

**FOX**  
**ELECTRONICS**<sup>®</sup>

An Integrated Device Technology, Inc. Company

# Frequency Control Solutions

Your global resource for advanced  
frequency control technology,  
quality and innovation.



...for more than  
**35** years!

- Crystals
- Oscillators
- XpressO
- VCXOs
- TCXOs
- OCXOs

SHORTFORM CATALOG

# XPRESSO®

The revolutionary XpressO® crystal oscillator family from Fox provides a wider range of options, with fewer compensating factors, shorter lead times, and reduced pricing. No cost, performance, or delivery time tradeoffs: you can have virtually the best of all worlds in one package.

**Great for your designs.** Fox XpressO oscillators with patented technologies (including proprietary ASICs with noise reduction silicon architectures and proven production techniques) deliver accurate performance over an extremely wide range of parameters – all at a lower cost than conventional oscillators!

**Great for your business, too!** Specifying the optimum oscillator is only half the battle. Getting it delivered in time to meet deadlines for engineering prototypes or full production models – without technical compromise and without paying a premium – seals the deal! This is where XpressO really lives up to its name.

- The exact frequency you need, from 0.750 MHz to 1.350 GHz
- Stabilities as tight as  $\pm 20$  ppm
- Low jitter and phase noise characteristics
- Choice of HCMOS, LVDS, and LVPECL versions for XO and VCXO product families and for TCXO (on special order)
- Choice of 2.5 V or 3.3 V supply voltages
- Choice of 7 x 5 mm, 5 x 3.2 mm and 3.2 x 2.5 mm package sizes
- Next day shipment of samples for prototyping
- Mere days for lead times on production quantities
- A new pricing structure that won't penalize you for requesting quick turnaround on unique frequencies



Part Number	Frequency Range	Frequency Stability	Temperature Range	Package	Voltage Operation	Output
FXO-HC3 Series	750 kHz ~ 250 MHz	$\pm 100, \pm 50, \pm 25$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	3.2 x 2.5 mm	2.5 V or 3.3 V	HCMOS
FXO-LC3 Series	750 kHz ~ 1.35 GHz	$\pm 100, \pm 50, \pm 25$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	3.2 x 2.5 mm	2.5 V or 3.3 V	LVDS
FXO-HC5 Series	750 kHz ~ 250 MHz	$\pm 100, \pm 50, \pm 25, \pm 20$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	5 x 3.2 mm	2.5 V or 3.3 V	HCMOS
FXO-PC5 Series	750 kHz ~ 1.35 GHz	$\pm 100, \pm 50, \pm 25, \pm 20$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	5 x 3.2 mm	2.5 V or 3.3 V	LVPECL
FXO-LC5 Series	750 kHz ~ 1.35 GHz	$\pm 100, \pm 50, \pm 25, \pm 20$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	5 x 3.2 mm	2.5 V or 3.3 V	LVDS
FXO-HC7 Series	750 kHz ~ 250 MHz	$\pm 100, \pm 50, \pm 25, \pm 20$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	HCMOS
FXO-PC7 Series	750 kHz ~ 1.35 GHz	$\pm 100, \pm 50, \pm 25, \pm 20$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	LVPECL
FXO-LC7 Series	750 kHz ~ 1.35 GHz	$\pm 100, \pm 50, \pm 25, \pm 20$ PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	LVDS

## XpressO® VCXOs

Part Number	Frequency Range	Frequency Pullability	Temperature Range	Package	Voltage Operation	Output
FVXO-HC5 Series	750 kHz ~ 250 MHz	$\pm 50$ PPM APR	-20°C ~ +70°C -40°C ~ +85°C (Option)	5 x 3.2 mm	2.5 V or 3.3 V	HCMOS
FVXO-LC5 Series	750 kHz ~ 1.35 GHz	$\pm 50$ PPM APR	-20°C ~ +70°C -40°C ~ +85°C (Option)	5 x 3.2 mm	2.5 V or 3.3 V	LVDS
FVXO-PC5 Series	750 kHz ~ 1.35 GHz	$\pm 50$ PPM APR	-20°C ~ +70°C -40°C ~ +85°C (Option)	5 x 3.2 mm	2.5 V or 3.3 V	LVPECL
FVXO-HC7 Series	750 kHz ~ 250 MHz	$\pm 50$ PPM APR	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	HCMOS
FVXO-LC7 Series	750 kHz ~ 1.35 GHz	$\pm 50$ PPM APR	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	LVDS
FVXO-PC7 Series	750 kHz ~ 1.35 GHz	$\pm 50$ PPM APR	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	LVPECL

