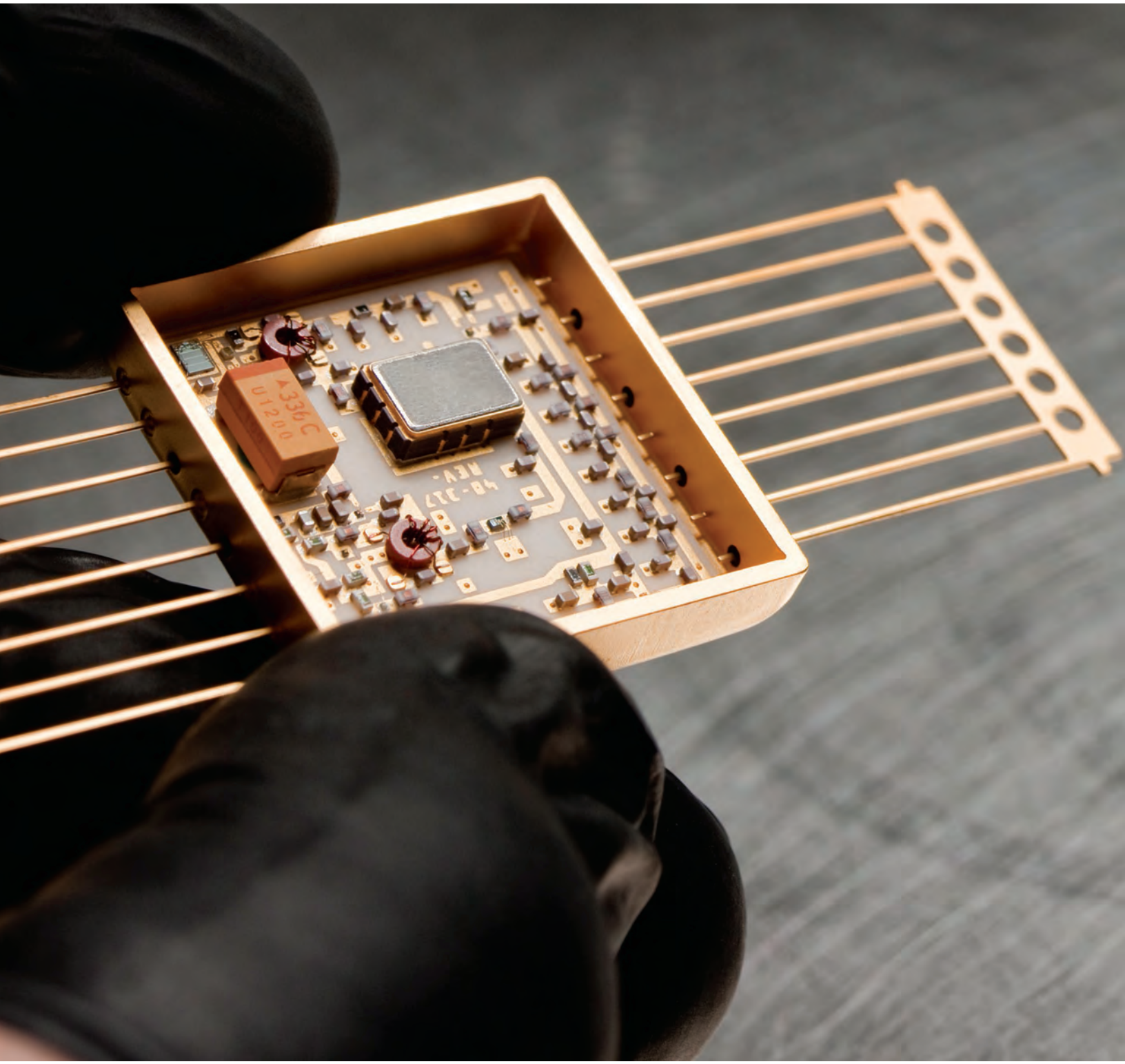
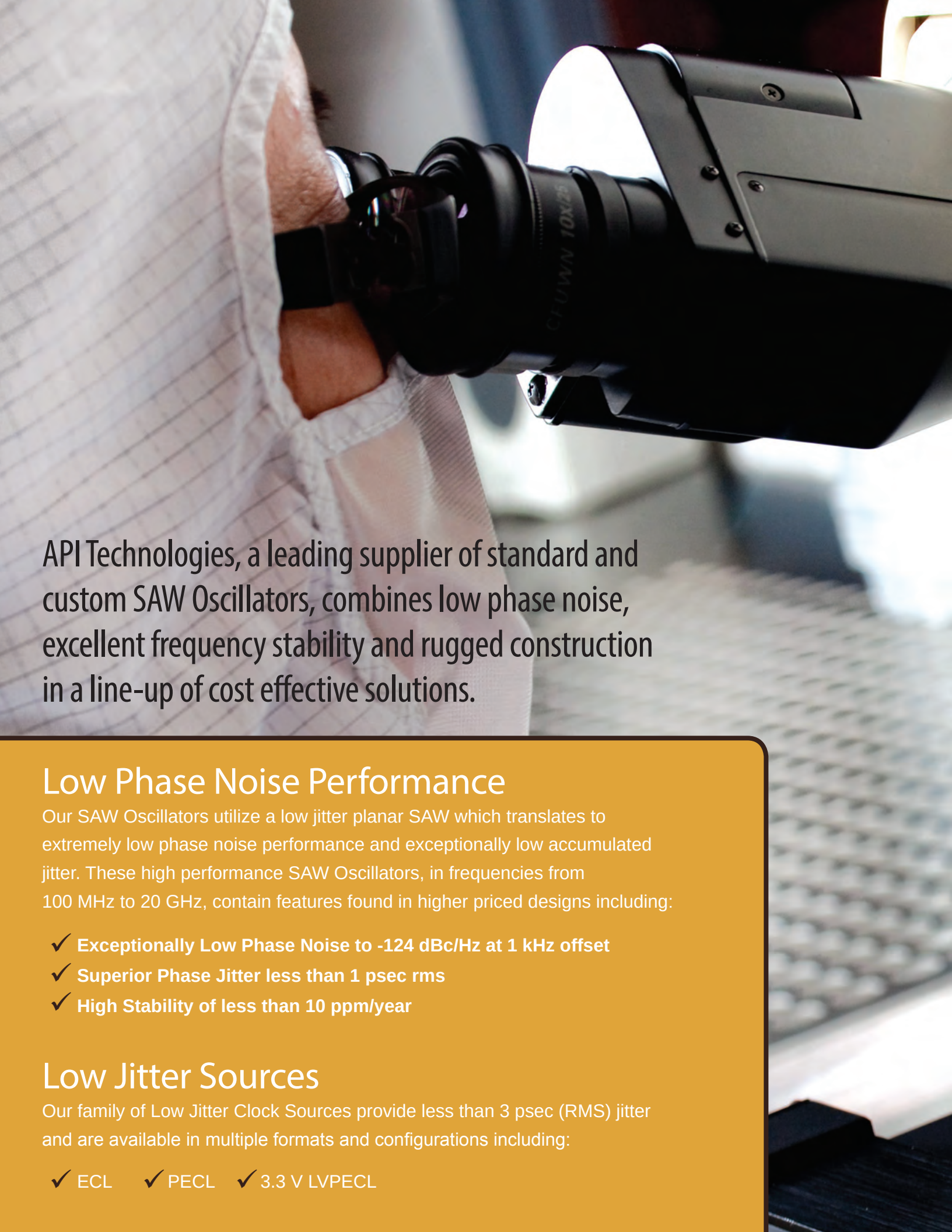
High Performance SAW Oscillators



api technologies corp.



