



Introduction to TXC MO (MEMS Oscillator)

12/08/2011

By Marketing Div.



Think of **TXC**



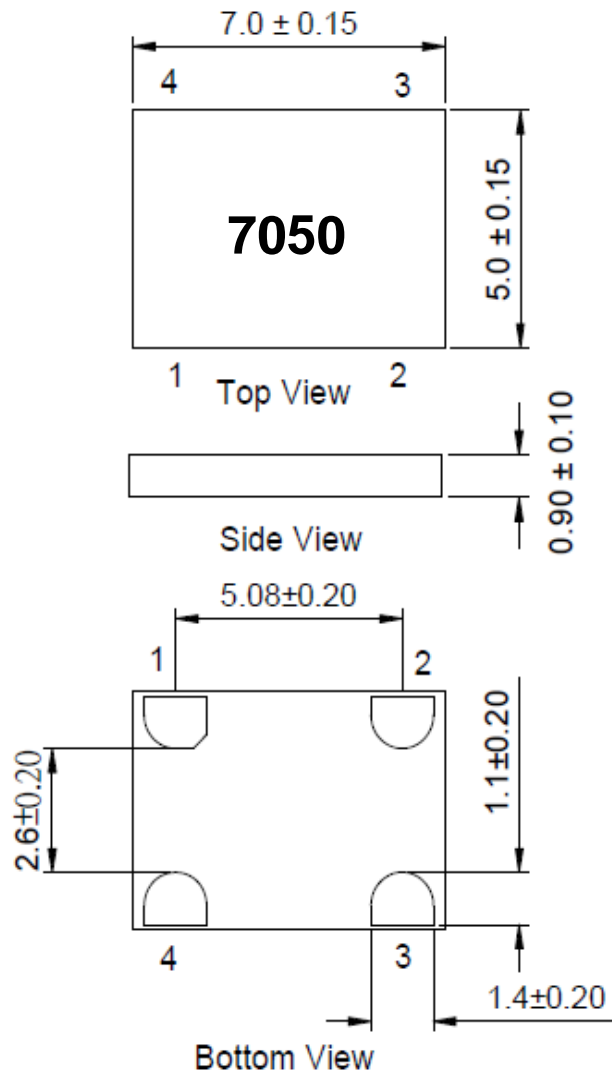
A Quartz Crystal and Oscillator Supplier



