

# YIG Filters and Oscillators

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Your single source for microwave electronics, Teledyne Microwave Solutions delivers the world's most advanced microwave technologies for demanding aerospace, military, commercial, and industrial applications.



# YIG Filters and Oscillators

## YIG Products from Teledyne Microwave Solutions (TMS)

Teledyne Microwave Solutions YIG Products (formerly Ferretec Products) has a long history of supplying YIG products and is known as the industry's Leading Supplier.

Teledyne Microwave Solution's YIG products supplies both closed-and open-loop YIG filters, YIG Oscillators, YIG-tuned harmonic generators, and YIG-based integrated receiver front-ends / tuners. Analog and digital drivers are available for all Ferretec YIG products. TMS's YIG products combine advanced technology and state-of-the-art performance with sophisticated manufacturing techniques to ensure consistently high quality.

TMS has extensive experience in the design, manufacture, and management of large military and commercial programs.

Engineering expertise in the integration of microwave components with analog and digital control circuits, combined with a highly productive manufacturing organization, has resulted in the selection of Ferretec Products by major defense systems companies, both domestically and internationally for high-volume production programs.

TMS products are organized to support government programs from the program management office through to the quality organization. QUALITY is not just a word or procedure, but rather the planned result of a Ferretec Products team committed to excellence and customer satisfaction. This results in commitment to our customers, at every level. From sales and engineering through manufacturing, quality is the responsibility of everyone within the Teledyne Microwave Solutions organization.

*The first product line from Ferretec Products was closed-loop YIG filters, trademarked FERRETRAC®. Customers include key U.S. defense contractors such as Lockheed-Sanders, ITT Avionics, Raytheon, General Dynamics, as well as international defense contractors and international-based companies. In 1984, Ferretec was awarded a contract by ITT Avionics to develop an integrated closed-loop receiver front-end for an update of the ALQ172 EW equipment on the B-52.*



# YIG Filters & Oscillators

## YIG Bandpass Filters at-a-Glance

- Multi-octave, wide dynamic range
- 2, 4, and 7-stage designs
- Dual channel 2+2 & 4+4 designs
- Standard and wide bandwidth models
- Temperature-compensated tuning
- Available with analog or digital input drivers
- MIL-SPEC & Commercial models

BANDPASS FILTERS							
Model No.	Tuning Range (GHz)	3dB BW (MHz, min.)	Insertion Loss (dB, max.)	Spur/Ripple (dB, max.)	ORI (dB, min)	ORS (dB, min)	
<b>2 Stage</b>	F1051	0.5 to 2.0	20	4.0	1.5	45	25
	F1053	6.0 to 18.0	25	3.0	1.5	50	30
	F1055	2.0 to 18.0	25	4.0	1.5	45	25
	F1056	8.0 to 26.5	40	4.0	2.0	40	30
	F1057	20.0 to 40.0	50	5.0	2.0	35	25
<b>4 Stage</b>	F1071	0.5 to 2.0	20	7.0	1.5	70	50
	F1073	6.0 to 18.0	25	4.5	1.5	80	50
	F1075	2.0 to 18.0	25	6.0	1.5	80	40
	F1076	8.0 to 26.5	40	6.0	2.0	60	40
	F1077	20.0 to 40.0	50	8.0	2.0	60	30
<b>6/7 Stage</b>	F2000	3.0 to 50.0	40	7.0 (3-6 GHz) 6.0 (6-50 GHz)	2.0	60	40
	F1080	0.5 to 2.0	25	7.0	1.0	80	60
	F1082	6.0 to 18.0	90	6.0	1.5	100	60
	F1084	2.0 to 18.0	50	7.0	2.0	100	50
	F1085	3.0 to 26.5	25	7.0	2.0	80	60
<b>4 Stage</b>	F1091	0.5 to 2.0	25	6.0	2.0	70	40
	F1093	2.0 to 6.0	70	5.0	2.0	70	40
	F1095	2.0 to 18.0	50	6.0	2.0	65	40
	F1096	8.0 to 26.5	80	7.0	2.0	70	40
	F1097	6.0 to 18.0	450	6.0	2.5	60	40
<b>7 Stage</b>	F1098	8.0 to 18.0	250	6.0	2.0	70	40
	F1099	8.0 to 18.0	500	6.0	2.5	60	40
	F1200	8.0 to 18.0	500	7.0	2.5	85	65
	F1201	6.0 to 18.0	500	8.0	2.5	85	65
	<b>2+2 (1)</b>	F3270C	2.0 to 18.0	30	4.0	2.0	45
<b>4+4 (1)</b>	F3271C	2.0 to 18.0	30	6.0	2.0	60	60