API Technologies, a leading supplier of standard and custom SAW Oscillators, combines low phase noise, excellent frequency stability and rugged construction in a line-up of cost effective solutions.

Low Phase Noise Performance

Our SAW Oscillators utilize a low jitter planar SAW which translates to extremely low phase noise performance and exceptionally low accumulated jitter. These high performance SAW Oscillators, in frequencies from 100 MHz to 20 GHz, contain features found in higher priced designs including:

- ✓ **Exceptionally Low Phase Noise to -124 dBc/Hz at 1 kHz offset**
- ✓ **Superior Phase Jitter less than 1 psec rms**
- ✓ **High Stability of less than 10 ppm/year**

Low Jitter Sources

Our family of Low Jitter Clock Sources provide less than 3 psec (RMS) jitter and are available in multiple formats and configurations including:

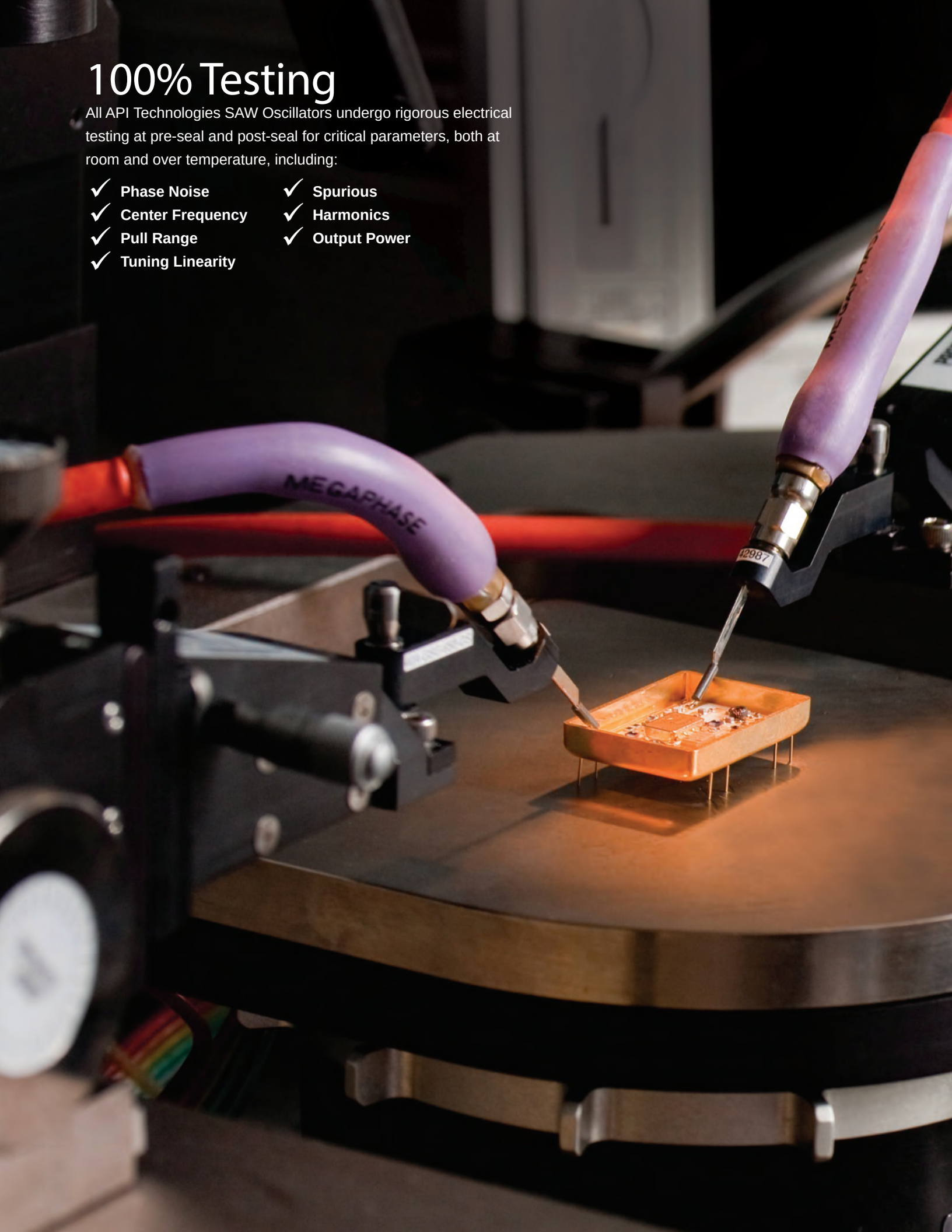
✓ ECL ✓ PECL ✓ 3.3 V LVPECL

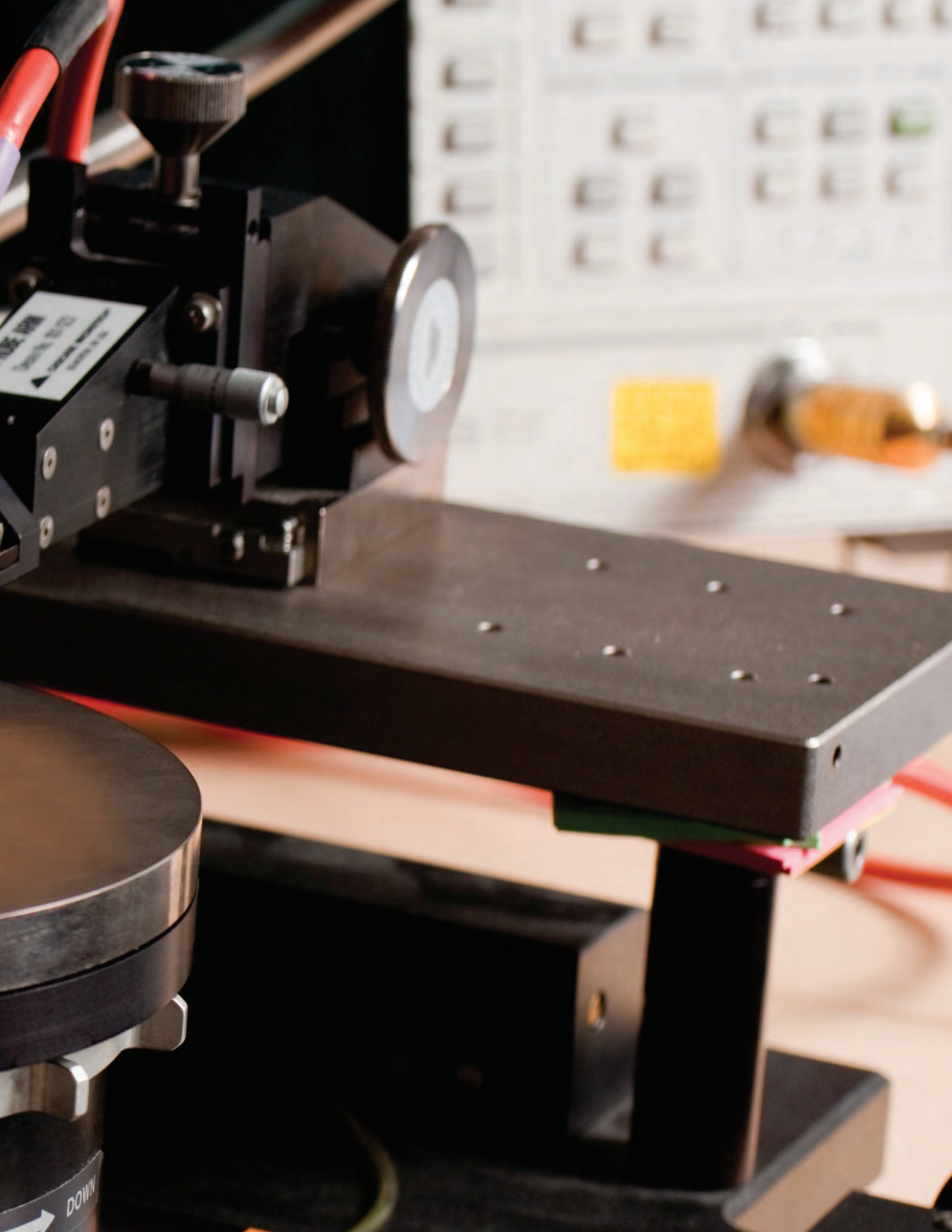

100 0
20 80
D. F.
B. F.
Nikon
JAPAN
Nikon

100% Testing

All API Technologies SAW Oscillators undergo rigorous electrical testing at pre-seal and post-seal for critical parameters, both at room and over temperature, including:

- ✓ **Phase Noise**
- ✓ **Center Frequency**
- ✓ **Pull Range**
- ✓ **Tuning Linearity**
- ✓ **Spurious**
- ✓ **Harmonics**
- ✓ **Output Power**




DOWN

Voltage Controlled SAW Oscillators

Part Number	Center Frequency (MHz)	Tuning BW (ppm)	Phase Noise (dBc/Hz)	Temperature Range (°C)	Package
MN724-0100.0000	100	14300	-112	-40 to +85	Surface Mount
MN724-0300.0000	300	3500	-111	-40 to +85	Surface Mount
MN724-0400.0000	400	2100	-110	-40 to +85	Surface Mount
MN725-0400.0000	400	700	-109	-55 to +100	Surface Mount
MN724-0435.2000	435.2	2200	-109	-40 to +85	Surface Mount
MN724-0475.0000	475	1700	-109	-40 to +85	Surface Mount
MN724-0491.5200	491.52	2000	-109	-40 to +85	Surface Mount
MN724-0500.0000	500	2000	-109	-40 to +85	Surface Mount
MN725-0500.0000	500	700	-109	-55 to +100	Surface Mount
MN724-0533.3300	533.33	1800	-109	-40 to +85	Surface Mount
MN724-0614.4000	614.4	1600	-108	-40 to +85	Surface Mount
MN724-0621.9100	621.91	1600	-108	-40 to +85	Surface Mount
MN724-0622.0800	622.08	1500	-108	-40 to +85	Surface Mount
MN724-0624.8200	624.82	1600	-108	-40 to +85	Surface Mount
MN724-0625.0000	625	1600	-108	-40 to +85	Surface Mount
MN725-0625.0000	625	700	-109	-55 to +100	Surface Mount
MN724-0627.3300	627.33	1600	-108	-40 to +85	Surface Mount
MN724-0637.5000	637.5	1500	-108	-40 to +85	Surface Mount
MN724-0640.0000	640	1500	-108	-40 to +85	Surface Mount
