



Si534x/8x Jitter Attenuators Recommended Crystal, TCXO and OCXOs Reference Manual

The purpose of this document is to provide a list of crystals, TCXOs and OCXOs which have been tested and qualified for use with Si534x/8x devices. Changes to this document will be accompanied by a Process Change Notice (PCN).

The information presented here is based on tested samples. Customers should monitor specification compliance and quality over time. Customers should also verify that the selected crystal or oscillator is a good match for their application.

RELATED DOCUMENTS

- Si534x Reference Manuals
- Si538x Reference Manuals
- AN905 Si534X External References; Optimizing Performance

1. Recommended Crystals

The tables below list the presently recommended crystals. Crystals that meet the specifications outlined in this document may be submitted to Silicon Labs for future qualification for use with the Si534x/8x clocks.

Table 1.1. Recommended Crystals for All Si538x/4x Devices Except Si5380

Supplier	Part No	Freq	Initial Tol (± ppm)	Accuracy over -40 °C to +85 °C (± ppm)	C0, Max pF	ESR Max Ω	CL pF	Tested over Temp for Activity Dips?	Drive Level (μW)	Case Size (mm)
Connor Winfield	CS-043	48 MHz	15	25	2.0	20	8	No	200	3.2 x 2.5
Hosonic	E3S48.00 0F08M22 SI	48 MHz	20	20	1.5	25	8	No	200	3.2 x 2.5
Hosonic	E2S48.00 0F08M22 SI	48 MHz	20	20	1.5	25	8	No	200	2.5 x 2.0
Kyocera	CX3225S B48000D0 FPJC1	48 MHz	10	15	2.0	23	8	No	200	3.2 x 2.5
Kyocera	CX3225S B48000D0 WPSC1	48 MHz	15	30	2.0	23	8	No	200	3.2 x 2.5
Kyocera	CX3225S B48000D0 WPTC1	48 MHz	30	60	2.0	23	8	No	200	3.2 x 2.5
Kyocera	CX3225S B48000D0 FPJC2	48 MHz	10	15	2.0	23	8	Yes	200	3.2 x 2.5
Kyocera	CX3225S B48000D0 WPSC2	48 MHz	15	30	2.0	23	8	Yes	200	3.2 x 2.5
NDK	NX3225S A-48.000 M- CS07559	48 MHz	20	30	1.8	23	8	No	200	3.2 x 2.5
Taitien	S0242- X-002-3	48 MHz	20	20	2.0	23	8	No	200	3.2 x 2.5
TXC	7M480700 12	48 MHz	10	15	2.0	22	8	No	200	3.2 x 2.5
TXC	7M480720 02	48 MHz	10	15	2.0	22	8	Yes	200	3.2 x 2.5
TXC	7M480720 01	48 MHz	20	30	2.0	22	8	Yes	200	3.2 x 2.5
Connor Winfield	CS-044	54 MHz	15	25	2.0	20	8	No	200	3.2 x 2.5
Hosonic	E3S54.00 0F08M22 SI	54 MHz	20	20	2.0	22	8	No	200	3.2 x 2.5

Supplier	Part No	Freq	Initial Tol (± ppm)	Accuracy over -40 °C to +85 °C (± ppm)	C0, Max pF	ESR Max Ω	CL pF	Tested over Temp for Activity Dips?	Drive Level (μW)	Case Size (mm)
Hosonic	E2S54.00 0F08M22 SI	54 MHz	20	20	1.5	25	8	No	200	2.5 x 2.0
Kyocera	CX3225S B54000D0 FPJC1	54 MHz	10	15	2.0	23	8	No	200	3.2 x 2.5
Kyocera	CX3225S B54000D0 WPSC1	54 MHz	15	30	2.0	23	8	No	200	3.2 x 2.5
Kyocera	CX3225S B54000D0 WPTC1	54 MHz	30	60	2.0	23	8	No	200	3.2 x 2.5
Kyocera	CX3225S B54000D0 FPJC2	54 MHz	10	15	2.0	23	8	Yes	200	3.2 x 2.5
Kyocera	CX3225S B54000D0 WPSC2	54 MHz	15	30	2.0	23	8	Yes	200	3.2 x 2.5
NDK	NX3225S A-54.000 M- CS07551	54 MHz	20	30	1.8	23	8	No	200	3.2 x 2.5
Siward	XTL57150 0- S315-006	54 MHz	50	50	2.0	20	8	No	200	3.2 x 2.5
Siward	XTL57150 0- S315-007	54 MHz	50	50	2.0	20	8	No	200	2.5 x 2.0
Taitien	S0242- X-001-3	54 MHz	20	20	2.0	23	8	No	200	3.2 x 2.5
TXC	7M540700 10	54 MHz	10	15	2.0	22	8	No	200	3.2 x 2.5
TXC	7M540720 01	54 MHz	20	30	2.0	22	8	Yes	200	3.2 x 2.5
TXC	7M540720 02	54 MHz	10	15	2.0	22	8	Yes	200	3.2 x 2.5
TXC	7M540720 03	54 MHz	10	15	2.0	15	8	Yes	200	3.2x2.5