Product Features

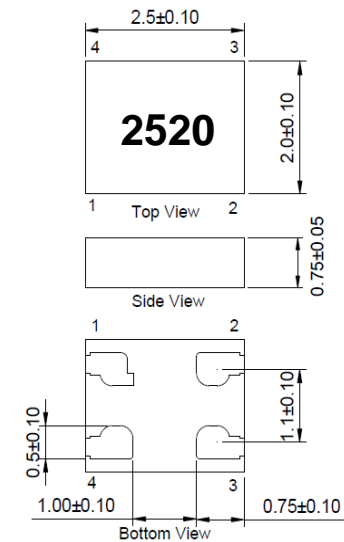
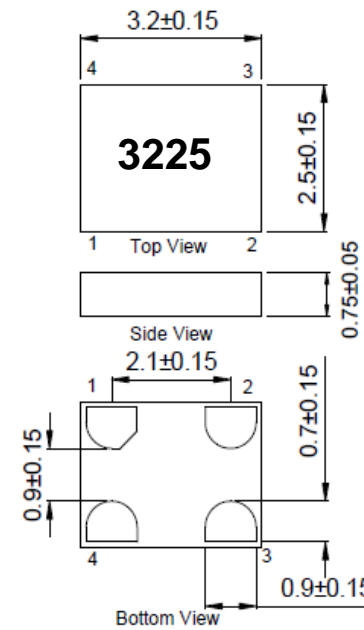
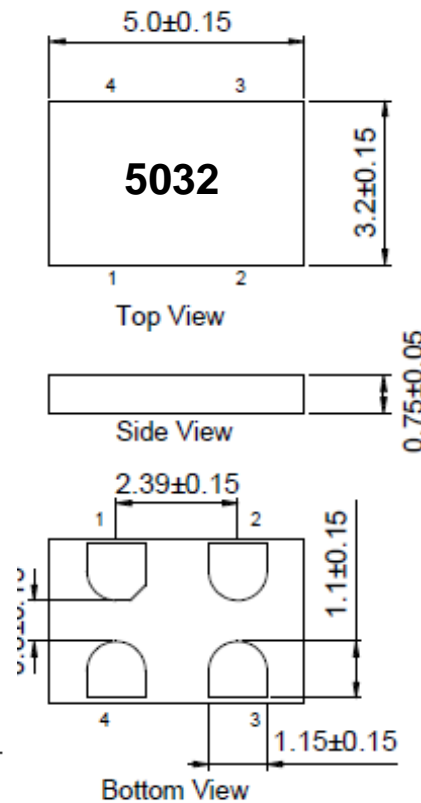
MO (Single-end)				
Frequency Range (MHz)	1~110MHz		110~ 150MHz	
Frequency Stability (PPM)	$\pm 20 \sim \pm 50$	$\pm 25 \sim \pm 50$	$\pm 20 \sim \pm 50$	$\pm 25 \sim \pm 50$
Temp Range (°C)	-20 to +70	-40 to +85	-20 to +70	-40 to +85
Supply Voltage (V)	1.8, 2.5, 2.8, 3.3		2.5, 2.8, 3.3	
Product series Package Size LxWxH (mm)	TA: 7.0x5.0x0.90 TB: 5.0x3.2x0.75 TC: 3.2x2.5x0.75 TD: 2.5x2.0x0.75			

Package Layout



AD FUNCTION:
 OE / \overline{ST}
 GND
 OUT
 VDD

- Pin to pin compatible with XO
- All size cover frequency 1~150MHz
- Height advantage



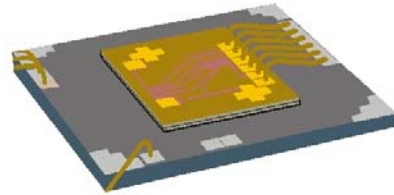
Different BOM Structures

Silicon-based Oscillator (MO)

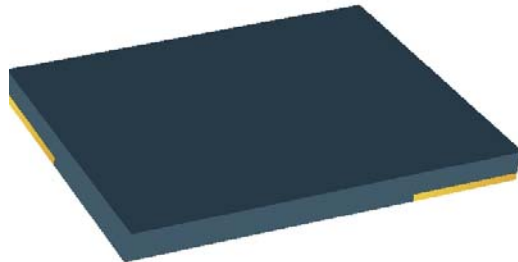
MEMS Resonator



IC



Plastic Package



Quartz-based Oscillator (XO)

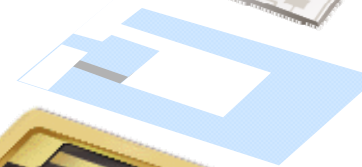
Metal Lid



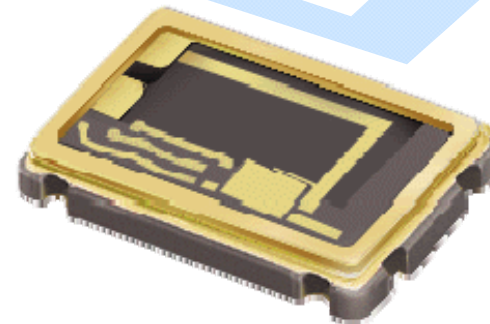
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Quartz Blank

