YIG-Tuned Oscillators (YTOs)

Wideband, low–phase-noise microwave sources for radar, electronic warfare, and signal-generation systems.

The wideband source architecture for swept, low-noise tunable microwave signal generation.

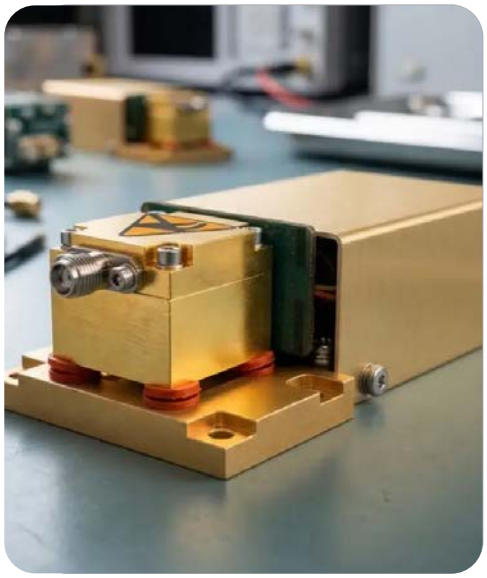
Microsource permanent-magnet YIG-tuned oscillators (YTOs) generate a continuously tunable microwave signal across a wide operating band, serving as a stable, spectrally pure source for demanding RF and microwave systems. Frequency is set by adjusting the magnetic field applied to a YIG resonator, enabling smooth analog tuning without band switching — the right architecture where wide frequency tuning and low phase noise both matter.

Why permanent-magnet YTOs

A permanent magnet supplies a fixed magnetic bias, reducing the main-coil current required to tune the YIG resonator across the operating band. This supports efficient wideband tuning and helps reduce the tuning-power burden in SWaP-constrained platforms.

Engineered for stable microwave source applications

The high-Q YIG resonator stabilizes the oscillator core for low phase noise across a wide, continuous tuning range, while an integrated driver and control electronics simplify subsystem integration. Machined housings with mil-spec chemical-conversion finishes and SMA or SMPM interfaces are designed for integration into RF and microwave subsystems.



CAPABILITIES

What we deliver

Low phase noise

High-Q YIG resonator stabilization delivers strong close-in and far-from-carrier noise performance across the band.

Wide continuous tuning

Smooth analog tuning across a broad operating band with no band switching — supports frequency swept operation.

Permanent-magnet biasing

Fixed magnetic bias reduces the main-coil current required for frequency tuning across the operating band.

Efficient tuning current

Permanent-magnet bias supports efficient main-coil tuning across the specified frequency range.

Specified temperature performance

Specified for operation from 0 to +70 °C, with frequency drift limited to 18.2 MHz across the rated temperature range.

Integrated driver

An integrated driver assembly simplifies tuning and RF-subsystem integration.

REPRESENTATIVE CONFIGURATION

G-YTO-12-13-000 — 11.7 to 13.0 GHz Permanent-Magnet YTO

Published electrical and environmental specifications for the G-YTO-12-13-000 permanent-magnet YTO. The frequency tuning range describes the operating band for this configuration. Final performance, tuning behavior, and packaging options may vary by frequency and application.

FREQUENCY

Frequency tuning range	11.7 – 13.0 GHz
Frequency accuracy @ +25 °C	±10 MHz max
Frequency drift vs. temperature	18.2 MHz max
Nominal LSB frequency step (12-bit; 4,096 codes)	317.4 kHz/code
Settling time to within ±10 MHz	100 ms max
Pulling into 12 dB return loss	1 MHz max
Pushing	1 MHz/V max

RF PERFORMANCE

RF output power setting @ +25 °C	10 to 14 dBm
Power flatness vs. range & temp.	±1 dB max

FM TUNING

FM coil tuning voltage range	-10 to +10 V
Frequency deviation	-25 to +25 MHz
FM load impedance	1 kΩ min
FM tuning BW (3 dB)	2.0 MHz min

PHASE NOISE LIMITS (MAX)

Offset Δ1 kHz	-30 dBc/Hz
Offset Δ10 kHz	-87 dBc/Hz
Offset Δ100 kHz	-122 dBc/Hz
Offset Δ1 MHz	-140 dBc/Hz
Offset Δ10 MHz	-150 dBc/Hz

SPURIOUS & HARMONICS

RF output spurious	≤ -70 dBc
2nd harmonic	≤ -12 dBc
3rd harmonic	≤ -20 dBc

POWER & ENVIRONMENT

Current @ +15 V ±1 V	170 mA max
Current @ −15 V ±1 V	200 mA max
Current @ +5 V ±1 V	150 mA max
Operating temperature range	0 to +70 °C

Note: Catalog specifications; subject to change without notice. Final limits, screening, and acceptance criteria follow approved program documentation.