## XpressO® TCXOs

Part Number	Frequency Range	Frequency Stability	Temperature Range	Package	Voltage Operation	Output
FXTC-HE7 Series	750 kHz ~ 250 MHz	$\pm 5, \pm 2.5, \pm 1.5, \pm 1$ PPM	0°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	HCMOS
FXTC-LE7 Series	750 kHz ~ 1.35 GHz	$\pm 5, \pm 2.5, \pm 1.5, \pm 1$ PPM	0°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V or 3.3 V	LVDS

# Oscillators

Part Number	Frequency Range	Frequency Stability	Temperature Range	Package	Voltage Operation	Output
F100 Series	1 MHz ~ 80 MHz	±100, ±50, ±25 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	2 x 1.6 mm ■	1.8 V, 2.5 V, 3.3 V	HCMOS
F200 Series	0.625 MHz ~ 67 MHz	±100, ±50, ±25 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	2.5 x 2 mm ■	1 V, 1.8 V, 2.5 V, 3.3 V	HCMOS
F247 / F249	4 MHz ~ 54 MHz	±20, ±15, ±10 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	2.5 x 2 mm ■	2.5 V	HCMOS
F237 / F239	4 MHz ~ 54 MHz	±20, ±15, ±10 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	2.5 x 2 mm ■	3.3 V	HCMOS
F300 Series	1.8 MHz ~ 170 MHz	±100, ±50, ±25, ±20 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	3.2 x 2.5 mm ■	1 V, 1.8 V, 2.5 V, 3.3 V	HCMOS
F347 / F349	4 MHz ~ 54 MHz	±15, ±10 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	3.2 x 2.5 mm ■	2.5 V	HCMOS
F337 / F339	4 MHz ~ 54 MHz	±15, ±10 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	3.2 x 2.5 mm ■	3.3 V	HCMOS
F500 Series	1.544 MHz ~ 125 MHz	±100, ±50, ±25, ±20 PPM	-10°C to +70°C -40°C to +85°C (Option)	5 x 3.2 mm ■	1.8 V, 2.5 V, 3.3 V	HCMOS
F547 / F549	4 MHz ~ 54 MHz	±15, ±10, ±8 PPM	-10°C to +70°C -40°C to +85°C (Option)	5 x 3.2 mm ■	2.5 V	HCMOS
F537 / F539	4 MHz ~ 54 MHz	±15, ±10, ±8 PPM	-10°C to +70°C -40°C to +85°C (Option)	5 x 3.2 mm ■	2.5 V	HCMOS
F4000 Series	1.8 MHz ~ 160 MHz	±100, ±50, ±25, ±20 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm ■	1.8 V, 2.5 V, 3.3 V, 5 V	HCMOS
F4107 / F4109 Series	1.8 MHz ~ 54 MHz	±20, ±15, ±10, ±8 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm ■	3.3 V	HCMOS
F3345 Series	1 MHz ~ 80 MHz	±100, ±50, ±25, ±20 PPM	-10°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm ■	5 V	HCMOS

## Auto Grade AEC-Q200 Oscillators

Part Number	Frequency Range	Frequency Stability	Temperature Range	Package	Voltage Operation	Output
FA510	2 MHz ~ 48 MHz	±100, ±50, ±25 PPM	-40°C ~ +85°C -40°C ~ +125°C (Option)	5 x 3.2 mm ■	1.8 V	HCMOS
FA540	2 MHz ~ 75 MHz	±100, ±50, ±25 PPM	-40°C ~ +85°C -40°C ~ +125°C (Option)	5 x 3.2 mm ■	2.5 V	HCMOS
FA530	2 MHz ~ 135 MHz	±100, ±50, ±25 PPM	-40°C ~ +85°C -40°C ~ +125°C (Option)	5 x 3.2 mm ■	3.3 V	HCMOS
FA4500	2 MHz ~ 48 MHz	±100, ±50, ±25 PPM	-40°C ~ +85°C -40°C ~ +125°C (Option)	7 x 5 mm ■	1.8 V	HCMOS
FA4400	2 MHz ~ 75 MHz	±100, ±50, ±25 PPM	-40°C ~ +85°C -40°C ~ +125°C (Option)	7 x 5 mm ■	2.5 V	HCMOS
FA4100	2 MHz ~ 135 MHz	±100, ±50, ±25 PPM	-40°C ~ +85°C -40°C ~ +125°C (Option)	7 x 5 mm ■	3.3 V	HCMOS