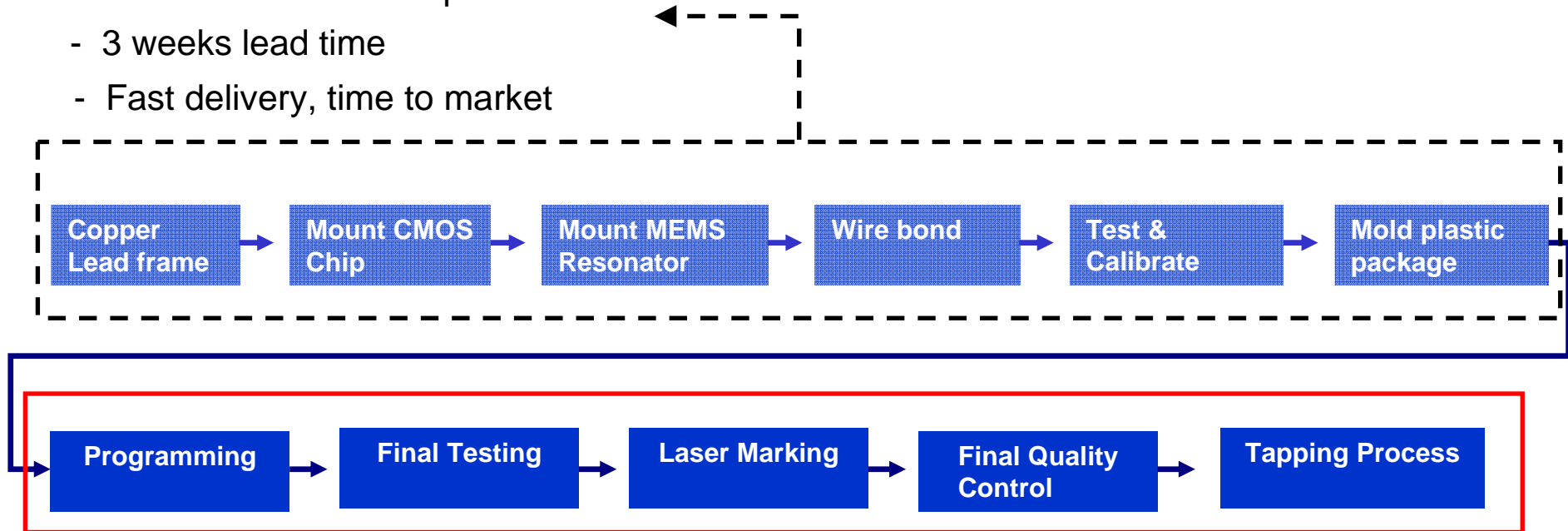


Ceramic Package



Process Flow

- Robust semiconductor process:
 - 3 weeks lead time
 - Fast delivery, time to market



- In-house programming and quality inspection process
 - 100% quality assurance
 - 1 week lead time



