

**OK-XBFXXXX-X Series  
HF/UHF SMD TCVCXO  
Ultra Low Phase Noise**

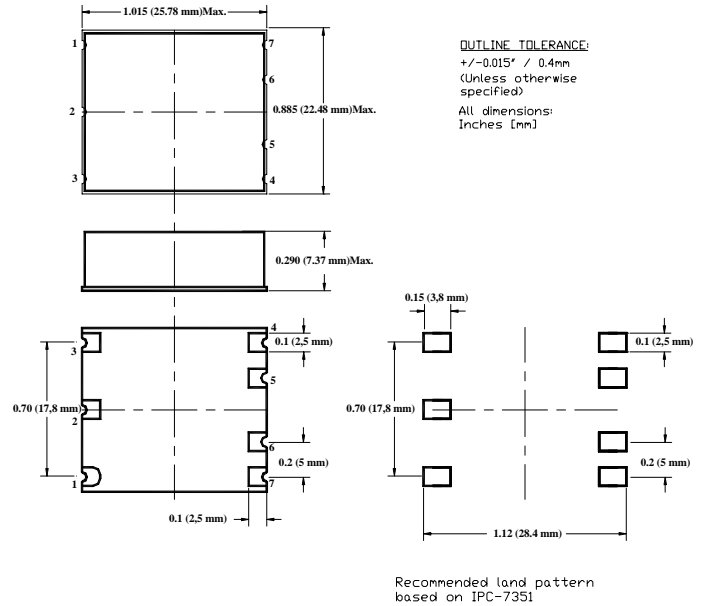
Rev. K

**Description:** The OK-XBFXXXX Series of SMD temperature compensated, voltage controlled crystal oscillators (TCVCXO), provides High and Ultra High Frequency with excellent temperature stability, extremely low phase noise and jitter with a variety of different output types in a small surface mount FR4 based package.

**Features**

- Small, Low Profile SMD Package
- Very Low Phase Jitter and Phase Noise
- Excellent Frequency Stability
- Ultra High Frequency – up to 2.5 GHz
- CMOS, Sine-Wave, Differential PECL or LVDS outputs available
- Stratum3 available
- COTS/Dual use

Note: For frequency stability over temperature  $\pm 1$ ppm and tighter, the package height may be 10mm or 12.5mm



**Creating a Part Number**

**OK - X BF X X X X - X - FREQ**

**Package Code**  
OK 7 Pad 25x22x7mm SMD

**Supply Voltage**

Code	Specification
0	5V $\pm 5\%$
A	3.3V $\pm 5\%$

**TCXO/TCVCXO Option**

Code	Specification
X	No V. Control
V	W/ V. Control

Note: Vc is not available with Code 3 Stability

**Output Type**

Code	Specification
C	CMOS
P	PECL
S	Sine-wave
L	LVDS

**Temp. Frequency Stability**

Code	Specification
1	$\pm 1.0$ ppm
2	$\pm 2.5$ ppm
3	$\pm 0.28$ ppm

**Environmental**

Code	Specification
L	Contains a level of lead that is in excess of RoHS directive and is not designed for reflow
R	RoHS compliant

**Temperature Range**

Code	Specification
E	-10°C to 60°C
B	0°C to 70°C
C	-20°C to 70°C
D	-40°C to 85°C

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### Specifications

Parameter	Symb	Condition	Min	Typ	Max	Unit	Note
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#### Electrical