(1) All Specs per channel

## YIG Band-Reject Filters at-a-Glance

TMS's "Advanced Technology" band-reject filters (BRFs) break through conventional size, insertion loss, specification and reliability barriers. Our designs allows wideband notch filter tuning over the 4-18 GHz range in a single unit.

- Ability to meet deep and wide notch bandwidth specifications while maintaining narrow 3dB bandwidths
- Reduction in spurious (typically on the order of 2dB) and increase in selectivity, notch depth and bandwidth
- Excellent Linearity
- Reduced Package sizes

BAND REJECT FILTERS							
Model No.	Tuning Range (GHz)	-40dB Rejection BW (MHz, min)	3dB BW (MHz, max)	Insertion Loss (dB, max)	Passband VSWR (dB, min)	ORS (dB, max)	Passband Range (GHz)
<b>7 Stage</b>	F1016	0.5 to 1.0	5	140	1.75	2.0:1	4.0 DC to 1.0
	F1017	1.0 to 2.0	5	140	1.75	2.0:1	4.0 DC to 2.0
	F1300	0.5 to 2.0	3	150	1.5	2.0:1	4.0 DC to 2.0
<b>10 Stage</b>	F1323	8.0 to 18.0	35	150	1.5	2.0:1	4.0 DC to 18.0
	F1322	6.0 to 18.0	25	150	1.5	2.0:1	4.0 DC to 18.0
	F1321	4.0 to 18.0	10	150	1.5	2.0:1	4.0 DC to 18.0
<b>12 Stage</b>	F1310	2.0 to 6.0	15	125	1.5	2.0:1	4.0 DC to 6.0
	F1311	2.0 to 8.0	15	150	1.5	2.0:1	4.0 DC to 6.0
	F1312	2.0 to 12.0	10	150	1.5	2.0:1	4.0 DC to 12.0
<b>16 Stage</b>	F1333	8.0 to 18.0	50	150	1.75	2.0:1	4.0 DC to 18.0
	F1332	6.0 to 18.0	40	150	1.75	2.0:1	4.0 DC to 18.0
	F1331	4.0 to 18.0	25	150	1.75	2.0:1	4.0 DC to 18.0
<b>Advanced BRF Solutions</b>							
<b>Super Notch 16 Stage</b>	F1334	8.9 to 9.6	70 @ -70dB			2.0:1	4.0 DC to 12.0
<b>Integrated BRF/BPF</b>	F1400	5.0 to 10.0	20 @ -50dB	150	2.0	2.0:1	4.0 DC to 10.0
		5.0 to 10.0	N/A	20 (min)	5.0	N/A	-60dB N/A
<b>Dual 8 Stage BRF</b>	F1401	Single Channel	4.5 to 18.0	10	150	2.0	2.0:1 4.0 DC to 18.0
		Dual Channel	4.5 to 18.0	20	150	3.5	3.5:1 5.0 DC to 18.0

RF Parameters									
Model	Frequency Range, Notch (MHz)	Frequency Range, Passband (MHz)	Passband Insertion Loss (dB)	Passband Return Loss (dB)	Minimum 40dB Rejection Bandwidth (MHz)	Maximum 3dB Notch Bandwidth (MHz)	Maximum Notch Tracking Spur Amplitude (dB)	Temperature Drift, +0 to +70°C (MHz)	Input Power, Minimum (dBm)
F3750	125-500	110-575	≤1.5	≥10	4	75	3	5	0
F3751	250-1500	220-1600	≤1.5	≥10	4	110	3	5	+3
F3752	500-2000	400-3000	≤1.5	≥10	6	50	3	10	+5
F3753	500-2600	400-3000	≤1.5	≥10	6	70	3	10	+5
F3754	2000-6000	1800-18200	≤1.6	≥10	20	125	4	10	+10
F3755	2000-18000	1800-18200	≤1.6	≥10	12	125	4	20	+10