Target Applications

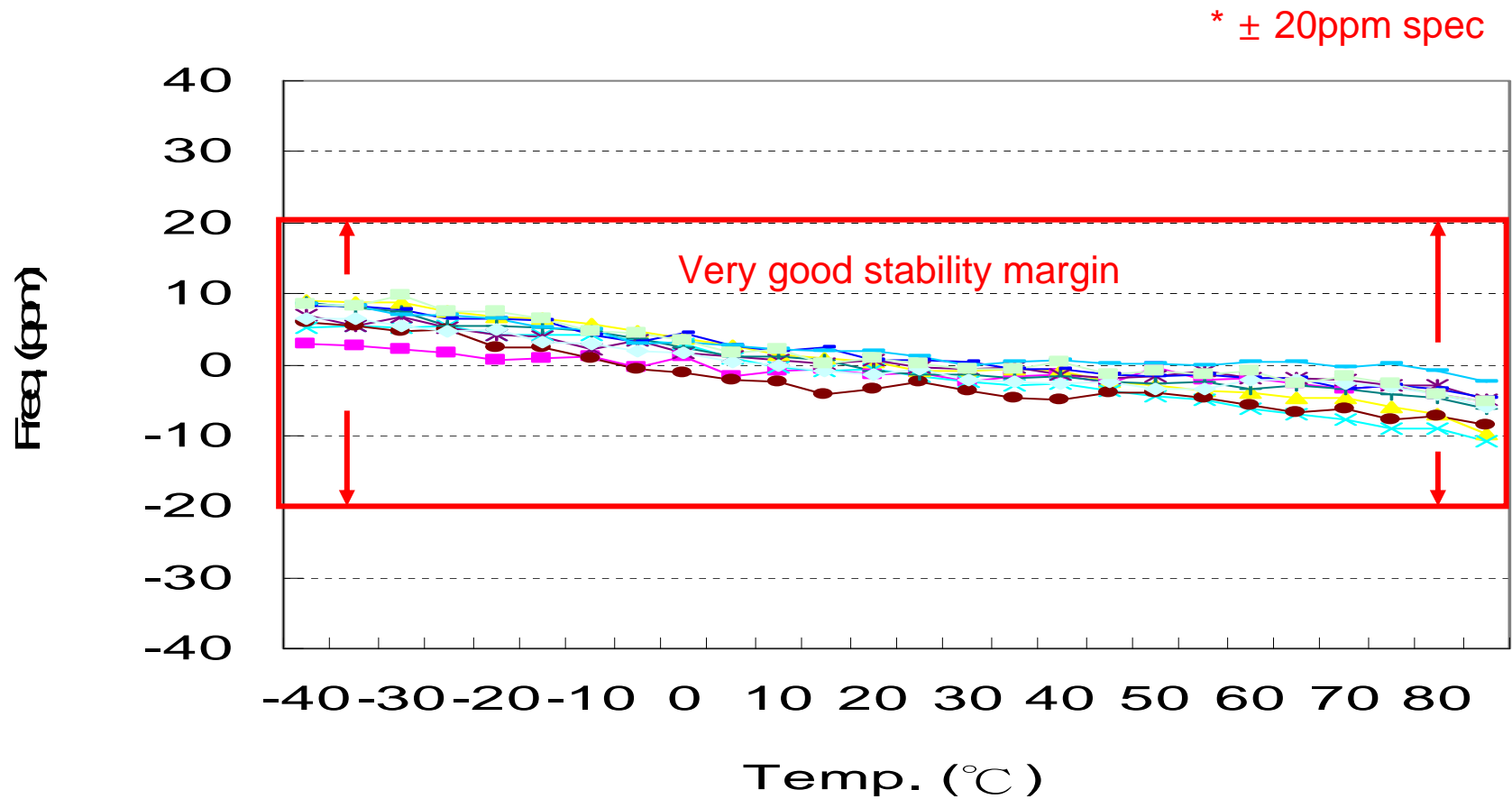
MO is ideal for the following wired applications

Applications	Output Frequency (MHz)
GPON/EPON	25, 32.768, 66, 125
Ethernet/Fiber Channel	25, 50, 62.5, 106.25, 125
SATA/SAS	32.25, 37.5, 75, 100
USB	12, 24, 48, 50
Digital Camera/CCTV/IP CAM	12, 22.5792, 24, 32, 72
STB	12.2, 27, 50
Printer	15.8682, 16.0972, 25, 33.263, 48, 57.849, 75, 100

* Other frequencies or features are available upon request.