Frequency Range	F	CMOS LVDS PECL, Sine-wave	30 30 30		200 1,000 2,500	MHz	
Input Voltage	Vcc		3.135 4.75	3.30 5.0	3.465 5.25	V	A 0
Input Current	Icc	CMOS, Sine PECL, Sine, LVDS			30 100	mA	@100MHz, 3.3V @622MHz, 3.3V
Frequency Stab.	$\Delta F/F$	Overall, available			$\pm 4.6$		20 years
Frequency Stability	$\Delta F/F$	vs. Temperature vs. Vcc aging		$\pm 0.5$ $\pm 0.1$ $\pm 1$ $\pm 3.5$	$\pm 1$	ppm ppm/V ppm/year ppm	See chart  First Year 10 years
Calibration	$\Delta F/F$	As shipped, 25°C		$\pm 0.5$	$\pm 1$	ppm	
Load		CMOS Sine PECL LVDS	15pf/10K Ohm Internally AC-coupled 50 Ohm 50 Ohm to Vcc-2V or Thevenin equivalent 100 Ohm between the outputs receiving end				
Duty cycle		@50%	45	50	55	%	CMOS, PECL, LVDS
Rise/Fall time	Tr/Tf	20 to 80 %		3 0.35		Ns	CMOS PECL, LVDS
Logic "1" level	Voh	CMOS	0.9Vcc			V	
Logic "0" level	Vol	CMOS			0.1Vcc	V	
Logic "1" level	Voh	PECL	Vcc-0.96		Vcc-0.81	V	100K available
Logic "0" level	Vol	PECL	Vcc-1.85		Vcc-1.65	V	100K available
Output Levels, LVDS	Vod	Differential Amplitude	247	330	454	mV	
		Amplitude error			50	mV	
	Vof	Offset Voltage	1.125	1.25	1.375	V	
		Offset Voltage Error			50	mV	
Output power	P	Sine-wave Into 50 Ohm	0 4	3 7		dBm	3.3V 5.0V
Start up time	Ts			2	10	ms	
Phase Jitter		1 $\sigma$		0.4 0.2	1 0.4	ps	100Hz to 20MHz 12KHz to 20MHz
Subharmonics		PECL, LVDS, Sine PECL, Sine CMOS, Sine		-45 -40	-40 -35 None	dBc	F>250MHz F>1,000MHz F<250MHz
Spurious					-60	dBc	
Harmonics		Sine-wave		-30	-25 -15	dBc	F<1,000MHz F $\geq$ 1,000MHz
SSB Phase Noise		@10Hz @100 Hz @1 KHz @10 KHz @100 KHz		-80 -110 -140 -155 -160		dBc/Hz	@100MHz
SSB Phase Noise		@10Hz @100 Hz @1 KHz @10 KHz @100 KHz		-60/-60 -90/-90 -120/-120 -140/-145 -145/-150		dBc/Hz	@622MHz; PECL, LVDS/Sine
SSB Phase Noise		@10Hz @100 Hz @1 KHz @10 KHz @100 KHz		-60 -90 -120 -130 -135		dBc/Hz	@1,000MHz



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### *Electrical* (continued)

Parameter	Symb	Condition	Min	Typ	Max	Unit	Note
Input Impedance				> 10KOhm			
Control voltage	Vc		0		3.3	V	
Modulation bandwidth	MB		2 Hz				Contact Factory for wider MB
Deviation		Vc=0V to 3.3V, 25°C	±5	±7		ppm	

### *Absolute Maximum Ratings*

Parameter	Symb	Condition	Min	Typ	Max	Unit	Note
Input Break Down Voltage	Vcc		-0.5		5.5	V	
Storage temp.	Ts		-40		105	°C	
Contr. Voltage	Vc		-1		9	V	

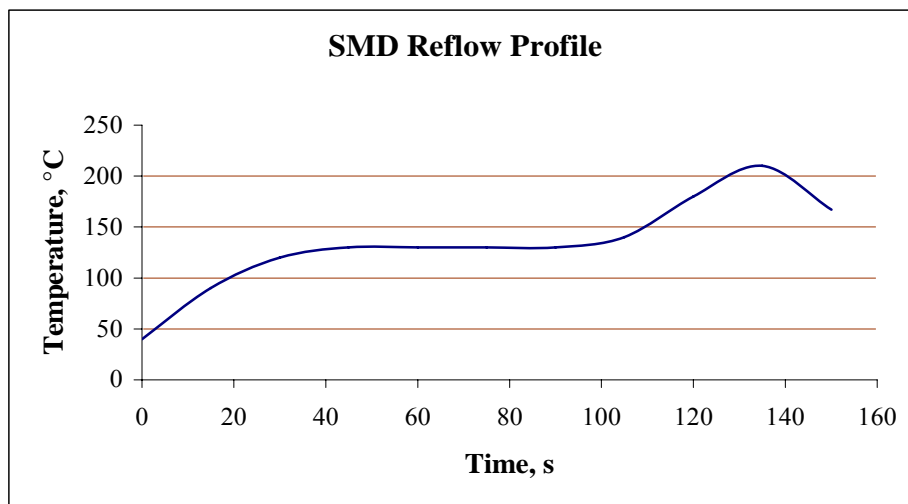
### *Environmental and Mechanical*

Operating temp. range	0°C to 70°C, -40°C to 85°C, see chart, page 1
Mechanical Shock	Per MIL-STD-202, Method 213, Cond. E
Thermal Shock	Per MIL-STD-883, Method 1011, Cond. A
Vibration	Per MIL-STD-883, Method 2007, Cond. A
Soldering Conditions	See MAX reflow profile; The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended.
Hermetic Seal	Leak rate less than $1 \times 10^{-8}$ atm.cc/s of helium (crystal only)

### *Electrical Connections*

Pin Out	Pin #1- Voltage Control ; Pin #2 - N/C ; Pin #3 - Vcc; Pin#4 - Output, CMOS, or Sine; Pin #5 - PECL/LVDS Output; Pin #6 - PECL/LVDS Complementary Output; Pin #7 - GND
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## Maximum solder reflow profile



The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended.