MN724-0644.5300	644.53	1600	-108	-40 to +85	Surface Mount
MN724-0657.4200	657.42	1600	-108	-40 to +85	Surface Mount
MN724-0666.3300	666.33	1600	-108	-40 to +85	Surface Mount
MN724-0666.5100	666.51	1500	-108	-40 to +85	Surface Mount
MN724-0669.1500	669.15	1500	-108	-40 to +85	Surface Mount
MN724-0669.3300	669.33	1500	-108	-40 to +85	Surface Mount
MN724-0669.6400	669.64	1500	-108	-40 to +85	Surface Mount
MN724-0672.1600	672.16	1600	-107	-40 to +85	Surface Mount
MN724-0690.5700	690.57	1500	-107	-40 to +85	Surface Mount
MN724-0693.4800	693.48	1400	-107	-40 to +85	Surface Mount
MN724-0696.4200	696.42	1500	-107	-40 to +85	Surface Mount
MN724-0696.6149	696.6149	1500	-107	-40 to +85	Surface Mount
MN724-0698.8123	698.8123	1500	-107	-40 to +85	Surface Mount
MN724-0707.3530	707.353	1400	-107	-40 to +85	Surface Mount
MN724-0719.7300	719.73	1400	-107	-40 to +85	Surface Mount
MN724-0750.0000	750	1300	-107	-40 to +85	Surface Mount
MN724-0777.6000	777.6	1400	-107	-40 to +85	Surface Mount
MN724-0787.7100	787.71	1200	-107	-40 to +85	Surface Mount
MN724-0840.0000	840	1300	-106	-40 to +85	Surface Mount
MN724-0843.7500	843.75	1200	-106	-40 to +85	Surface Mount
MN724-0873.8115	873.8115	1900	-106	-40 to +85	Surface Mount
MN724-0950.0000	950	900	-105	-40 to +85	Surface Mount
MN724-0983.0400	983.04	1000	-105	-40 to +85	Surface Mount
MN724-1000.0000	1000	1000	-105	-40 to +85	Surface Mount
MN724-1066.6600	1066.66	900	-105	-40 to +85	Surface Mount
MN724-1228.8000	1228.8	800	-103	-40 to +85	Surface Mount
MN724-1243.8200	1243.82	800	-103	-40 to +85	Surface Mount
MN724-1244.1600	1244.16	800	-103	-40 to +85	Surface Mount
MN724-1249.6400	1249.64	800	-103	-40 to +85	Surface Mount
MN724-1250.0000	1250	800	-103	-40 to +85	Surface Mount
MN725-1250.0000	1250	700	-103	-55 to +100	Surface Mount
MN724-1254.6600	1254.66	800	-103	-40 to +85	Surface Mount
MN724-1275.0000	1275	800	-103	-40 to +85	Surface Mount
MN724-1280.0000	1280	800	-103	-40 to +85	Surface Mount
MN724-1289.0600	1289.06	800	-103	-40 to +85	Surface Mount
MN724-1314.8400	1314.84	800	-103	-40 to +85	Surface Mount
MN724-1332.6600	1332.66	800	-103	-40 to +85	Surface Mount
MN724-1333.0200	1333.02	700	-103	-40 to +85	Surface Mount
MN724-1338.3000	1338.3	700	-103	-40 to +85	Surface Mount
MN724-1338.6600	1338.66	700	-103	-40 to +85	Surface Mount
MN724-1339.2800	1339.28	700	-103	-40 to +85	Surface Mount
MN724-1344.3200	1344.32	800	-103	-40 to +85	Surface Mount
MN724-1381.1400	1381.14	800	-102	-40 to +85	Surface Mount
MN724-1386.9600	1386.96	700	-102	-40 to +85	Surface Mount
MN724-1392.8400	1392.84	800	-102	-40 to +85	Surface Mount