Frequency Stability Performance

Improved stability over operation temperature range

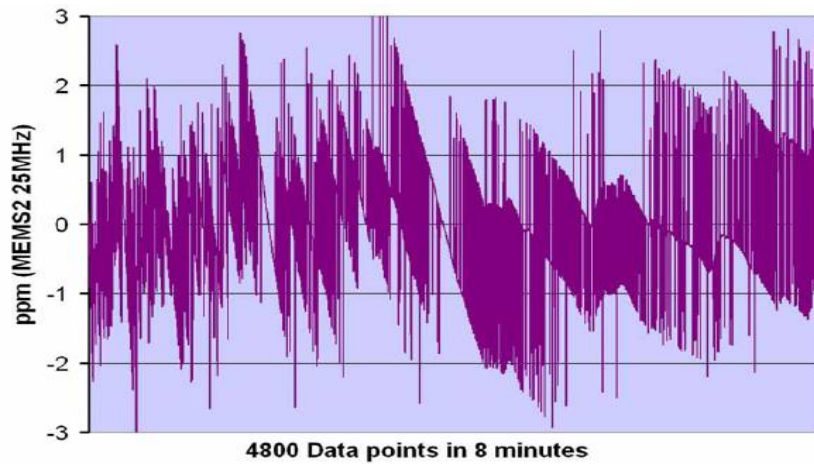




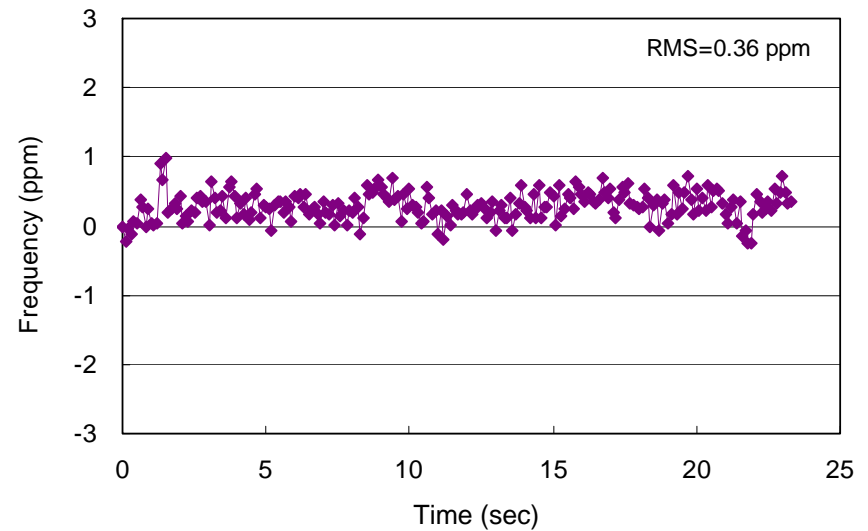
Short Term Stability Performance

Improved stability

2006



2011





MO & XO Structure

Resonant Element + Circuit = Oscillator

Resonant Element (Passive)	Circuit (Active)	Packaging	Oscillator	Stability over Temperature (ppm)
Quartz	Osc. Circuit	Ceramic	Crystal Oscillator(XO)	$\pm 20\sim 50$
Crystal Resonator	Osc. Circuit + PLL		Programmable XO	$\pm 20\sim 50$
Piezoelectric	Osc. Circuit + TC Δ		TCXO	$\pm 0.1\sim 2$
	Osc. Circuit + Oven		OCXO	$< \pm 0.001\sim 0.1$
Silicon	Osc. Circuit + PLL + TC Δ	Plastic	MEMS Oscillator (MO)	± 20 to 50
MEMS Resonator				
Electrostatic				

Δ TC = Temperature Compensation



MO & XO Specification

	MO				XO			
Frequency Range (MHz)	1~110MHz		110~ 150MHz		8~54MHz	1~125MHz	1~150MHz	1~170MHz
Frequency Stability (PPM)	±20 ~ ±50	±25 ~ ±50	±20 ~ ±50	±25 ~ ±50	±20 ~ ±50			
Temp Range (°C)	-20 to +70	-40 to +85	-20 to +70	-40 to +85	-20 to +70 , -40 to +85			
Supply Voltage (V)	1.8, 2.5, 2.8, 3.3		2.5, 2.8, 3.3		1.8, 2.5, 2.8, 3.3			
Package Size LxWxH (mm)	TA: 7.0x5.0x0.90 TB: 5.0x3.2x0.75 TC: 3.2x2.5x0.75 TD: 2.5x2.0x0.75				8W 2.5x2.0x0.8	7X 3.2x2.5x1.0	7C 5.0x3.2x1.2	7W 7.0x5.0x1.3
RMS Phase Jitter (12KHz~20MHz) (typ)	< 20ps				<1 ps			