Table 1.2. Recommended Crystals for Si5380 Device

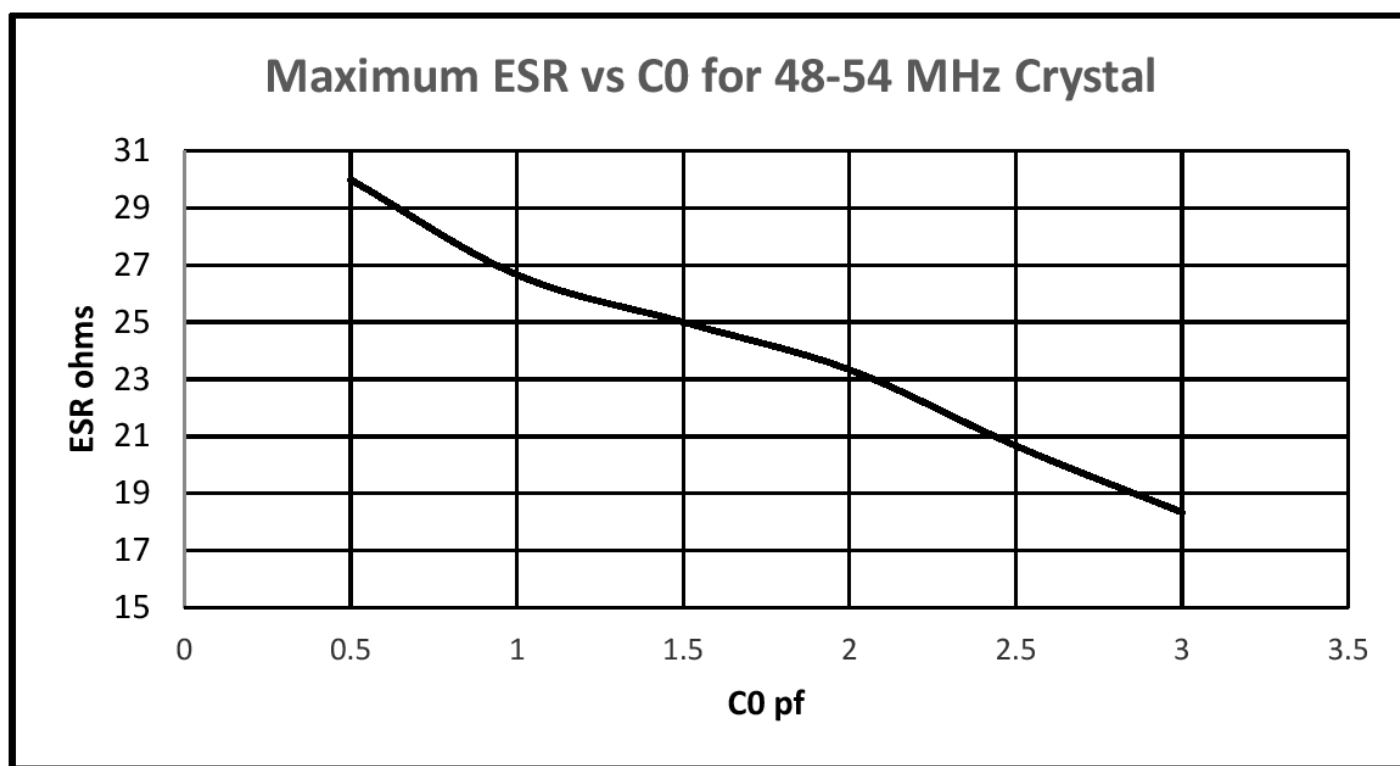
Supplier	Part No	Freq	Initial Tol (\pm ppm)	Accuracy over -40 °C to +85 °C (\pm ppm)	C0, Max pF	ESR Max Ω	CL pF	Tested over Temp for Activity Dips?	Drive Level (μ W)	Case Size (mm)
TXC	7M540720 04	54 MHz	10	15	2.0	10	8	Yes	300 ¹	3.2x2.5

Note:

1. When the ESR max is 10 ohms, a crystal rated to 300 μ W is required. If the ESR max is 15 ohms, a crystal rated to 350 μ W is required.