Voltage Controlled SAW Oscillators

Part Number	Center Frequency (MHz)	Tuning BW (ppm)	Phase Noise (dBc/Hz)	Temperature Range (°C)	Package
MN724-1393.2298	1393.2298	800	-102	-40 to +85	Surface Mount
MN724-1397.6246	1397.6246	800	-102	-40 to +85	Surface Mount
MN724-1414.7060	1414.706	700	-102	-40 to +85	Surface Mount
MN724-1439.4600	1439.46	700	-102	-40 to +85	Surface Mount
MN724-1500.0000	1500	700	-102	-40 to +85	Surface Mount
MN724-1555.2000	1555.2	700	-101	-40 to +85	Surface Mount
MN724-1575.4200	1575.42	600	-101	-40 to +85	Surface Mount
MN725-1675.0000	1675	700	-100	-55 to +100	Surface Mount
MN724-1680.0000	1680	700	-101	-40 to +85	Surface Mount
MN725-1687.0000	1687	700	-100	-55 to +100	Surface Mount
MN724-1687.5000	1687.5	600	-101	-40 to +85	Surface Mount
MN724-1747.6230	1747.623	1000	-100	-40 to +85	Surface Mount
MN724-1900.0000	1900	400	-99	-40 to +85	Surface Mount
MN724-1966.0800	1966.08	500	-99	-40 to +85	Surface Mount
MN724-2000.0000	2000	500	-99	-40 to +85	Surface Mount
MN724-2133.3200	2133.32	500	-98	-40 to +85	Surface Mount
MN724-2457.6000	2457.6	400	-97	-40 to +85	Surface Mount
MN724-2487.6400	2487.64	400	-96	-40 to +85	Surface Mount
MN725-2488.0000	2488	700	-97	-55 to +100	Surface Mount
MN724-2488.3200	2488.32	400	-96	-40 to +85	Surface Mount
MN724-2499.2800	2499.28	400	-96	-40 to +85	Surface Mount
MN725-2500.0000	2500	700	-97	-55 to +100	Surface Mount
MN724-2500.0000	2500	400	-96	-40 to +85	Surface Mount
MN724-2509.3200	2509.32	400	-96	-40 to +85	Surface Mount
MN724-2550.0000	2550	400	-96	-40 to +85	Surface Mount
MN724-2560.0000	2560	400	-96	-40 to +85	Surface Mount
MN724-2578.1200	2578.12	400	-96	-40 to +85	Surface Mount
MN724-2629.6800	2629.68	400	-96	-40 to +85	Surface Mount
MN724-2665.3200	2665.32	400	-96	-40 to +85	Surface Mount
MN724-2666.0400	2666.04	400	-96	-40 to +85	Surface Mount
MN724-2676.6000	2676.6	400	-96	-40 to +85	Surface Mount
MN724-2677.3200	2677.32	400	-96	-40 to +85	Surface Mount
MN724-2678.5600	2678.56	400	-96	-40 to +85	Surface Mount
MN724-2688.6400	2688.64	400	-96	-40 to +85	Surface Mount
MN724-2762.2800	2762.28	400	-95	-40 to +85	Surface Mount
MN724-2773.9200	2773.92	400	-95	-40 to +85	Surface Mount
MN724-2785.6800	2785.68	400	-95	-40 to +85	Surface Mount
MN724-2786.4596	2786.4596	400	-95	-40 to +85	Surface Mount
MN724-2795.2492	2795.2492	400	-95	-40 to +85	Surface Mount
MN724-2829.4120	2829.412	300	-95	-40 to +85	Surface Mount
MN724-2878.9200	2878.92	300	-95	-40 to +85	Surface Mount
MN724-3000.0000	3000	300	-94	-40 to +85	Surface Mount
MN724-3110.4000	3110.4	300	-94	-40 to +85	Surface Mount
MN724-3150.8400	3150.84	300	-94	-40 to +85	Surface Mount
MN725-3350.0000	3350	700	-93	-55 to +100	Surface Mount
MN724-3360.0000	3360	300	-93	-40 to +85	Surface Mount
MN724-3375.0000	3375	300	-93	-40 to +85	Surface Mount
MN725-3375.0000	3375	700	-93	-55 to +100	Surface Mount
MN724-3495.2460	3495.246	500	-93	-40 to +85	Surface Mount

Performance is typical measured at 25°C. Phase Noise is measured at 1 kHz offset.

Voltage Controlled SAW Oscillators

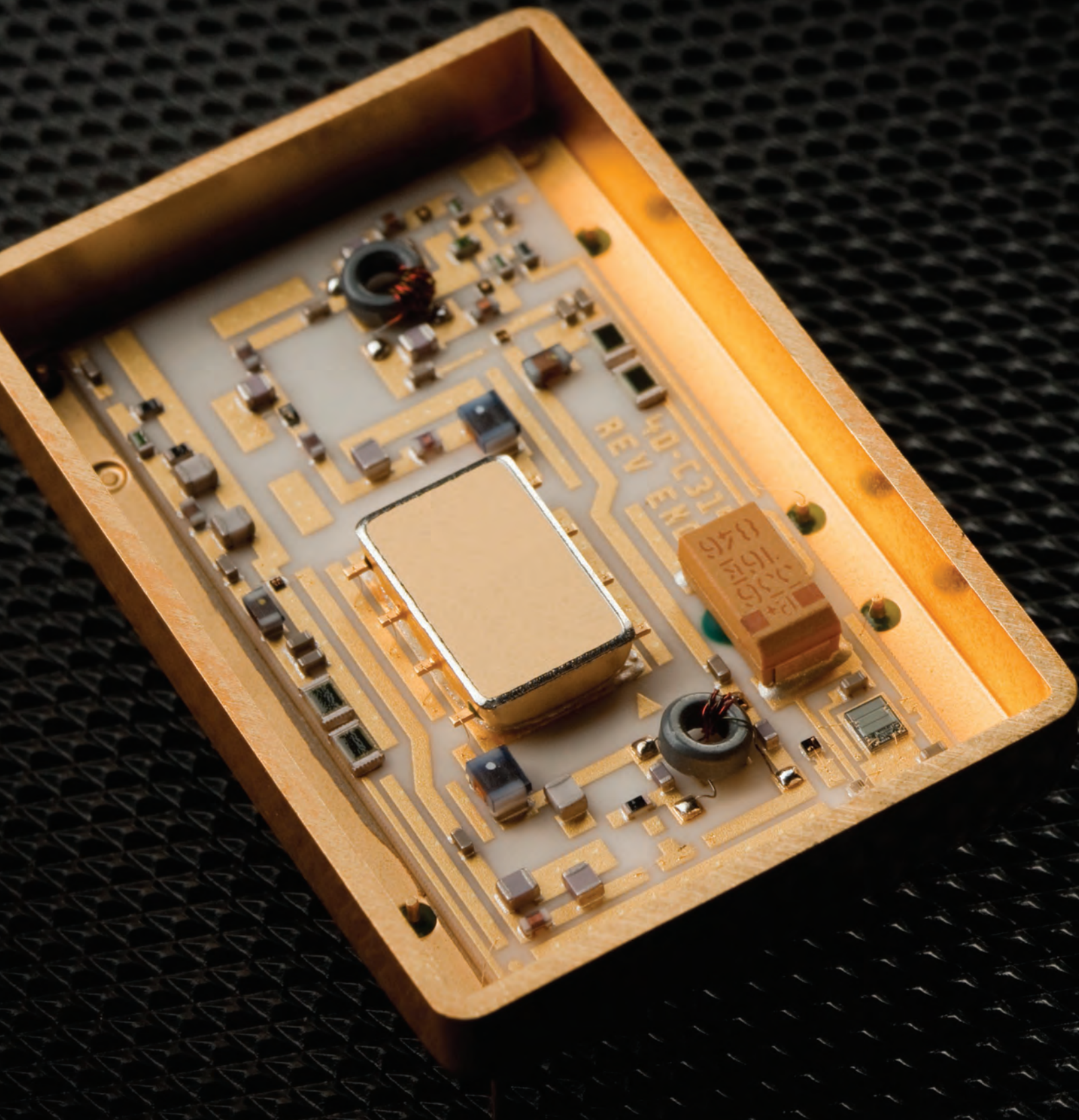
API Voltage Controlled SAW Oscillators are design for both performance and reliability. With your choice of either hermetic kovar or low cost package options, these low phase noise oscillators feature low vibration sensitivity of Γ = 2x10-9/g while delivering linear tuning over a wide temperature range.