MO & XO – Electrical Performance

- Electrical Characteristics

MO	FR	FR	F@ 2.97V	F@3.63V	I	VH	VL	TR	TF	DUTY	START T
	Hz	ppm	ppm	ppm	mA	V	V	nsecs	nsecs	%	msecs
1	24,999,917	-3.32	-0.10	0.30	7.42	3.32	-0.07	0.80	0.80	50.58	7.04
2	24,999,962	-1.52	0.20	0.60	7.68	3.31	-0.05	0.80	0.81	50.58	6.55
3	24,999,877	-4.92	0.00	1.00	7.42	3.32	-0.06	0.80	0.81	50.64	7.17
4	24,999,947	-2.12	0.30	0.60	7.42	3.31	-0.07	0.80	0.81	50.60	6.49
5	24,999,874	-5.02	0.00	0.00	7.42	3.31	-0.06	0.80	0.80	50.60	6.68
AVG	24,999,936	-2.57	-0.08	0.45	7.49	3.31	-0.06	0.80	0.81	50.60	6.85
MAX	25,000,012	0.48	0.50	1.30	7.68	3.32	-0.05	0.81	0.82	50.64	7.19
MIN	24,999,874	-5.02	-0.80	-0.30	7.42	3.31	-0.07	0.79	0.80	50.58	6.49
STD	43.72	1.75	0.41	0.51	0.13	0.00	0.01	0.01	0.01	0.02	0.27

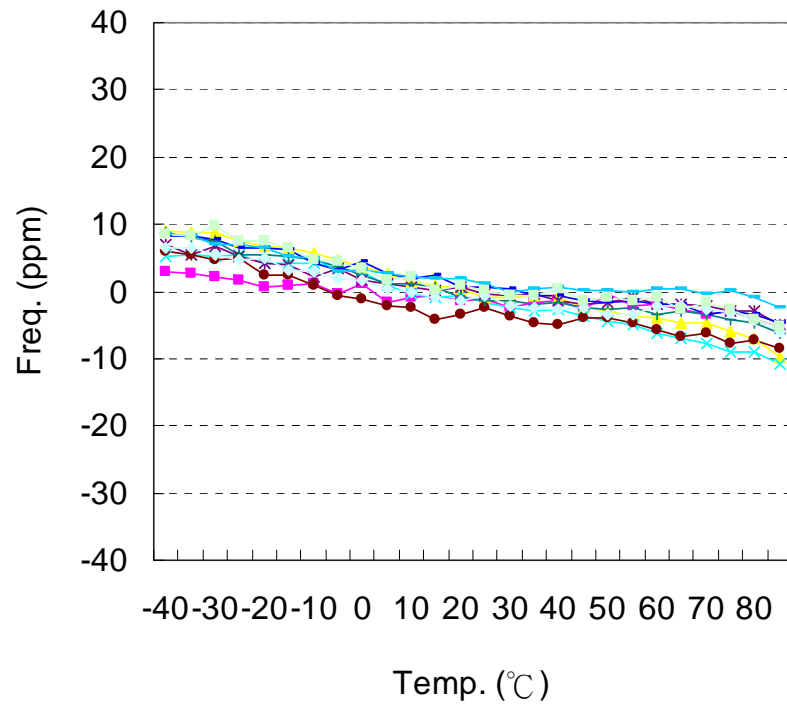
XO	FR	FR	F@2.97V	F@3.63V	I	VH	VL	TR	TF	DUTY	START T
	Hz	ppm	ppm	ppm	mA	V	V	nsecs	nsecs	%	msecs
1	25,000,032	1.26	-0.10	0.00	1.51	3.28	-0.02	0.96	0.88	49.88	0.57
2	25,000,019	0.76	-0.10	-0.00	1.51	3.29	-0.05	0.90	0.80	49.90	0.17
3	25,000,007	0.26	0.00	0.00	1.51	3.29	-0.05	0.88	0.84	49.66	0.21
4	25,000,039	1.56	-0.00	0.10	1.51	3.30	-0.06	0.88	0.82	49.92	0.20
5	25,000,037	1.46	-0.10	-0.10	1.26	3.30	-0.06	0.90	0.85	49.93	0.62
AVG	25,000,023	0.92	-0.02	0.01	1.46	3.30	-0.05	0.92	0.86	49.89	0.29
MAX	25,000,039	1.56	0.10	0.10	1.51	3.33	-0.02	0.97	0.90	50.24	0.62
MIN	25,000,007	0.26	-0.10	-0.10	1.26	3.28	-0.06	0.88	0.80	49.65	0.15
STD	10.69	0.43	0.06	0.07	0.11	0.02	0.01	0.03	0.03	0.18	0.18