# YIG Filters & Oscillators

## YIG Oscillators at-a-Glance

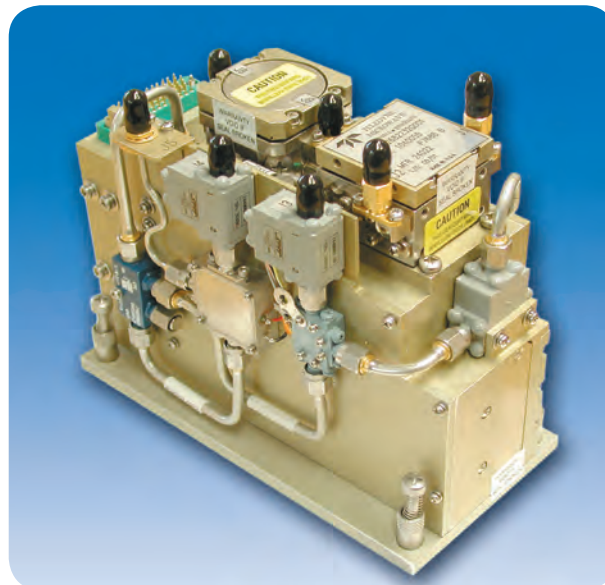
- Flat power output over temperature
- Multi-octave tuning
- Temperature-compensated tuning
- Excellent Linearity
- Internal amplifier stages provide high output power for test applications
- Reduced package sizes (surface mount, 1" & 1.25")
- Analog or digital drivers

YIG OSCILLATORS								
Model No.	Tuning Range (GHz)	Power Output (dBm min)	Variation (dB max)	Harmonics (dBc max)	Temp Drift (MHz max)	Tuning Linearity (% max)	Hysteresis (MHz max)	Phase Noise at 100KHz (dBc/Hz)
<b>Commercial YIG Tuned Oscillators</b>								
FS1062	2.0 to 8.0	14	±2.5	-12	15	±0.15	8	-120
FS1064	2.0 to 4.0	14	±2.0	-12	15	±0.1	2	-120
FS1066	4.0 to 8.0	14	±2.0	-12	20	±0.1	4	-120
FS1068	2.0 to 6.0	13	±2.0	-12	15	±0.1	2	-125
FS2637	8.0 to 18.0	13	±3.0	-12	30	±0.15	12	-125
FS2692	6.0 to 13.0	13	±2.5	-12	30	±0.25	10	-125
FS2678	12.0 to 20.0	10	±4.0	-12	30	±0.15	12	-125
FS2722	2.0 to 18.0	13	±3.5	-10	30	±0.15	15	-123
FS2788	2.0 to 20.0	8	±4.0	-8	30	±0.15	20	-110
<b>1" Cube Series or 0.5" PCB Mount</b>								
FS1022	2.0 to 8.0	14	±2.0	-12	20	±0.1	8	-120
FS1043	2.0 to 6.0	14	±2.0	-12	15	±0.08	6	-120
FS2950	3.0 to 6.0	13	±2.0	-12	10	±0.1	3	-125
FS3013	3.0 to 7.0	13	±2.0	-12	10	±0.1	3	-125
<b>1.25" Cube Series</b>								
FS2705	2.0 to 6.0	12	±2.0	-12	15	±0.15	8	Consult Factory
FS2706	2.0 to 8.0	12	±2.5	-12	15	±0.15	8	
FS2707	2.0 to 10.0	12	±2.5	-12	15	±0.15	8	
FS1036	5.0 to 18.0	10	±4.0	-10	20	±0.075	12	
FS1034	6.0 to 18.0	13	±3.0	-12	30	±0.075	12	
FS1035	8.0 to 18.0	13	±3.5	-12	20	±0.075	10	
<b>2" Cylindrical Series</b>								
FS1001	2.0 to 10.0	15	±2.0	-12	15	±0.15	8	Consult Factory
FS1012	6.0 to 18.0	16	±2.5	-12	20	±0.075	12	
FS1014	4.0 to 18.0	12	±2.5	-12	30	±0.075	14	



## YIG Sub-Systems at-a-Glance

Teledyne Microwave capitalizes on its expertise in microwave switch, attenuator, amplifier and oscillator technologies to provide high performance subassemblies and super-components. Partnering closely with our customers, we continually develop various integrated subsystems from low level module designs such as digital attenuators and switch assemblies to highly integrated subsystems found in many custom applications.



