



Reliability Test Data Report

ECS-3951M/3953M Family of SMD Oscillators

Test Completed 6/29/2001

Approved by: Mr. Kurasawa

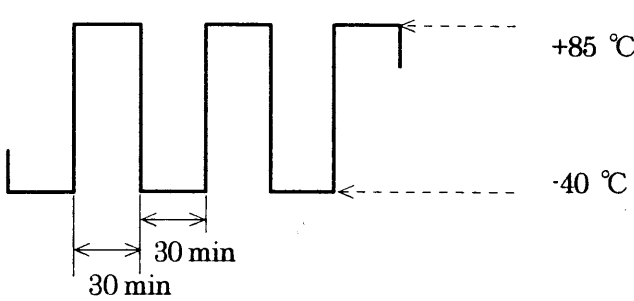
Standard performance of crystal oscillator

1 MECHANICAL PERFORMANCE

Test	Test method and test condition	Referee condition
1.1 Vibration test	① Measure the frequency, Duty, Vol and Voh before the test. ② Fix the specimen on the diaphragm and vibrate in the direction of X, Y and Z. Frequency 10 Hz ~ 55 Hz ~ 10 Hz Amplitude 0.7 mm ~ 0.9 mm Sweep 1.0 min ~ 2.0 min Test duration is 2 hours for each direction.	Frequency deviation (Tolerance = 5.0 ppm Max.) Satisfy the spec. of Duty, Vol and Voh.
1.2 Drop test	① Measure the frequency, Duty, Vol and Voh before the test. ② Drop freely on a hard wooden plate three times from a height 75 cm.	Frequency deviation (Tolerance = 5.0 ppm Max.) Satisfy the spec. of Duty, Vol and Voh.
1.3 Solderability	Dip the specimen into the solder pot at a temperature of $230\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$ for 5 seconds after preliminary heating $150\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$ for 1 minute and the solder must reach up to the terminal electrode.	The 3/4 of electrode shall be covered with solder.
1.4 Resistance to Soldering heat	① Measure the frequency, Duty, Vol and Voh before the test. ② Let the specimen pass through reflow for 10 s (Max.) which is pre-heated at a temperature of $160\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$ $240\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.	Frequency deviation (Tolerance = 10 ppm Max.) Satisfy the spec. of Duty, Vol and Voh.
1.5 Airtightness	① Create a vacuum in the chamber. ② Substitute the inside by helium. ③ Check the leakage of helium by the leak detector.	Amount of helium leak $10^{-3}\text{ }\mu\text{Pa}\cdot\text{m}^3/\text{s}$ Max.

Standard performance of crystal oscillator

2 CLIMATIC RESISTANCE

Test	Test method and test condition	Referee condition
2.1 Resistance to heat	① Measure the frequency before the test. ② Place the specimen in chamber kept at a temperature of $+100\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ for 240 hours. ③ Take out and measure it after leaving for 1 hour.	Frequency deviation (Tolerance = 10 ppm Max.)
2.2 Resistance to cold	① Measure the frequency before the test. ② Place the specimen in chamber kept at a temperature of $-40\text{ }^{\circ}\text{C}\pm 3\text{ }^{\circ}\text{C}$ for 240 hours. ③ Take out and measure it after leaving for 1 hour.	Frequency deviation (Tolerance = 5.0 ppm Max.)
2.3 Heat shock	① Measure the frequency before the test. ② Subject the specimen to the 10 cycles of temperature change stated below.  ③ Measure it after leaving it for 1 hour.	Frequency deviation (Tolerance = 10 ppm Max.)
2.4 Resistance to humidity	① Measure the frequency before the test. ② Place the specimen in chamber kept at a temperature of $+40\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ and a humidity at 90 % ~ 95 % for 240 hours. ③ Take out and measure it after leaving for 1 hour.	Frequency deviation (Tolerance = 5.0 ppm Max.)
2.5 Aging	① Measure the frequency before the test. ② Place the specimen in chamber kept at a temperature of $+85\text{ }^{\circ}\text{C}\pm 3\text{ }^{\circ}\text{C}$ for 500 hours. ③ Take out and measure it after leaving for 1 hour.	Frequency deviation (Tolerance = 5.0 ppm Max.)