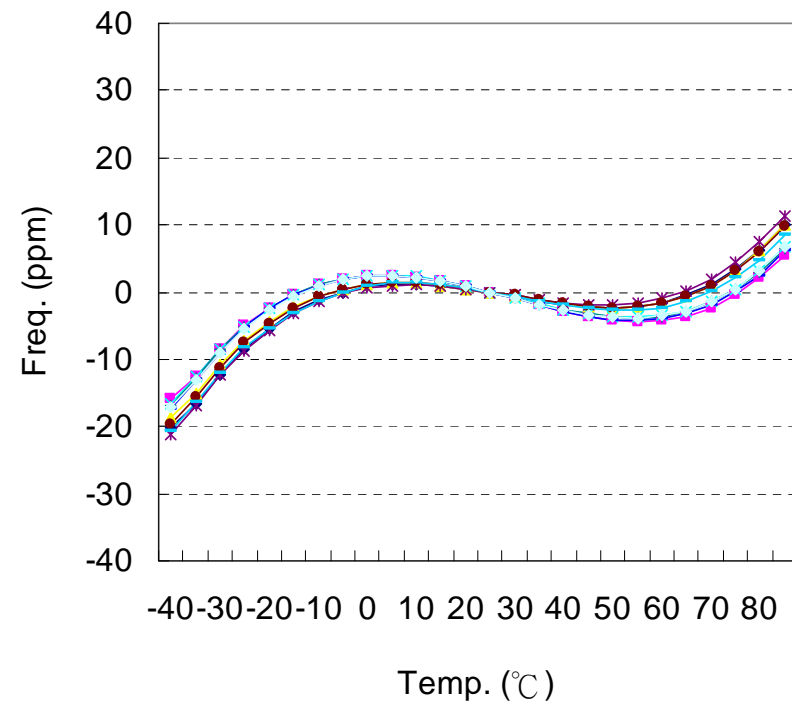
MO & XO – Stability Performance

- Frequency Stability Difference

MO



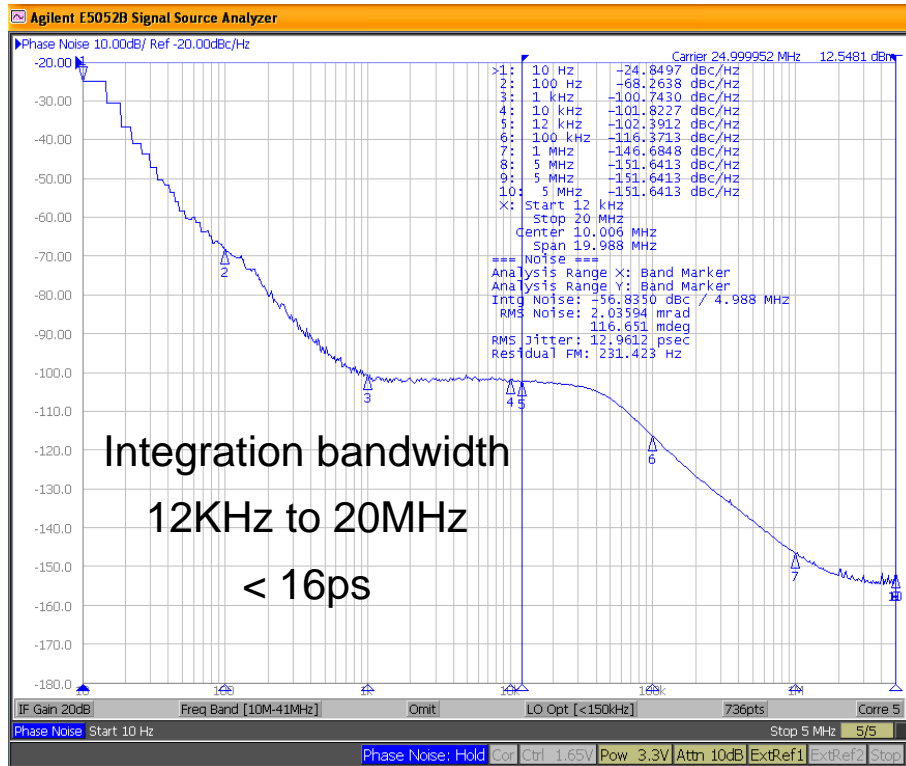
XO



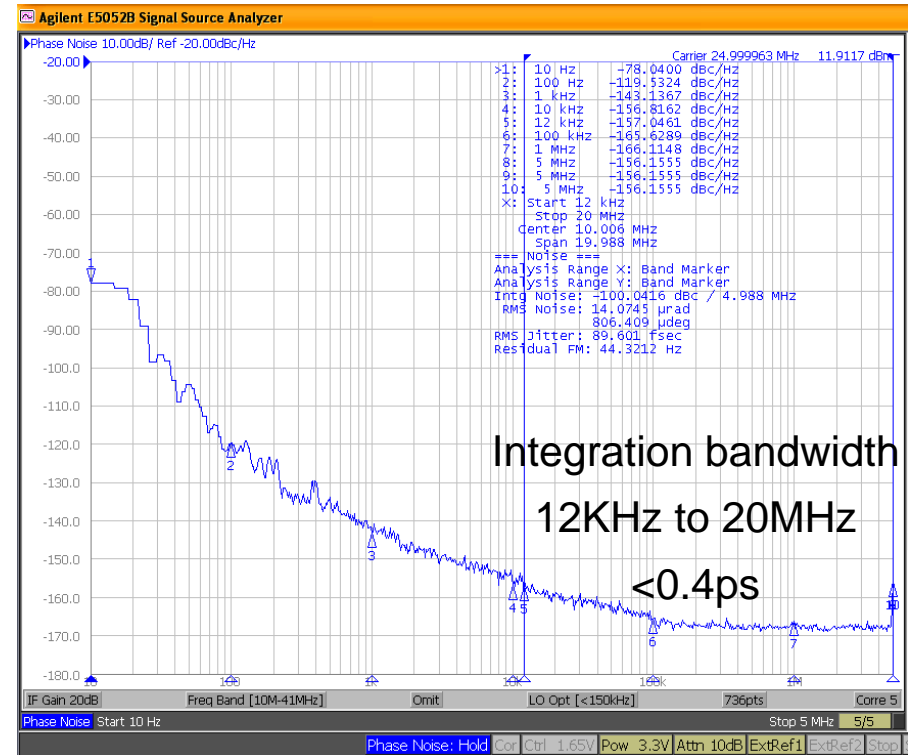
MO & XO – Jitter Performance

- Phase jitter
 - MO is suitable for wired applications
 - XO is for wireless and wired applications

MO



XO



Contact TXC Account Manager for **Sample request**