# YIG Filters & Oscillators



## TINYIG Oscillators

The smallest available oscillator in the industry, Teledyne Microwave Solution's TINYIG is an ultra-low phase noise YIG-tuned oscillator (YTO) that provides superior phase noise frequency up to 20 GHz.

Uniquely designed to be RoHS compliant, these YIG TO-8 oscillators exploit the principle of magnetic resonance to generate a clean, low phase noise microwave signal over broad tuning ranges. It can greatly simplify system designs, thus reducing costs, eliminating the need for extra components, and reducing the risk of malfunctions of complicated electronic connections and operations.

## TINYIG Oscillators at-a-Glance

- Smallest oscillator available in the RF and microwave industry
- Up to 20 GHz: 3 to 8, 8 to 16, and 10 to 20 GHz (other custom bands upon request)
- Permanent Magnet (PM)
- Surface Mount or PCB
- RoHS Compliant
- Provides designers broader frequency tuning coverage to replace multiple VCOs

TINYig OSCILLATORS

	FS2830R	FS2800R	FS2772R	FS2899R	FS2897R	FS2898R	FS2900R	FS3005R
<b>TUNING RANGE (GHz)</b>	<b>3.0-6.0</b>	<b>3.0-8.0</b>	<b>4.0-8.0</b>	<b>5.0-10.0</b>	<b>7.0-11.0</b>	<b>6.0-13.0</b>	<b>8.0-16.0</b>	<b>10.0-20.5</b>
Power Output (dBm)	+6	+6	+6	+6	+5	+4	+3	+3
Power Output Variation, max (dB)	+5	+6	+4	+4	+7	+7	+7	+7
Harmonics (dBc, max)	-12	-12	-12	-12	-12	-12	-12	-12
Non-Harmonic Spurious (dBc, max)	-70	-70	-70	-70	-70	-70	-70	-70
<b>PHASE NOISE dBc/Hz</b>								
@100KHz offset min.	-125	-125	-125	-125	-125	-125	-123	-118
@100KHz offset typ.	-128	-128	-130	-128	-128	-128	-125	-121
@10KHz offset min.	-100	-100	-100	-100	-100	-100	-98	-93
Temperature Drift (MHz, max) (0 to 60°C)	±45	±45	±45	±50	±50	±50	±60	±60
Tuning Linearity (MHz, max)	±2	±2	±2	±10	±20	±20	±45	±35
Hysteresis (MHz, max)	15	15	15	15	25	25	60	60
Frequency Pushing (MHz/V, max)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Frequency Pulling (1.5:1 VSWR, max)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
<b>TUNING COIL</b>								
Sensitivity (MHz/mA) ±10%	8	8	8	8	9	12	12	11
Resistance (ohms, max)	7	7	7	7	6	7	10	11
Inductance (mH, max)	10	10	10	10	9	10	25	30
<b>OPTIONAL FM COIL</b>								
Sensitivity (KHz/mA, typ)	300	300	300	300	300	350	300	350
3 dB Bandwidth (KHz, typ)	400	400	400	400	400	400	400	400
Resistance (ohms, typ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Inductance (uH, typ)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>BIAS CURRENT</b>								
+5 or 8 Volts (mA, max)	70	70	70	70	70	70	70	70
-5 Volts (mA, max)	20	20	20	20	N/A	N/A	N/A	N/A
<b>OUTLINE</b>								
PCB	1305981	1305981	1305981	1305981	IN-051697	IN-051698	IN-051699	IN-051699
Surface Mount	IN-050088	IN-050088	IN-050088	IN-050088	IN-051696	IN-051544	IN-051684	IN-051684

Available in PCB or Surface Mount, FSXXXXR-PCB or FSXXXXR-SMT.

FM Coil Modulation BW available up to 2MHz.

Other Frequency bands available upon request.





# TELEDYNE MICROWAVE SOLUTIONS

Everywhere you look™

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