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ECS-3953M-500 50.000 MHz Oscillator

1.1: Vibration

Pre Vibration

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	31	-363	-243	-115	-4	-40	-91	-1025	-32	50	-183.2	322.0	-1025.0	50.0
Stability (ppm)	0.6	-7.3	-4.9	-2.3	-0.1	-0.8	-1.8	-20.5	-0.6	1.0	-3.7	6.4	-20.5	1.0
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	52	52	51	51	51	52	51	51	51	50	51.2	0.6	50.0	52.0
Duty B %	48	48	49	49	49	48	49	49	49	50	48.8	0.6	48.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.5	1.6	1.6	1.6	1.5	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.2	1.3	1.3	1.3	0.0	1.2	1.3
Icc (mA)	13.2	13.3	13.1	13.2	13.3	13.1	13.0	13.4	13.2	13.2	13.2	0.1	13.0	13.4

Post Vibration

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-54	-397	-279	-134	-28	-91	-126	-1081	-78	6	-226.2	323.9	-1081.0	6.0
Stability (ppm)	-1.1	-7.9	-5.6	-2.7	-0.6	-1.8	-2.5	-21.6	-1.6	0.1	-4.5	6.5	-21.6	0.1
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	52	51	51	51	51	52	51	51	51	50	51.1	0.6	50.0	52.0
Duty B %	48	49	49	49	49	48	49	49	49	50	48.9	0.6	48.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.2	1.3	1.2	1.3	0.0	1.2	1.3
Icc (mA)	13.2	13.3	13.1	13.5	13.2	13.3	13.2	13.1	13.4	13.2	13.3	0.1	13.1	13.5

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-85	-34	-36	-19	-24	-51	-35	-56	-46	-44	-43.0	18.7	-85.0	-19.0
Stability (ppm)	-1.7	-0.6	-0.7	-0.4	-0.5	-1	-0.7	-1.1	-1	-0.9	-0.9	0.4	-1.7	-0.4
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	-1	0	0	0	0	0	0	0	0	-0.1	0.3	-1.0	0.0
Duty B %	0	1	0	0	0	0	0	0	0	0	0.1	0.3	0.0	1.0
Rise Time (ns)	0	0	0	0	0	0.1	0	0	0	0.1	0.0	0.0	0.0	0.1
Fall Time (ns)	0	0	0	0	0	0	0	0	0	-0.1	0.0	0.0	-0.1	0.0
Icc (mA)	0	0	0	0.3	-0.1	0.2	0.2	-0.3	0.2	0	0.1	0.2	-0.3	0.3

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1.2: Drop, 75 cm 3 times

Pre Drop

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-372	-314	-472	-258	-293	-331	-274	-97	-158	-310	-287.9	104.6	-472.0	-97.0
Stability (ppm)	-7.4	-6.3	-9.4	-5.2	-5.9	-6.6	-5.5	-1.9	-3.1	-6.2	-5.8	2.1	-9.4	-1.9
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	50	51	51	52	51	51	51	52	51	51.1	0.6	50.0	52.0
Duty B %	49	50	49	49	48	49	49	49	48	49	48.9	0.6	48.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.7	1.6	1.6	0.0	1.5	1.7
Fall Time (ns)	1.3	1.2	1.3	1.3	1.2	1.3	1.3	1.3	1.4	1.3	1.3	0.1	1.2	1.4
Icc (mA)	13.3	13.2	13.0	13.4	13.2	13.2	13.5	13.0	13.1	13.3	13.2	0.2	13.0	13.5

Post Drop

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-351	-343	-457	-256	-257	-279	-252	-94	-167	-300	-275.6	99.9	-457.0	-94.0
Stability (ppm)	-7.0	-6.9	-9.1	-5.1	-5.1	-5.6	-5.0	-1.9	-3.3	-6.0	-5.5	2.0	-9.1	-1.9
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	50	51	51	52	51	52	51	52	51	51.2	0.6	50.0	52.0
Duty B %	49	50	49	49	48	49	48	49	48	49	48.8	0.6	48.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.4	1.3	1.3	0.0	1.2	1.4
Icc (mA)	13.3	13.2	13.2	13.4	13.2	13.2	13.5	13.1	13.1	13.4	13.3	0.1	13.1	13.5

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	21	-29	15	2	36	52	22	3	-9	10	12.3	22.8	-29.0	52.0
Stability (ppm)	0.4	-0.6	0.3	0.1	0.8	1	0.5	0	-0.2	0.2	0.3	0.5	-0.6	1.0
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	0	0	0	0	0	1	0	0	0	0.1	0.3	0.0	1.0
Duty B %	0	0	0	0	0	0	-1	0	0	0	-0.1	0.3	-1.0	0.0
Rise Time (ns)	0	0	0	0	0.1	-0.1	0	0	-0.1	0	0.0	0.1	-0.1	0.1
Fall Time (ns)	0	0.1	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.1
Icc (mA)	0	0	0.2	0	0	0	0	0.1	0	0.1	0.0	0.1	0.0	0.2