# TCXOs and OCXOs

## TCXOs













Part Number	Frequency Range	Frequency Stability	Temperature Range	Package	Voltage Operation	Output
FOX922 Series	10 MHz ~ 40 MHz	±2 PPM	-20°C ~ +75°C	2.5 x 2 mm	2.5 ~ 3.3 V	Clipped Sine
FOX922-GP Series	16 MHz ~ 38.4 MHz	±0.5 PPM	-30°C ~ +85°C	2.5 x 2 mm	1.8 ~ 3.3 V	Clipped Sine
FOX251 Series	4 MHz ~ 54 MHz	±2.5 PPM	-30°C ~ +85°C	2.5 x 2 mm	2.5 ~ 3.3 V	HCMOS
FOX923 Series	8 MHz ~ 52 MHz	±2.5 PPM	-30°C ~ +85°C	3.2 x 2.5 mm	1.8 ~ 3.3 V	Clipped Sine
FOX923-GP Series	10 MHz ~ 27.456 MHz	±0.5 PPM	-30°C ~ +85°C	3.2 x 2.5 mm	1.8 ~ 3.3 V	Clipped Sine
FOX923CH Series	8.192 MHz ~ 32.768 MHz	±2.5 PPM	-30°C ~ +85°C	3.2 x 2.5 mm	3.3 V	HCMOS
FOX914 Series	8 MHz ~ 40 MHz	±2.5 PPM	-30°C ~ +85°C	5 x 3.2 mm	1.8 ~ 3.3 V	Clipped Sine
FOX924 Series	8 MHz ~ 34 MHz	±2.5 PPM	-30°C ~ +85°C	5 x 3.2 mm	3.3 V	HCMOS
FOX331 Series	10 MHz ~ 26 MHz	±0.28 PPM	-20°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	3.3 V	HCMOS
FXTC-HE72 Series	750 kHz ~ 180 MHz	±5, ±2.5, ±1.5, ±1 PPM	0°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V	HCMOS
FXTC-HE73 Series	750 kHz ~ 250 MHz	±5, ±2.5, ±1.5, ±1 PP	0°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	3.3 V	HCMOS
FXTC-LE72 Series	750 kHz ~ 1 GHz	±5, ±2.5, ±1.5, ±1 PPM	0°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	2.5 V	LVDS
FXTC-LE73 Series	750 kHz ~ 1.35 GHz	±5, ±2.5, ±1.5, ±1 PPM	0°C ~ +70°C -40°C ~ +85°C (Option)	7 x 5 mm	3.3 V	LVDS
FOX801LF Series	10 MHz ~ 50 MHz	±2.5 PPM	0°C ~ +70°C	11.4 x 9.6 mm	3 V, 3.3 V, 5 V	Clipped Sine
FOX801BHCLF Series	10 MHz ~ 56 MHz	±2.5 PPM	0°C ~ +70°C	11.4 x 9.6 mm	3 V, 3.3 V, 5 V	HCMOS

## OCXOs





Part Number	Frequency Range	Frequency Stability	Temperature Range	Package	Voltage Operation	Output
FHS301 / 501 Series	5 MHz ~ 80 MHz	±250 PPB	-30°C ~ +75°C	8 Pin Half Dip/ Low Profile	3.3 V, 5 V	Clipped Sine or HCMOS
FTS310 Series	2.43 MHz ~ 60 MHz	±250 PPB	-40°C ~ +65°C -40°C ~ +85°C (Option)	14 Pin DIP	3.3 V	HCMOS/TTL
FTS301 / 501 Series	10 MHz ~ 40 MHz	±250 PPB	0°C ~ +70°C -20°C ~ +70°C (Option)	14 Pin DIP	3.3 V, 5 V	HCMOS/TTL
FTC Series	1 MHz ~ 100 MHz	±10, ±20, ±50 PPB	0°C ~ +70°C -40°C ~ +75°C (Option)	1 in x 1 in	5 V	Clipped Sine or HCMOS
FTE Series	5 MHz ~ 50 MHz	±7, ±10, ±15 PPB	0°C ~ +70°C -40°C ~ +75°C (Option)	36 x 27.2 mm Euro Package	5 V	Clipped Sine or HCMOS
FTM301AH	5 MHz ~ 40 MHz	±10, ±20, ±50 PPB	0°C ~ +70°C -40°C ~ +85°C (Option)	25.4 x 22.1 mm SMD	3.3 V	HCMOS