For more information or to let us know how we may help you, please contact us at

888.879.4099

Multiple Features

High performance is the cornerstone of our SAW Oscillator designs. We use a low loss planar SAW device as the frequency controlling element. Adding multiple complimentary features including gold for low loss and kovar SAW packages results in a product with inherent high reliability to meet today's demanding requirements.



Fixed Frequency SAW Oscillators

Part Number	Center Frequency (MHz)	Phase Noise (dBc/Hz)	Stability (ppm/year)	DC Supply (V)	Package
MN715-0303.8250	303.825	-129	10	8	DIP
MN715-0418.0000	418	-129	10	8	DIP
MN715-0425.0000	425	-128	10	8	DIP
MN715-0500.0000	500	-128	10	8	DIP
MN715-0563.0000	563	-127	10	8	DIP
MN715-0625.0000	625	-127	10	8	DIP
MN715-0700.6000	700.600	-126	10	8	DIP
MN715-0840.0000	840	-125	10	8	DIP
MN715-0940.0000	940	-124	10	8	DIP
MN715-0960.0000	960	-124	10	8	DIP
MN715-0970.0000	970	-124	10	8	DIP
MN715-0991.0000	991	-124	10	8	DIP
MN715-1000.0000	1000	-124	10	8	DIP
MN715-1009.0000	1009	-124	10	8	DIP
MN715-1028.0000	1028	-124	10	8	DIP
MN715-1030.0000	1030	-124	10	8	DIP
MN715-1048.0000	1048	-124	10	8	DIP
MN715-1080.0000	1080	-123	10	8	DIP
MN715-1090.0000	1090	-123	10	8	DIP
MN715-1100.0000	1100	-123	10	8	DIP
MN715-1110.0000	1110	-123	10	8	DIP
MN715-1133.0000	1133	-123	10	8	DIP
MN715-1150.0000	1150	-123	10	8	DIP
MN715-1151.0000	1151	-123	10	8	DIP
MN715-1155.0000	1155	-123	10	8	DIP
MN715-1160.0000	1160	-123	10	8	DIP
MN715-1165.0000	1165	-123	10	8	DIP
MN715-1290.0000	1290	-122	10	8	DIP

Performance is typical measured at 25°C. Phase Noise is measured at 1 kHz offset.

Phased Locked Voltage Controlled SAW Oscillators

Designed for high-end commercial and military applications, these low phase noise Phased Locked designs combine the high fundamental frequency and low phase noise of a SAW with the frequency stability of an external reference. The result is a family of designs that have excellent vibration sensitivity, low phase noise performance which are available in standard and custom frequencies.

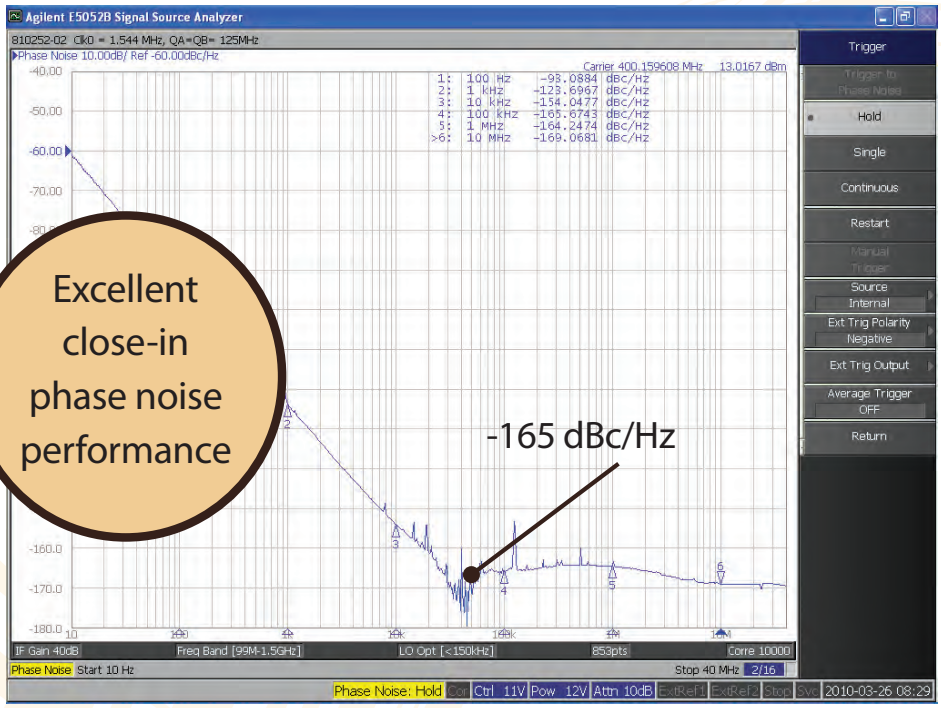


Phase Locked Voltage Controlled SAW Oscillators

Model Number	Center Frequency (MHz)	Lock Range (ppm)	Reference Frequency (MHz)	SSB Phase Noise (dBc/Hz)						Supply (Volts/mA)
				10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	
MN745-0400	400	+/- 100	10	-65	-95	-115	-115	-140	-155	8/90
MN745-0500	500	+/- 100	10	-65	-95	-115	-115	-140	-155	8/90
MN745-0625	625	+/- 100	10	-65	-95	-115	-115	-140	-155	8/90
MN745-0640	625	+/- 100	10	-65	-95	-115	-115	-140	-155	8/110
MN745-1250	1250	+/- 100	10	-60	-88	-110	-110	-134	-149	8/120
MN745-1675	1675	+/- 100	10	-60	-88	-110	-110	-134	-149	8/120
MN745-1687	1687	+/- 100	10	-60	-88	-110	-110	-134	-149	8/120
MN745-2488	2488	+/- 100	10	-56	-83	-105	-105	-129	-143	8/120
MN745-2500	2500	+/- 100	10	-56	-83	-105	-105	-129	-143	8/120
MN745-3350	3350	+/- 100	10	-54	-81	-103	-103	-127	-141	8/120
MN745-3375	3375	+/- 100	10	-54	-81	-103	-103	-127	-141	8/120

| High Performance |

Exceptional performance coupled with high reliability is what differentiates API SAW Oscillators from other vendors. Our engineers continue to push the technology envelope in order to provide our customers with standard and custom designs that meet specifications and exceed expectations.