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1.3: Solderability

S/N	Coverage	Pass/Fail
1	4/4	Pass
2	4/4	Pass
3	4/4	Pass
4	4/4	Pass
5	4/4	Pass
6	4/4	Pass
7	4/4	Pass
8	4/4	Pass
9	4/4	Pass
10	4/4	Pass

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1.4: Resistance to reflow +240°C ± 10°C 10 seconds

Pre Reflow

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-66	-121	16	359	-58	-1373	79	71	432	144	-51.7	497.6	-1373.0	432.0
Stability (ppm)	-1.3	-2.4	0.3	7.2	-1.2	-27.5	1.6	1.4	8.6	2.9	-1.0	10.0	-27.5	8.6
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	52	51	51	51	52	51	51	51	52	51.3	0.5	51.0	52.0
Duty B %	49	48	49	49	49	48	49	49	49	48	48.7	0.5	48.0	49.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.5	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.2	1.3	1.3	1.3	1.2	1.3	1.2	1.3	1.3	1.3	0.0	1.2	1.3
Icc (mA)	13.2	13.1	13.4	13.0	13.3	13.2	13.2	13.1	13.3	13.1	13.2	0.1	13.0	13.4

Post Reflow

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-134	-160	-45	359	-13	-1345	56	82	435	133	-63.2	490.0	-1345.0	435.0
Stability (ppm)	-2.7	-3.2	-0.9	7.1	-0.3	-26.9	1.1	1.6	8.7	2.7	-1.3	9.8	-26.9	8.7
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	52	51	51	51	52	51	51	51	51	51.2	0.4	51.0	52.0
Duty B %	49	48	49	49	49	48	49	49	49	49	48.8	0.4	48.0	49.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.5	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.2	1.3	1.3	1.2	1.3	1.2	1.3	1.3	1.3	0.0	1.2	1.3
Icc (mA)	13.3	13.1	13.4	13.0	13.3	13.3	13.2	13.1	13.4	13.2	13.2	0.1	13.0	13.4

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-68	-39	-61	0	45	28	-23	11	3	-11	-11.5	36.7	-68.0	45.0
Stability (ppm)	-1.4	-0.8	-1.2	-0.1	0.9	0.6	-0.5	0.2	0.1	-0.2	-0.2	0.7	-1.4	0.9
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	0	0	0	0	0	0	0	0	-1	-0.1	0.3	-1.0	0.0
Duty B %	0	0	0	0	0	0	0	0	0	1	0.1	0.3	0.0	1.0
Rise Time (ns)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fall Time (ns)	0	0.1	-0.1	0	0	0	0	0	0	0	0.0	0.0	-0.1	0.1
Icc (mA)	0.1	0	0	0	0	0.1	0	0	0.1	0.1	0.0	0.1	0.0	0.1

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1.5: Airtightness/Fine Leak Test

S/N	Leakage	Pass/Fail
1	4.8E -09	Pass
2	6.3E -09	Pass
3	4.8E -09	Pass
4	6.0E -09	Pass
5	4.8E -09	Pass
6	5.0E -09	Pass
7	5.1E -09	Pass
8	5.1E -09	Pass
9	4.7E -09	Pass
10	5.2E -09	Pass

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ECS-3953M-500 50.000 MHz Oscillator

2.1: Resistance Heat +100°C ± 2°C 240 Hours

Pre Heat

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-144	-256	73	-444	22	-359	-791	-331	-279	-520	-302.9	254.8	-791.0	73.0
Stability (ppm)	-2.9	-5.1	1.5	-8.9	0.4	-7.2	-15.8	-6.6	-5.6	-10.4	-6.1	5.1	-15.8	1.5
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	52	51	51	52	51	51	51	51	51	51.2	0.4	51.0	52.0
Duty B %	49	48	49	49	48	49	49	49	49	49	48.8	0.4	48.0	49.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.3	0.0	1.2	1.3
Icc (mA)	13.4	13.2	13.3	13.2	13.1	13.0	13.2	13.2	13.1	13.3	13.2	0.1	13.0	13.4