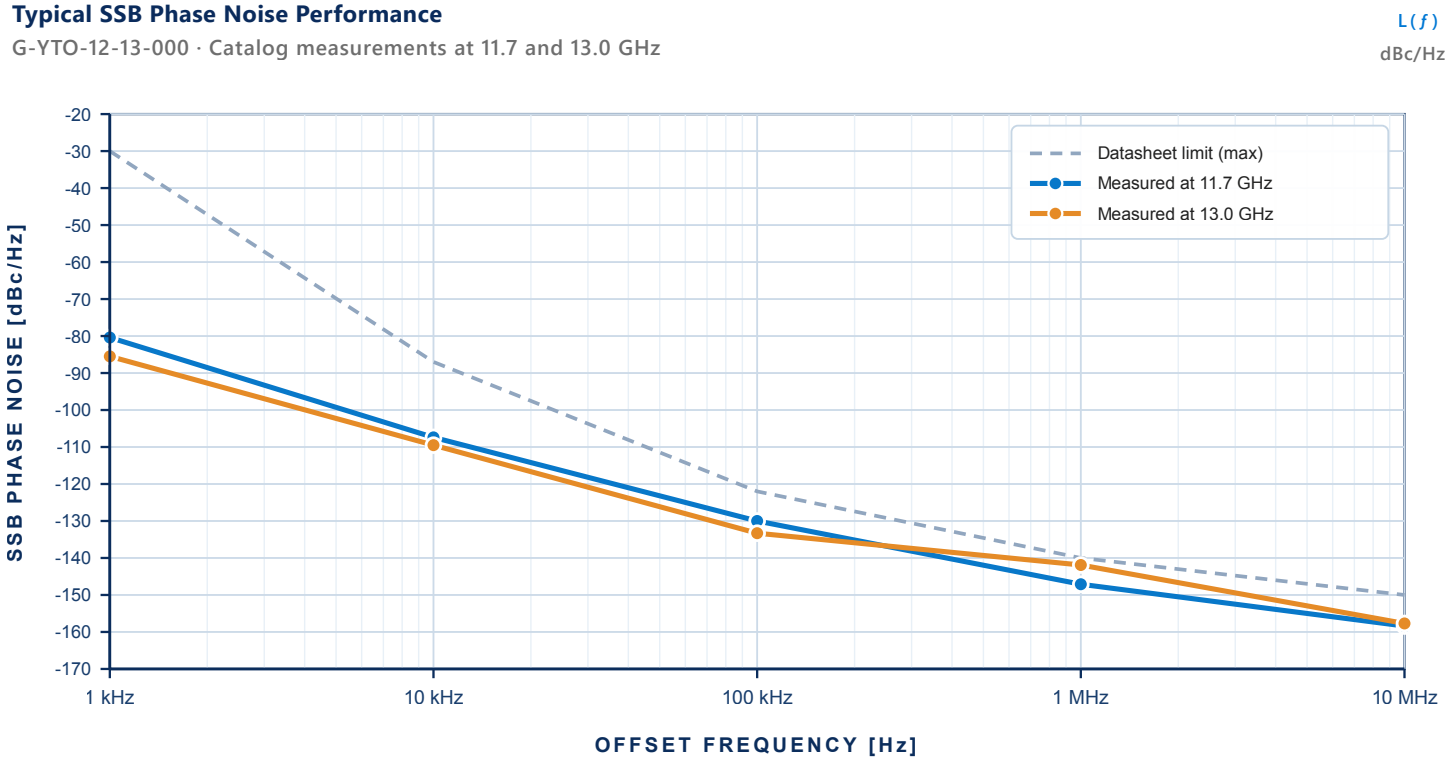
ARCHITECTURE FIT

YIG oscillator vs DRO vs synthesizer

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

Typical SSB Phase Noise Performance

G-YTO-12-13-000 · Catalog measurements at 11.7 and 13.0 GHz



APPLICATIONS

Where YTOs fit

Radar systems
Stable LO performance across operating modes supports coherent processing and continuous frequency tuning.

Electronic warfare
Wide, continuous tuning and low phase noise support tunable signal generation in dynamic RF environments.

SIGINT / ELINT
Low phase noise across wide tuning ranges helps preserve sensitivity in broadband signal-collection systems.

Test & measurement
Repeatable, tunable microwave signal generation supports component characterization, validation, and laboratory testing.

Local oscillator generation
Provides a tunable, low-phase-noise LO for mixers, receivers, and microwave subsystems.

Frequency conversion chains
Supports tunable up/downconversion across wide operating bands alongside Microsource converters and multipliers.

PACKAGING

Packaging & materials

DIMENSIONS	MOUNTING ASSEMBLY	YTO BODY	RF INTERFACE	DC INTERFACE	CONSTRUCTION
4.5 × 2.0 × 1.26 in. L × W × H	Aluminum alloy 6061 MIL-DTL-5541F conversion coating	Carpenter 49 MIL-DTL-45204 gold plating	SMA female G-YTO-12-13-000 configuration	26-pin, dual-row 2 mm pitch header	Non-hermetic Moisture gasketing available

Talk with **Microsource** about wideband, low-noise tunable oscillator solutions for demanding RF and microwave systems.

A GRESHAM WORLDWIDE COMPANY

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