Dielectric Resonator Oscillators (DROs)

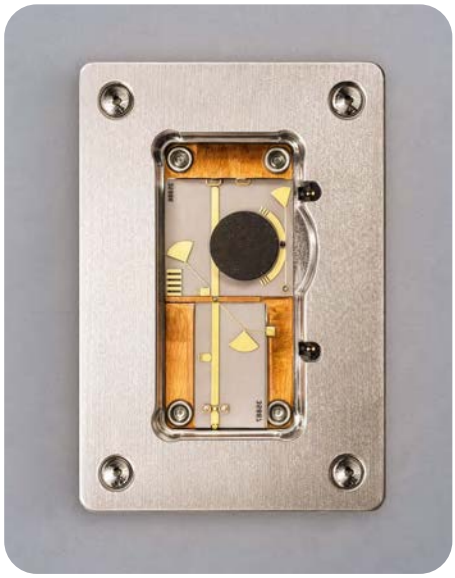
Low phase noise, frequency-stable microwave sources for radar, communications, and precision RF systems.

The right source architecture for an efficient, low-noise fixed-frequency source.

Microsource DROs address applications that need a small, light, low–DC–power source with high stability and low phase noise, without the wide electronic tuning range of a YIG-tuned oscillator (YTO) or VCO-based synthesizer. Where a fixed or narrow-tuning LO or reference is the right fit, a DRO is often the simplest path. Microsource implementations use three-terminal active devices (HBTs and MESFETs) tuned for high efficiency and low noise in packaging built for deployed hardware.

Designed for harsh environments

Microsource DROs are designed for deployed, harsh-environment use across the -40°C to +85°C operating range. They can be built with a variety of RF connectors (SMA, 2.92 mm, SMPM) and DC connection styles, with plating finishes tailored to platform corrosion and mating-hardware requirements. Hermetic and non-hermetic constructions are available depending on leak-rate, outgassing, and lifetime needs.



Engineered for stable microwave source applications

A DRO uses a high-Q dielectric resonator to stabilize a microwave oscillator core, supporting spectral purity relative to a free-running wideband VCO without the electromagnetic tuning mechanism of a YTO. Microsource emphasizes efficient, low-noise active devices and packaging suited to integrated subsystem use without the current-driven tuning mechanism of a YTO.

CAPABILITIES

What we deliver

Low Phase Noise Performance

High-Q resonator stabilization for strong close-in and far-from-carrier noise, behavior is band and resonator-specific.

High Frequency Stability

Defined accuracy, drift, pulling, and pushing characteristics specified per datasheet and program requirements.

Narrow-tuning / Fixed Operation

Electronic and mechanical tuning ranges are modest by design, not a substitute for YTO- or synthesizer-class breadth.

Efficient microwave source

HBT and MESFET active devices are selected and tuned for high efficiency and low noise in compact realization.

Harsh-environment packaging

Hermetic and non-hermetic constructions available with mil-spec chemical conversion coatings and screened devices.

Flexible interconnect options

RF connector families (SMA, 2.92 mm, SMPM) and DC pin finishes specified to match platform interfaces.

REPRESENTATIVE CONFIGURATION

G-DRO-10-12-000 — 10 to 12 GHz X-band DRO

Published electrical and environmental data for a representative X-band Microsource DRO. The nominal center frequency range describes the band of operation for this class — refer to the footnote regarding tuning range vs. band of operation. Final performance, tuning behavior, and packaging options may vary by frequency and application.

FREQUENCY

Nominal center frequency range	10.0 – 12.0 GHz
Accuracy @ +25 °C	±1 MHz
Drift vs. temperature	2.5 MHz
Mechanical tuning range	50 MHz min
Pulling into 12 dB RL	1 MHz
Pushing	1 MHz/V
Settling to ±10 kHz	250 µs typ.

ELECTRONIC TUNING

Tuning voltage range	0 – 17 V
Tuning sensitivity	2.0 MHz/V nom.
Tuning port capacitance	5 pF
FM tuning BW (3 dB)	1.0 MHz

OUTPUT POWER

Power setting @ +25 °C	0 to +4 dBm
Power variation vs. temp.	±1 dB

PHASE NOISE @ 10.5 GHZ CARRIER

Offset 1 kHz	-50 dBc/Hz
Offset 10 kHz	-78 dBc/Hz
Offset 100 kHz	-105 dBc/Hz
Offset 1 MHz	-135 dBc/Hz
Offset 10 MHz	-155 dBc/Hz

SPECTRAL PURITY

Output spurious	-70 dBc
2nd harmonic	-25 dBc
3rd harmonic	-15 dBc

POWER & ENVIRONMENT

Supply voltage	+8 ±1 V
Supply current	150 mA
Operating temperature	-40 to +85 °C
Form factor (L × W × H)	1.5 × 1.0 × 0.60 in

Note: Specifications subject to change without notice. Range of frequencies over which this class of DRO may operate, not the tuning range specification. Representative measurements drawn from the Microsource catalog; final limits and screening follow approved program documentation.