Post Heat

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-274	-408	-62	-561	-65	-512	-997	-418	-406	-619	-432.2	273.9	-997.0	-62.0
Stability (ppm)	-5.5	-8.2	-1.2	-11.2	-1.3	-10.2	-19.9	-8.4	-8.1	-12.4	-8.6	5.5	-19.9	-1.2
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	52	51	51	51	51	51	51	51	51	51.1	0.3	51.0	52.0
Duty B %	49	48	49	49	49	49	49	49	49	49	48.9	0.3	48.0	49.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.0	1.3	1.3
Icc (mA)	13.4	13.2	13.3	13.3	13.1	13.1	13.2	13.2	13.1	13.2	13.2	0.1	13.1	13.4

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-130	-152	-135	-117	-87	-153	-206	-87	-127	-99	-129.3	36.0	-206.0	-87.0
Stability (ppm)	-2.6	-3.1	-2.7	-2.3	-1.7	-3	-4.1	-1.8	-2.5	-2	-2.6	0.7	-4.1	-1.7
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	0	0	0	-1	0	0	0	0	0	-0.1	0.3	-1.0	0.0
Duty B %	0	0	0	0	1	0	0	0	0	0	0.1	0.3	0.0	1.0
Rise Time (ns)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fall Time (ns)	0	0	0	0	0	0	0.1	0	0	0	0.0	0.0	0.0	0.1
Icc (mA)	0	0	0	0.1	0	0.1	0	0	0	-0.1	0.0	0.1	-0.1	0.1

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2.2: Resistance Cold -40°C ± 3°C 240 Hours

Pre Cold

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-475	-439	-324	-591	-684	-196	-170	-634	-266	-59	-383.8	213.7	-684.0	-59.0
Stability (ppm)	-9.5	-8.8	-6.5	-11.8	-13.7	-3.9	-3.4	-12.7	-5.3	-1.2	-7.7	4.3	-13.7	-1.2
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	51	51	50	51	51	50	50	51	51	50.7	0.5	50.0	51.0
Duty B %	49	49	49	50	49	49	50	50	49	49	49.3	0.5	49.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.5	1.6	1.6	1.5	1.5	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.3	0.0	1.2	1.3
Icc (mA)	13.1	13.0	13.2	13.2	13.3	13.5	13.0	13.0	13.4	13.2	13.2	0.2	13.0	13.5

Post Cold

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-452	-435	-301	-562	-638	-252	-195	-600	-200	11	-362.4	209.6	-638.0	11.0
Stability (ppm)	-9.0	-8.7	-6.0	-11.2	-12.8	-5.0	-3.9	-12.0	-4.0	0.2	-7.2	4.2	-12.8	0.2
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	51	51	51	51	51	51	50	50	51	50	50.7	0.5	50.0	51.0
Duty B %	49	49	49	49	49	49	50	50	49	50	49.3	0.5	49.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.5	1.5	1.6	1.6	1.5	1.6	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.2	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.2	1.3	0.0	1.2	1.3
Icc (mA)	13.1	13.0	13.2	13.2	13.3	13.5	13.1	13.0	13.4	13.1	13.2	0.2	13.0	13.5

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	23	4	23	29	46	-56	-25	34	66	70	21.4	38.9	-56.0	70.0
Stability (ppm)	0.5	0.1	0.5	0.6	0.9	-1.1	-0.5	0.7	1.3	1.4	0.4	0.8	-1.1	1.4
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	0	0	1	0	0	0	0	0	-1	0.0	0.5	-1.0	1.0
Duty B %	0	0	0	-1	0	0	0	0	0	1	0.0	0.5	-1.0	1.0
Rise Time (ns)	0	0	0	-0.1	0	0	0	0	0.1	0	0.0	0.0	-0.1	0.1
Fall Time (ns)	0	0	0	0	0	0	-0.1	0	0.1	0	0.0	0.0	-0.1	0.1
Icc (mA)	0	0	0	0	0	0	0.1	0	0	-0.1	0.0	0.0	-0.1	0.1

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2.3: Temp Cycle -40°C to +85°C 30 Min ea. 10 Cycles

Pre Temp Cycle

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	152	-406	-357	-282	-336	-428	-365	-350	40	-323	-265.5	196.6	-428.0	152.0
Stability (ppm)	3.0	-8.1	-7.1	-5.6	-6.7	-8.6	-7.3	-7.0	0.8	-6.5	-5.3	3.9	-8.6	3.0
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	52	51	51	51	51	51	52	51	51	51	51.2	0.4	51.0	52.0
Duty B %	49	49	49	49	49	49	48	49	49	49	48.9	0.3	48.0	49.0
Rise Time (ns)	1.6	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.0	1.3	1.3
Icc (mA)	13.2	13.3	13.3	13.2	13.5	13.1	13.0	13.1	13.2	13.2	13.2	0.1	13.0	13.5