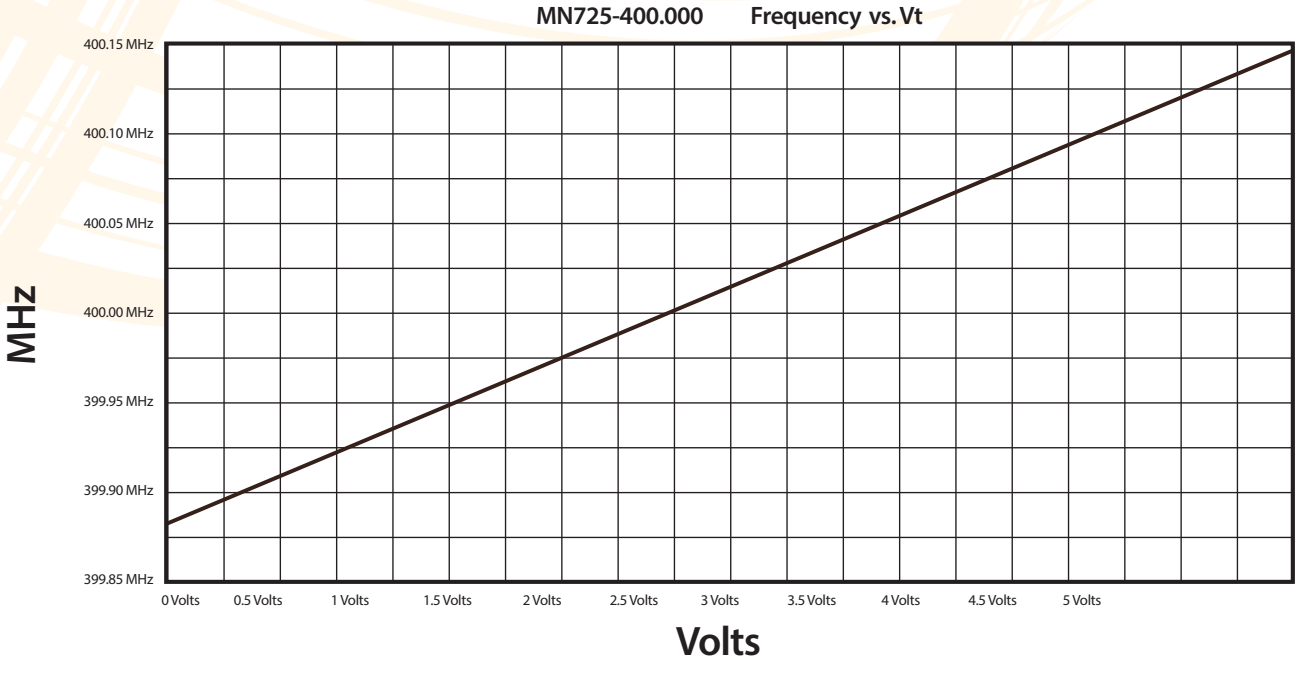


Raising The Bar

Exceptional phase noise performance is the cornerstone of most SAW based oscillator requirements. Using a number of proprietary methods including low noise bipolar amplifiers, low noise voltage regulators and low loss SAW designs, we have raised the industry's bar for SAW oscillator performance.

Linear Tuning Ranges

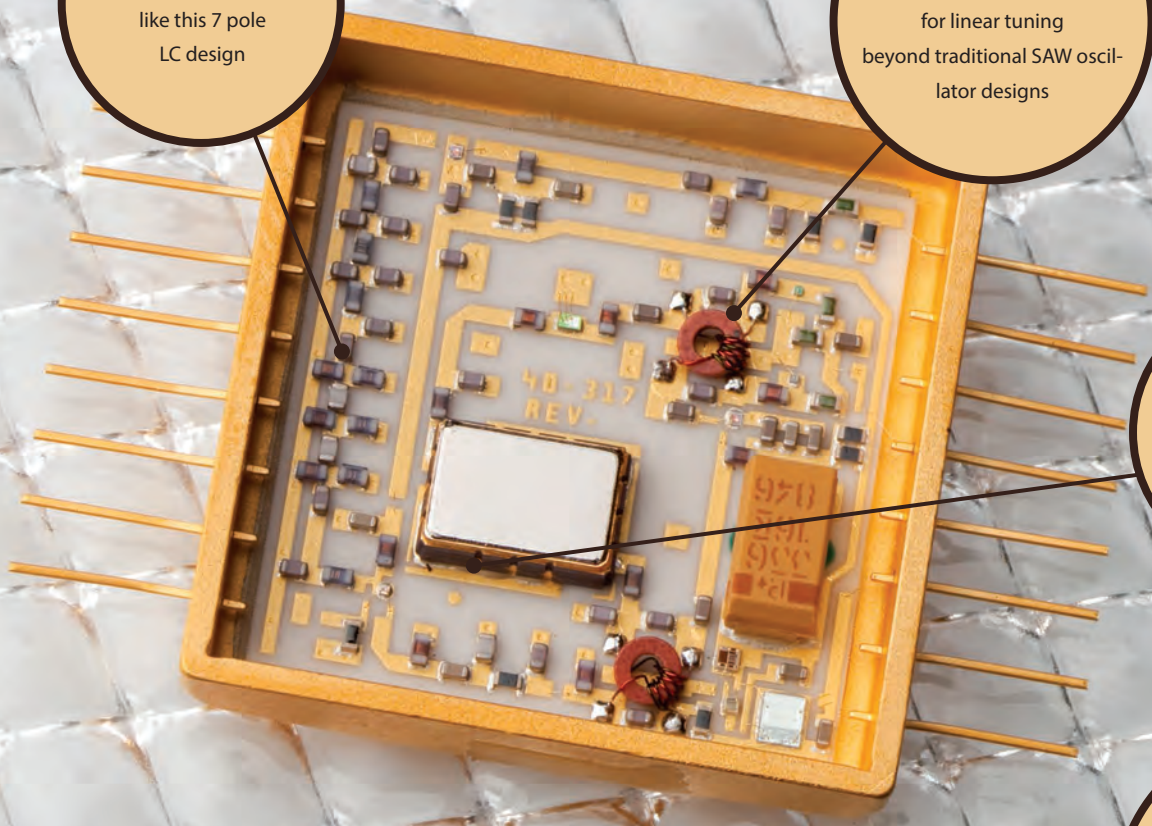
By using a SAW with a conventional phase shifter, API oscillators achieve a high tuning linearity.