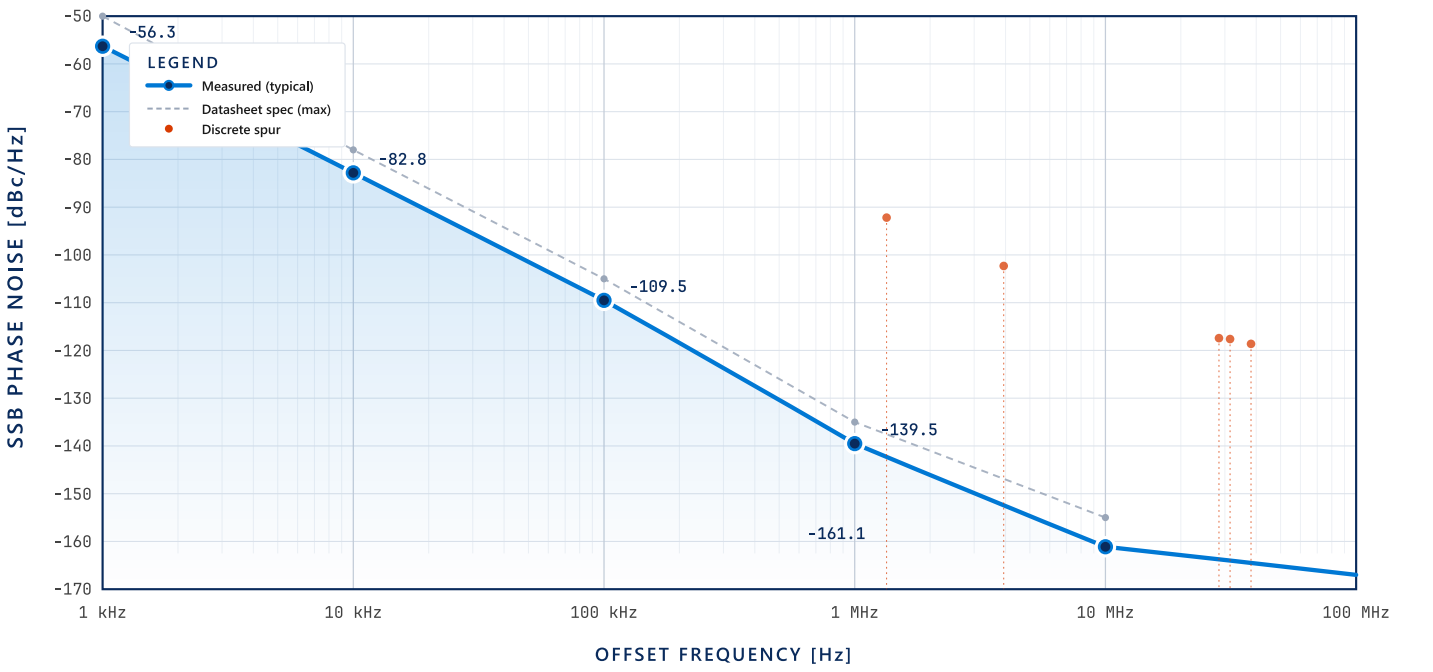
ARCHITECTURE FIT

DRO vs YIG oscillator vs synthesizer

	DRO	YIG Oscillator	Synthesizer
Tuning range	Fixed / narrow electronic and mechanical trim	Wide tunable band, YTO-class agility	Programmable steps or hops per design
Stability	High, narrow-band resonator-stabilized	Strong, band-dependent	Reference- and loop-dependent
Phase noise	Low, excellent for fixed or narrow LO roles	Very good, with tuning range/noise tradeoff	Depends on VCO/YTO architecture and loop
Complexity	Lower, oscillator module vs. full synthesizer	Medium, tuning driver and bias complexity	Highest, reference, loop, and control stack
Best use case	Stable LO or reference source without wide agility	Swept or agile sources needing wide tune	Precision frequency control and step operation

Typical SSB Phase Noise Performance

G-DRO-10-12-000 · 10.5 GHz carrier · T = +25 °C



APPLICATIONS

Where DROs fit

Radar systems
Compact fixed-frequency or narrow-tuning sources for RF chains where spectral purity and stability matter.

Electronic warfare
Stable sources in RF chains that need a compact, efficient fixed-frequency tone.

Satellite communications
Payload, terminal, and ground-system LO applications with disciplined spectral behavior.

Local oscillator generation
Drive mixers and converters with a stable tone where wideband agility is not required.

Test & measurement
Reference-quality sources for bench and subsystem test, complementing full-bench synthesizers.

Frequency conversion chains
Pairs naturally with Microsource converters and multipliers as the stable LO anchor in the chain.

PACKAGING

Packaging & materials

DIMENSIONS	HOUSING	OUTER COVER	RF CONNECTOR	DC PINS	CONSTRUCTION
1.5 x 1.0 x 0.60 in excl. tuning element	Aluminum 6061 MIL-DTL-5541F	Aluminum 4047 MIL-DTL-5541F	SMA-F · 2.92 mm-F SMPM optional	0.030 in Kovar Soft electroless gold	Hermetic / non-hermetic Per program

Talk with **Microsource** about fixed-frequency, narrow-tuning, and custom oscillator solutions for demanding RF and microwave systems.

A GRESHAM WORLDWIDE COMPANY

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