# Crystals

Part Number	Frequency Range	Frequency Tolerance	Frequency Stability	Temperature Range	Package	Notes
FX216 Series	24 MHz ~ 60 MHz	±50 PPM ~ ±10 PPM	±50 PPM ~ ±10 PPM	-10°C ~ +60°C to -40°C ~ +85°C	2 x 1.6 x 0.4 mm 	4-pad Design RoHS Compliant
FX252BS	12 MHz ~ 80 MHz	±50 PPM ~ ±10 PPM	±50 PPM ~ ±10 PPM	0°C ~ +70°C to -40°C ~ +85°C	2.5 x 2 x 0.6 mm 	4-pad Design RoHS Compliant
FQ3225B	12 MHz ~ 50 MHz	±30 PPM ~ ±20 PPM	±30 PPM ~ ±20 PPM	-10°C ~ +70°C to -40°C ~ +85°C	3.2 x 2.5 x 1 mm 	4-pad Design RoHS Compliant
FX325BS	16 MHz ~ 50 MHz	±50 PPM ~ ±10 PPM	±50 PPM ~ ±10 PPM	-10°C ~ +60°C to -40°C ~ +85°C	3.2 x 2.5 x 0.8 mm 	4-pad Design RoHS Compliant
FQ5032 Series	12 MHz ~ 48 MHz	±30 PPM ~ ±20 PPM	±30 PPM ~ ±20 PPM	0°C ~ +70°C to -40°C ~ +85°C	5 x 3.2 x 1.2 mm 	2- or 4-pad Design RoHS Compliant
FX532 Series	10 MHz ~ 67 MHz	±50 PPM ~ ±10 PPM	±50 PPM ~ ±10 PPM	-10°C ~ +60°C to -40°C ~ +85°C	5 x 3.2 x 1 mm 	2- or 4-pad Design RoHS Compliant
FQ6035 Series	6 MHz ~ 40 MHz	±30 PPM ~ ±20 PPM	±30 PPM ~ ±20 PPM	0°C ~ +70°C to -40°C ~ +85°C	6 x 3.5 x 1.3 mm 	2- or 4-pad Design RoHS Compliant
FMB	9 MHz ~ 176 MHz	±50 PPM ~ ±5 PPM	±50 PPM ~ ±3 PPM	-10°C ~ +60°C to -40°C ~ +85°C	6 x 3.5 x 1.1 mm 	4-pad Design RoHS Compliant
FD	6 MHz ~ 218 MHz	±50 PPM ~ ±5 PPM	±50 PPM ~ ±3 PPM	-10°C ~ +60°C to -40°C ~ +85°C	7 x 5 x 1.1 mm 	4-pad Design RoHS Compliant
FE	6 MHz ~ 160 MHz	±50 PPM ~ ±20 PPM	±50 PPM ~ ±20 PPM	-10°C ~ +60°C to -40°C ~ +85°C	7 x 5 x 1.7 mm 	2-pad Design RoHS Compliant
FQ1045A	3.2768 MHz ~ 7 MHz	±30 PPM ~ ±20 PPM	±30 PPM ~ ±20 PPM	0°C ~ +70°C to -40°C ~ +85°C	10 x 4.5 x 1.7 mm 	4-pad Design RoHS Compliant
HC49SDF	3.2 MHz ~ 80 MHz	±50 PPM ~ ±10 PPM	±50 PPM ~ ±5 PPM	-20°C ~ +70°C to -55°C ~ +125°C	13.9 x 5 x 4.5 mm 	Industry Standard RoHS Compliant

