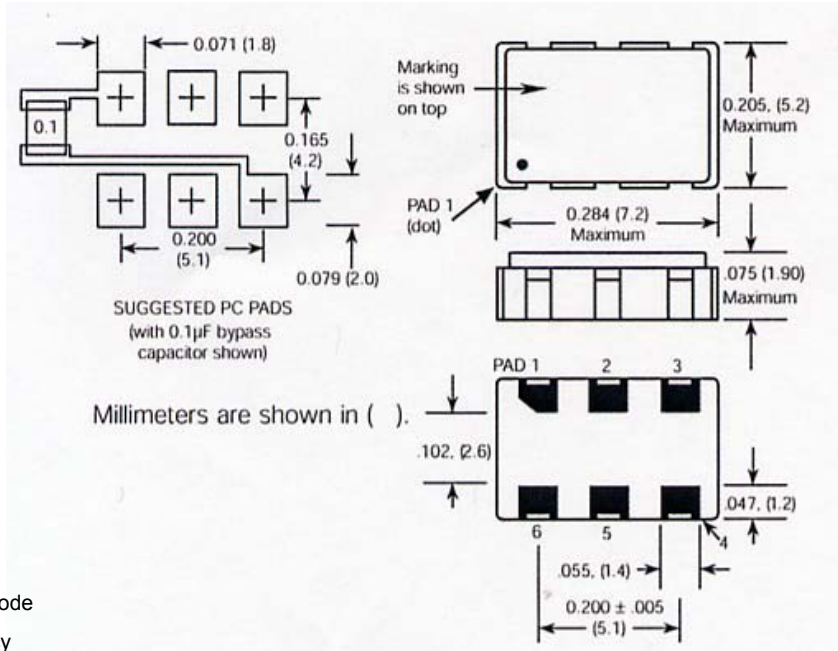
These packages are designed for reflow soldering in accordance with recommended profiles. For hand-soldering, the temperature of the iron should not exceed 400°C for three seconds.

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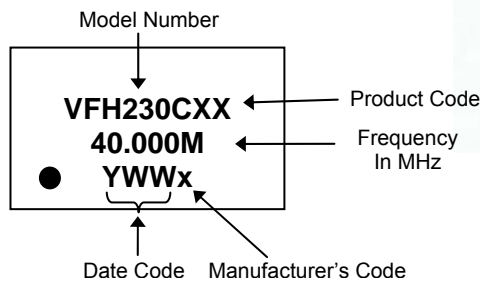


Pin Assignment

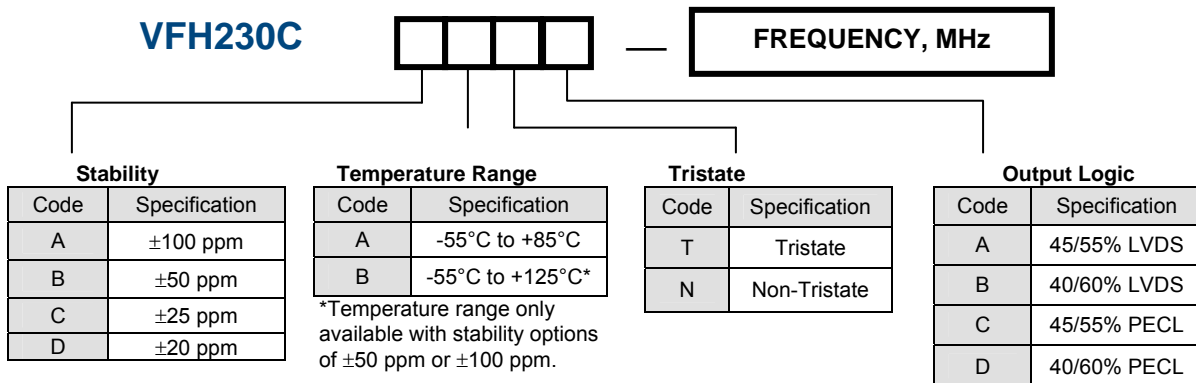
Pin #	Connection
1	Tristate
2	N/C
3	Case, GND
4	Output
5	Output
6	Supply Voltage



Marking Specification



How to Order



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TABLE 2
Reliability Test Procedures and Conditions for Quartz Crystal Oscillators

1. Group A

Electrical Characteristics at 25°C

- Frequency at nominal supply voltage and endpoints
- Input current
- Symmetry (Duty Cycle)
- Zero/One levels
- Rise/Fall times
- Frequency (verify frequency at the temperature extremes)

Physical Dimensions

- Length/width
- Height
- Package finish (Corrosion, discoloration, etc.)
- Marking placement/legibility

2. Group B

1000 hrs at or above 125°C, nominal voltage, proper load (sample size by MIL -PRF-55310 table 6, max. aging within 15 years requirement without catastrophic failures)

3. Group C- All units have passed Group A testing

A. Subgroup 1: 8 pcs.

<u>Standard</u>	<u>Condition</u>	<u>Description</u>	<u>End Point Measurement</u>
MIL-STD-883	Method 2002 COND.B	Mechanical Shock 1500 g's, 0.5ms 5 drops, 6 axis	Frequency Output waveform
MIL-STD-883	Method 2007 COND. A	Vibration, var. freq. 20 g's, 0.06" disp., 20- 20, 000-20 Hz	Frequency Output waveform
MIL-STD-883	Method 2003	Solderability	Visual 95% Coverage

B. Subgroup 2: 4 pcs (One-half of Subgroup 1)

<u>Standard</u>	<u>Condition</u>	<u>Description</u>	<u>End point Measurement</u>
MIL-STD-883	Method 1011 COND. B	Thermal Shock Liq. To liq. 15 cycles	Frequency Output waveform
MIL-STD-202	Method 105 COND. B	Altitude, 3.44 inch Hg. 12 hrs	Frequency Output waveform
MIL-STD-883	Method 1004	Moisture resist. with supply voltage applied 25°C to 65°C, 90 to 100% RH, 10 cycles	Frequency Output waveform
MIL-STD-202	Method 210 COND. A	Resistance to Solder Heat Immersion @350°C 3.5 sec	Frequency Output waveform

C. Subgroups 3: 4 pcs. (One half of Subgroup 1)

<u>Standard</u>	<u>Condition</u>	<u>Description</u>	<u>End point Measurement</u>
	Storage Temp. No. Oper	24 hrs. @ -55°C 24 hrs. @ 125°C	Frequency Output waveform
MIL-STD-883	Method 1009 COND. A	Salt Atmosphere 24 hrs. @ 35°C 0.5-3.0% Solution	Frequency Output waveform Visual
MIL-STD-883	Method 1014 COND. A	Fine Leak	Qs <5 X10 ⁻⁸
MIL-STD-883	Method 1014 COND. C	Gross Leak	Visual in 125°C Detector fluid

Test data is available for additional cost.

Recommended Reflow Soldering Profile