In general, a crystal meeting the requirements of the figures below and having a max power rating as specified in the applicable data sheet is guaranteed to oscillate.

Some applications may require crystals that have been tested incrementally over the entire temperature range to ensure that the change in crystal resonant frequency over any 2 °C temperature difference is bounded. This is called testing for activity dips and can add cost to the crystal. The Si534x/8x products are designed to work with both normally-tested crystals as well as activity dip-tested crystals.


Figure 1.1. Maximum ESR vs. C0 for 48-54 MHz 200 μ W Crystal

Crystals are typically specified at a single data point, for example $C0 \leq 1.5$ pF and $ESR \leq 25$ ohms. Figures 1.1 and 1.2 show a maximum ESR vs C0 curve specification as opposed to a single data point, any values below the curve meet specification and any values above the curve should not be used. From Figure 1.1 a crystal with a $C0 \leq 0.5$ pF and $ESR \leq 30$ ohms can be used as well as $C0 \leq 3$ pF and $ESR \leq 18.5$ ohms, taking the endpoint values as an example. The specification curves shown in Figure 1.1 and Figure 1.2 provide for a wider selection of potential crystals which will be guaranteed to oscillate.

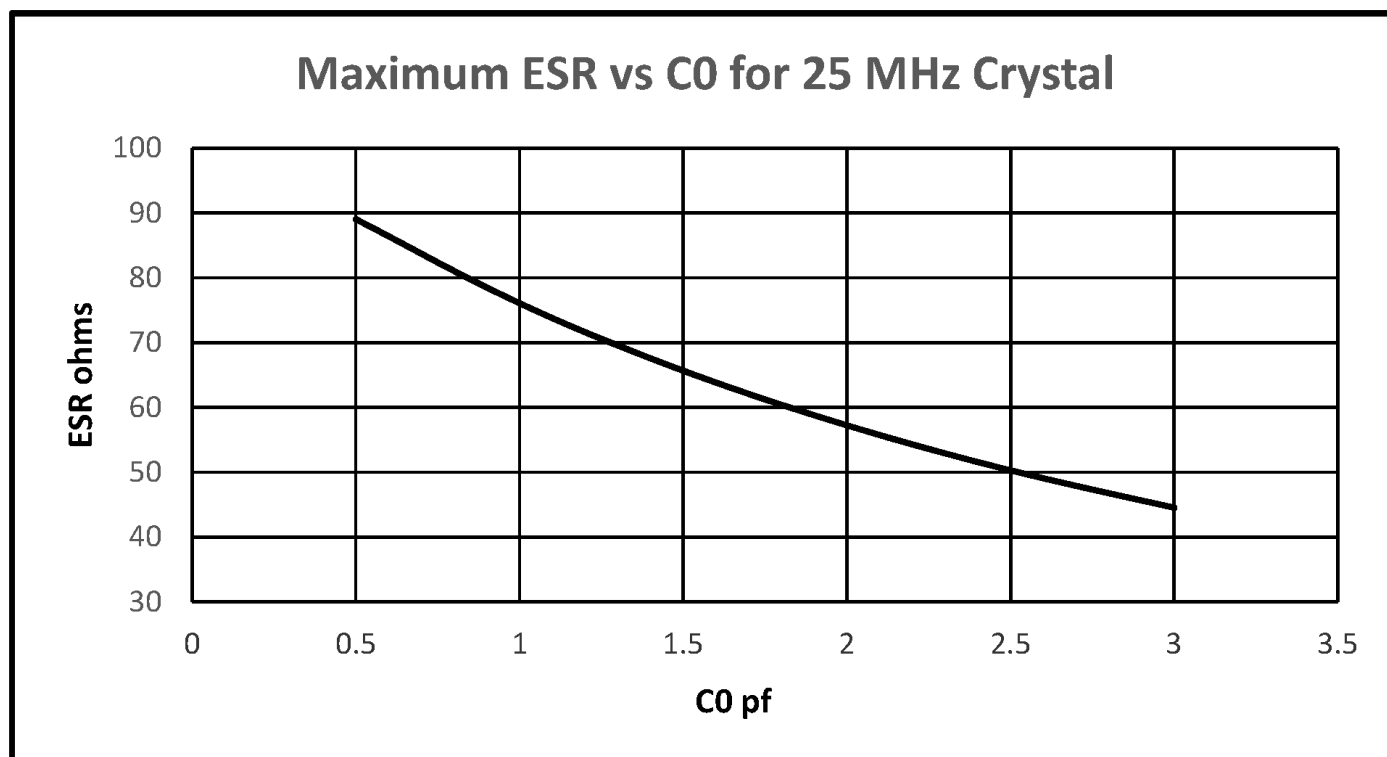


Figure 1.2. Maximum ESR vs. C0 for 25 MHz 100 μ W Crystal

2. Recommended Stratum 3/3E Oscillators

The table below is a list of low frequency Stratum 3 TCXOs and Stratum 3E OCXOs which have been approved for use with members of the Si534x/8x family, such as the Si5348, which have a separate Reference Clock input distinct from the XA-XB interface.

Table 2.1. Recommended Stratum 3/3E Oscillators

Supplier	Part Number	TCXO/ OCXO	Frequency (MHz)	Stability over Temp (ppb)	Temp	Stratum	Package
AVX	OO12.8000000 M14070AT	OCXO	12.000	±10	-40/+85°C	3E	22x25.4
Connor Win-field	OH300-50503 CF-012.8M	OCXO	12.800	±5	0/+70°C	3E	22x25.4