## Automotive AEC-Q200 Crystals

Part Number	Frequency Range	Frequency Tolerance	Frequency Stability	Temperature Range	Package	Notes
FXA2520	16 MHz ~ 50 MHz	±50 PPM	±50 PPM ~ ±100 PPM	-40°C ~ +85°C to -40°C ~ +125°C	2.5 x 2 x 0.6mm 	4-pad Design RoHS Compliant
FXA3225	12 MHz ~ 52 MHz	±50 PPM	±50 PPM ~ ±100 PPM	-40°C ~ +85°C to -40°C ~ +125°C	3.2 x 2.5 x 0.75 mm 	4-pad Design RoHS Compliant
FXA5032	8 MHz ~ 52 MHz	±50 PPM	±50 PPM ~ ±100 PPM	-40°C ~ +85°C to -40°C ~ +125°C	5 x 3.2 x 1 mm 	4-pad Design RoHS Compliant
FXA7050	6 MHz ~ 48 MHz	±50 PPM	±50 PPM ~ ±100 PPM	-40°C ~ +85°C to -40°C ~ +125°C	7 x 5 x 1.1 mm 	4-pad Design RoHS Compliant

## Watch Crystals

Part Number	Frequency Range	Frequency Tolerance	Frequency Stability	Temperature Range	Package	Notes
FX122	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	2 x 1.2 x 0.6 mm 	12.5 pF or 9 pF RoHS Compliant
FX135	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	3.2 x 1.5 x 0.9 mm 	12.5 pF or 9 pF RoHS Compliant
FX145	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	4.1 x 1.5 x 0.9 mm 	12.5 pF RoHS Compliant
FX255	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	4.9 x 1.8 x 1 mm 	12.5 pF RoHS Compliant
FSXLF	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	7 x 1.5 x 1.4 mm 	12.5 pF or 7 pF RoHS Compliant
FSRLF	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	8.7 x 3.7 x 2.5 mm 	12.5 pF or 6 pF RoHS Compliant
FSMLF	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-40°C ~ +85°C	10.41 x 4.06 x 3.56 mm 	12.5 pF or 6 pF RoHS Compliant
NCLF Series	32.768 kHz	±20 PPM	-0.04 PPM / ΔC²	-20°C ~ +60°C	3 x 8, 2 x 6, 1 x 5 mm 	12.5 pF or 6 pF RoHS Compliant

# Fox Custom Products Center –

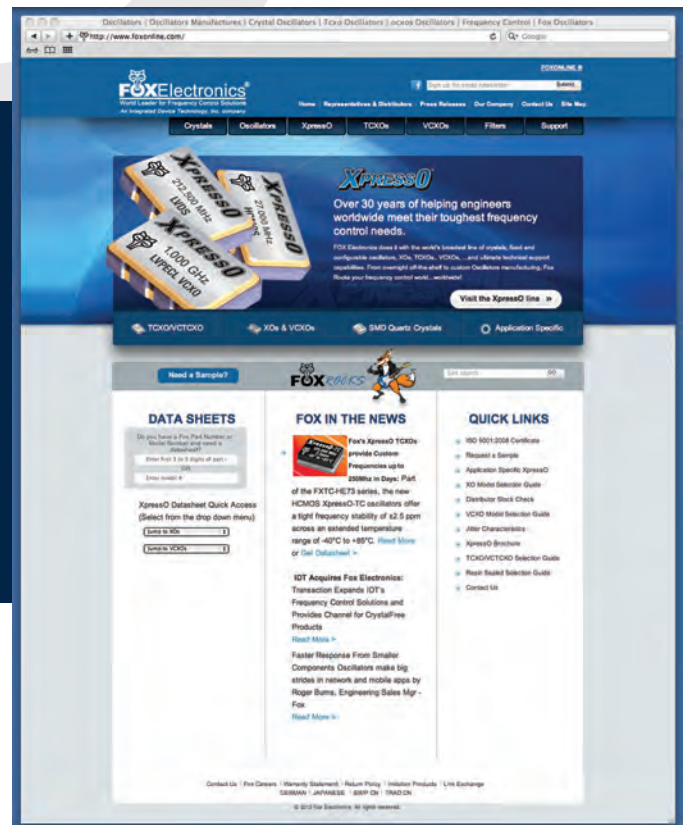
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