Integral clean up filters like this 7 pole LC design

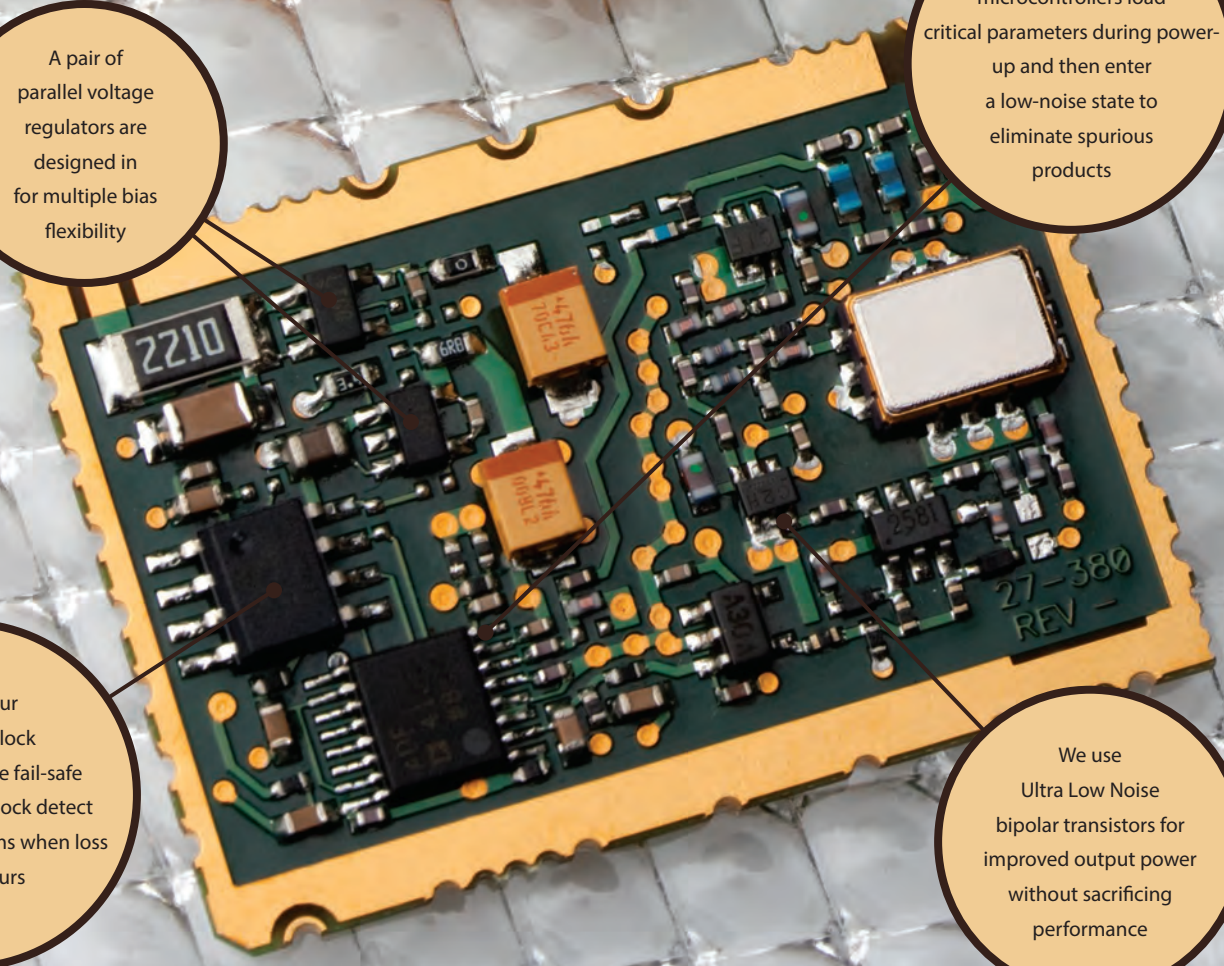
Varactor diodes in quadrature allow for linear tuning beyond traditional SAW oscillator designs

Available X2 or X4 multipliers extend frequency performance to 4000 MHz



Embedded microcontrollers load critical parameters during power-up and then enter a low-noise state to eliminate spurious products

A pair of parallel voltage regulators are designed in for multiple bias flexibility



Many of our SAW phase-lock oscillators provide fail-safe measures like the lock detect circuitry which alarms when loss of lock occurs

We use Ultra Low Noise bipolar transistors for improved output power without sacrificing performance

High Reliability

API's SAW oscillators are manufactured for integration into both commercial and military applications. Our oscillators are available with screening to test methods of MIL-STD-883, MIL-STD-202 and MIL-STD-810 in strict compliance with our ISO9001:2001 certified facility.

Seam Sealing

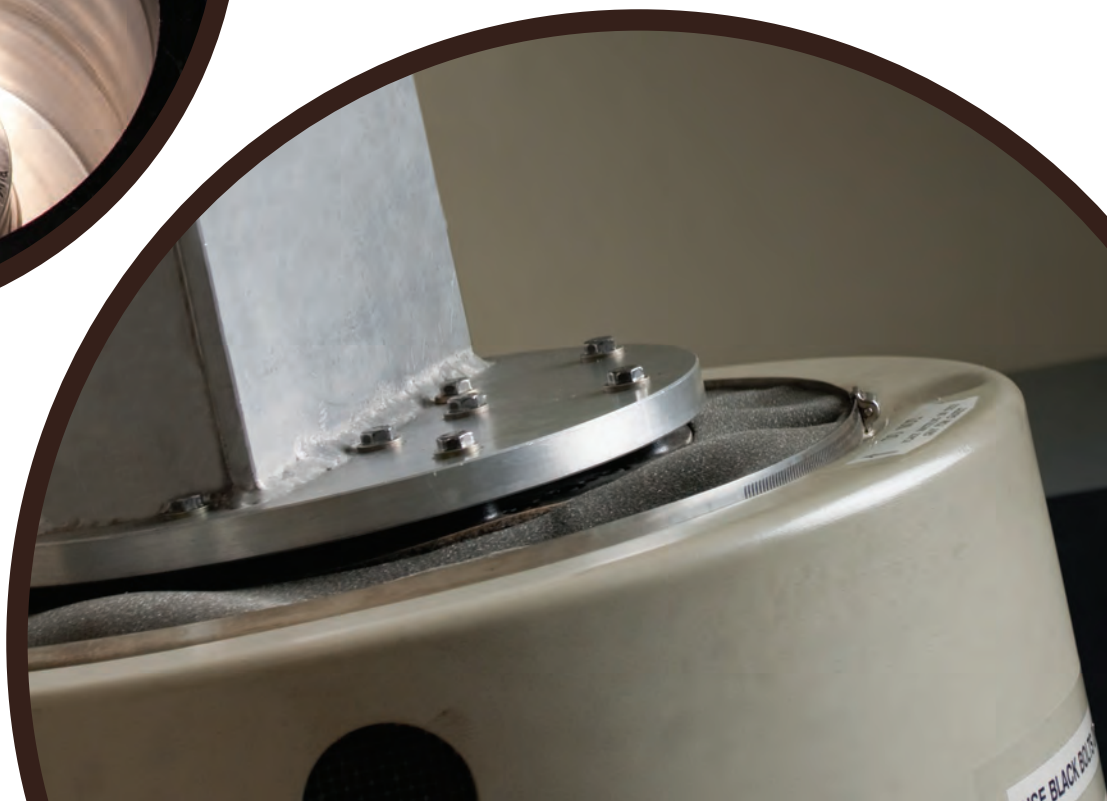
API Technologies' inventory of sealing methods includes seam sealing which maintains environmental integrity to pass the rigors of MIL-PRF-38534 methods 1014 conditions A & C for both Gross and Fine leak detection.





Constant Acceleration

API offers constant acceleration in compliance with MIL-STD-883, Test Method 2001 for our SAW oscillator products.



Vibration Testing

On-site random and sinusoidal vibration to 30g, along with shock testing allow our engineers to test their designs under extreme conditions.

100% Testing

Our SAW oscillators undergo rigorous testing for phase noise, harmonic and sub-harmonic suppression, output signal power level and tuning linearity following any environmental screening. The units are tested at the operating temperatures which assures compliance to specifications under all environmental conditions.



Temperature Cycling

We cycle our SAW oscillators from -55 to +100°C in compliance with MIL-STD-883, Test Method 1010 Cond. A

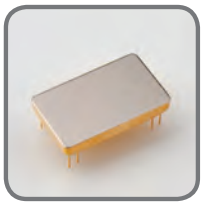




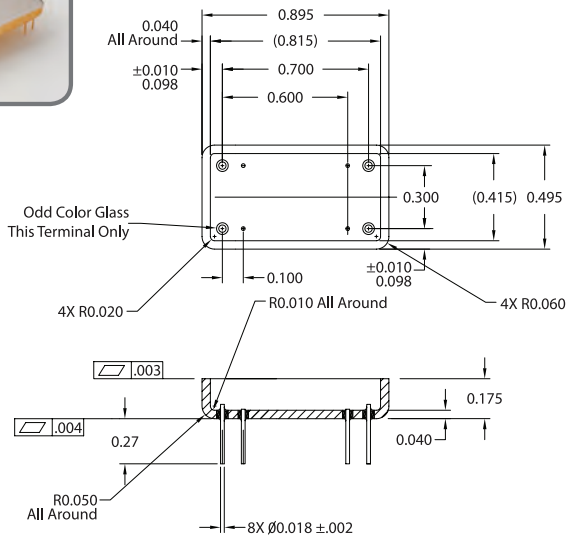
Stability Bake

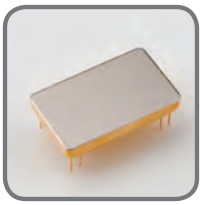
All our oscillators receive a 96 hour stability bake at 100°C to provide optimal stability. We also can provide an active burn-in for the oscillators.