Connor Win-field	OH300-61003 CF-012.8M	OCXO	12.800	±10	-40/+85°C	3E	22x25.4
Epson	OG2522CAN CSGJHG 12.8000MB	OCXO	12.800	±10	-40/+85°C	3E	22X25.4
NDK	NH14M09WA-12.8M-NSA3540A	OCXO	12.800	±10	-20/+70°C	3E	9x15
NDK	NT14M09TA-1 2.8M-NSA3543A	OCXO	12.800	±20	-40/+85°C	3E	9x15
Rakon	STP3158LF	OCXO	12.800	±10	-40/+85°C	3E	22x25.4
Rakon ^{1°}	STP3268LF	OCXO	10.000	±1	-40/+85°C	3E	22x25.5
Vectron	OX-2022-EAE-1080-12M 8000000	OCXO	12.800	±5	-40/+85°C	3E	25x25
Vectron	OX-4033-EAE-1080-12M 8000000	OCXO	12.800	±10	-40/+85°C	3E	12.7x20.3
Connor Win-field	T100F-012.8M	TCXO	12.800	±100	0/+70°C	3	5x7
Connor Win-field	T200F-012.8M	TCXO	12.800	±200	-40/+85°C	3	5x7
Epson	TG-5500CA-08 N 12.8000MB	TCXO	12.800	±280	-40/+85°C	3	5x7
NDK	NT7050BC-12.8M-NSA3517A	TCXO	12.800	±280	-40/+85°C	3	5x7
Rakon	E6127LF	TCXO	12.800	±280	-20/+70°C	3	5x7
Rakon	E6518LF	TCXO	12.800	±280	-40/+85°C	3	5x7
Vectron	VT-803-EAE-2870-12M 8000000	TCXO	12.800	±280	-40/+85°C	3	5x3

Note:

1. The STP3268LF offers superior temperature and phase stability, resulting in improved MTIE TDEV noise generation performance which may be required in some applications.

3. Recommended Stratum 3 High Frequency Oscillators

The table below is a list of high frequency Stratum 3 TCXOs which have been approved for use with the Si534x/8x family in general when connected at the XA input. See the appropriate Reference Manual for the TCXO to XA input interface circuit.

Table 3.1. Recommended Stratum 3 TCXOs

Supplier	Part Number	TCXO/OCXO	Frequency (MHz)	Case Size (mm)
Epson	TG-5500CA-68N 49.1520MB	TCXO	49.152	5x7
Epson	TG-5500CA-67N 40.0000MB	TCXO	40.000	5x7
Rakon	513872	TCXO	40.000	5x7
NDK	NT7050BB-40M- ENA4199B	TCXO	40.000	5x7
Vectron	VT-803- EAH-2870-40M0000000	TCXO	40.000	5x3.2
Vectron	VT-803- EAH-2870-49M1520000	TCXO	49.152	5x3.2
Vectron	VT-803- EAH-2870-50M0000000	TCXO	50.000	5x3.2

4. Document Change List

4.1 Revision 1.0 - Initial Release

- Initial release.

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