Post Temp Cycle

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	4	-461	-506	-408	-439	-592	-516	-359	-135	-437	-384.9	182.9	-592.0	4.0
Stability (ppm)	0.1	-9.2	-10.1	-8.2	-8.8	-11.8	-10.3	-7.2	-2.7	-8.7	-7.7	3.7	-11.8	0.1
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	52	51	51	51	51	51	52	51	51	51	51.2	0.4	51.0	52.0
Duty B %	48	49	49	49	49	49	48	50	49	49	48.9	0.6	48.0	50.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.0	1.6	1.6
Fall Time (ns)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	0.0	1.2	1.3
Icc (mA)	13.2	13.3	13.2	13.3	13.4	13.1	13.0	13.1	13.3	13.2	13.2	0.1	13.0	13.4

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-148	-55	-149	-126	-103	-164	-151	-9	-175	-114	-119.4	52.1	-175.0	-9.0
Stability (ppm)	-2.9	-1.1	-3	-2.6	-2.1	-3.2	-3	-0.2	-3.5	-2.2	-2.4	1.0	-3.5	-0.2
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty B %	-1	0	0	0	0	0	0	1	0	0	0.0	0.5	-1.0	1.0
Rise Time (ns)	0	0.1	0.1	0	0	0	0	0	0	0	0.0	0.0	0.0	0.1
Fall Time (ns)	0	0	0	0	0	0	0	0	-0.1	0	0.0	0.0	-0.1	0.0
Icc (mA)	0	0	-0.1	0.1	-0.1	0	0	0	0.1	0	0.0	0.1	-0.1	0.1

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2.4: Resistance to Humidity 90-95% +40°C ± 2°C 240 Hours

Pre Humidity

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-148	-1137	13	-289	-133	-299	-127	-527	-278	-1431	-435.6	474.6	-1431.0	13.0
Stability (ppm)	-3.0	-22.7	0.3	-5.8	-2.7	-6.0	-2.5	-10.5	-5.6	-28.6	-8.7	9.5	-28.6	0.3
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	52	52	51	51	51	51	51	52	51	51	51.3	0.5	51.0	52.0
Duty B %	48	48	49	49	49	49	49	48	49	49	48.7	0.5	48.0	49.0
Rise Time (ns)	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.5	1.6	1.6	0.0	1.5	1.6
Fall Time (ns)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.0	1.3	1.3
Icc (mA)	13.4	13.2	13.1	13.2	13.4	13.3	13.3	13.4	13.2	13.1	13.3	0.1	13.1	13.4

Post Humidity

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	-137	-1201	13	-273	-137	-269	-126	-531	-283	-1428	-437.2	486.8	-1428.0	13.0
Stability (ppm)	-2.7	-24.0	0.3	-5.5	-2.7	-5.4	-2.5	-10.6	-5.7	-28.8	-8.8	9.8	-28.8	0.3
VOH (V)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	0.0	3.3	3.3
VOL (V)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duty A %	52	51	51	51	51	51	51	51	51	51	51.1	0.3	51.0	52.0
Duty B %	48	49	49	49	49	49	49	49	49	49	48.9	0.3	48.0	49.0
Rise Time (ns)	1.6	1.6	1.6	1.6	1.6	1.7	1.6	1.6	1.6	1.6	1.6	0.0	1.6	1.7
Fall Time (ns)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.0	1.3	1.3
Icc (mA)	13.4	13.2	13.2	13.2	13.4	13.3	13.3	13.4	13.2	13.1	13.3	0.1	13.1	13.4

Change from Pre and Post

	1	2	3	4	5	6	7	8	9	10	Avg	Std Dev	Min	Max
Stability (Hz)	11	-64	0	16	-4	30	1	-4	-5	3	-1.6	24.5	-64.0	30.0
Stability (ppm)	0.3	-1.3	0	0.3	0	0.6	0	-0.1	-0.1	-0.2	-0.1	0.5	-1.3	0.6
VOH (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
VOL (V)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Duty A %	0	-1	0	0	0	0	0	-1	0	0	-0.2	0.4	-1.0	0.0
Duty B %	0	1	0	0	0	0	0	1	0	0	0.2	0.4	0.0	1.0
Rise Time (ns)	0	0	0	0.1	0	0.1	0	0	0.1	0	0.0	0.0	0.0	0.1
Fall Time (ns)	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Icc (mA)	0	0	0.1	0	0	0	0	0	0	0	0.0	0.0	0.0	0.1

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2.5 Aging