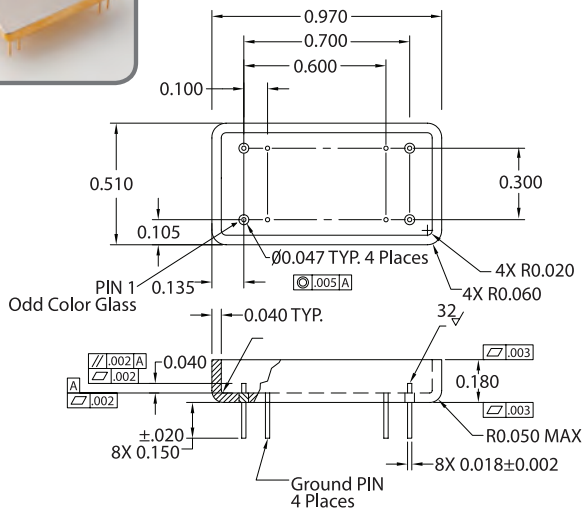


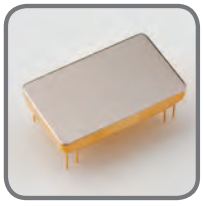
0.895 x 0.495 8 Pin DIP Package



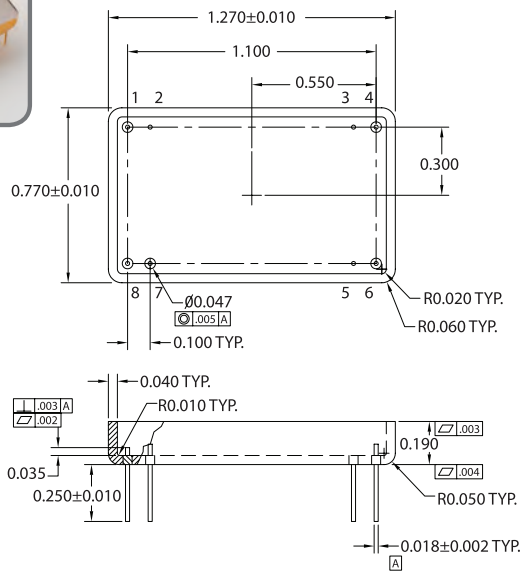


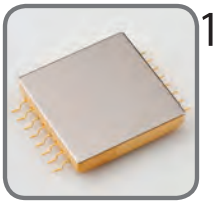
0.970 x 0.510 8 Pin DIP Package



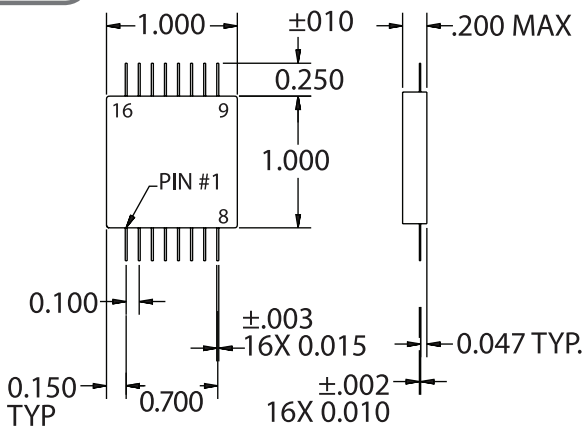


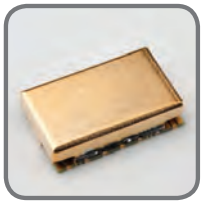
1.27 x 0.77 8 Pin DIP Package



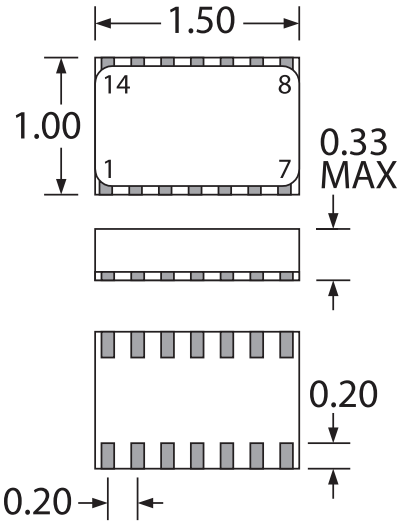


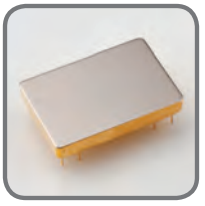
1.00 x 1.00 16 Pin Flatpack Package



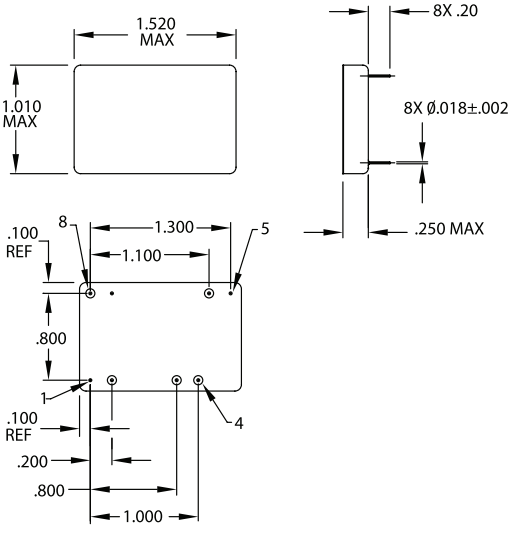


1.50 x 1.00 Surface Mount Package





1.520 x 1.010 8 Pin DIP Package





Quality Assurance

- ✓ Certified to ISO 9001:2001 and AS9100-B
- ✓ Quality control system compliant to MIL-I-45208 and MIL-Q-9858
- ✓ ANSI/Z540-1-1994 compliant calibration
- ✓ Screening available to the test methods of MIL-STD-883, MIL-STD-202 and MIL-STD-810

| Design Resources |



micro.apitech.com

API Technologies' website features complete information on all standard products with updated versions of more than 900 product datasheets. API's customers enjoy FREE engineering tools, tours, application notes, white papers, and the ability to create a custom designed product per individual specifications.

Cascade Design Suite

With over 750 datasheets on API Technologies' Amplifiers, Mixers, Oscillators & Control Products, this CD also offers the industry's best manufacturer's cross reference. The System Simulator lets you optimize your design by viewing an individual component's contribution to overall system performance. You can also quickly evaluate trade-offs in component selection and their impact on system performance (e.g. Gain, Noise, P1dB, IP3, Dynamic Range,.....)



api technologies corp.

API Technologies Corp. is a trusted provider of RF/microwave, microelectronics, and security solutions for critical and high-reliability applications. The company designs, develops and manufactures electronic components, modules, systems and products for technically demanding defense, commercial/industrial and aerospace applications. API Technologies' customers include many leading Fortune 500 companies, as well as a majority of NATO governments. While API was founded in 1981, our heritage brands have served the demanding, hi-rel marketplace for more than 60 years. API Technologies trades on the NASDAQ under the symbol ATNY.

www.apitech.com • +1.855.294.3800