RF COMMUNICATIONS

Product Selector Guide

maxim integrated™

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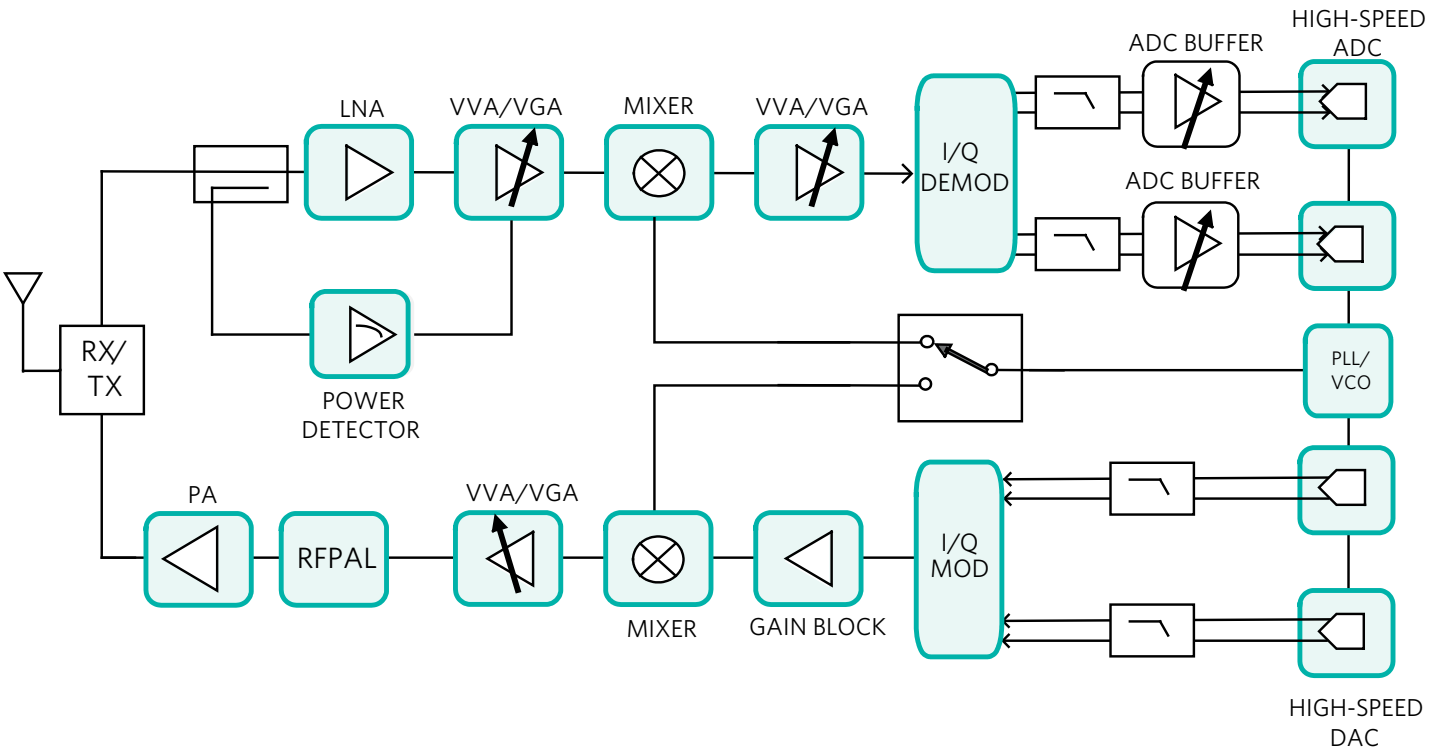
Introduction

Highly integrated wireless and radio frequency (RF) ICs are the connecting building blocks for the enhanced IoT, smart technology, and communication markets. Connected devices are becoming the focus of modern life and our high-performance solutions support critical wireless, mobile, automotive, and cable designs. Our broad portfolio addresses these markets with high-performance building block ICs, including power amplifiers, RF transceivers, RF receivers, RF transmitters, low-noise amplifiers (LNAs), and an extensive range of RF mixers.

The RF Signal Chain



Broadband Gain Blocks

We offer high-performance broadband gain blocks designed for use as a PA predriver, low-noise amplifier, or as a cascadeable 50Ω amplifier with up to +19.5dBm output power. With a wide operating frequency range from 40MHz to 4000MHz, these devices are suited for many applications including cellular infrastructure, microwave radios, and CATV or cable modems.

Key Features

- Low Noise Figure (< 3dB)
- Exceptional Gain Flatness (< 0.5dB)
- High OIP3
- Pin-Compatible Product Family
- High ESD > 2kV

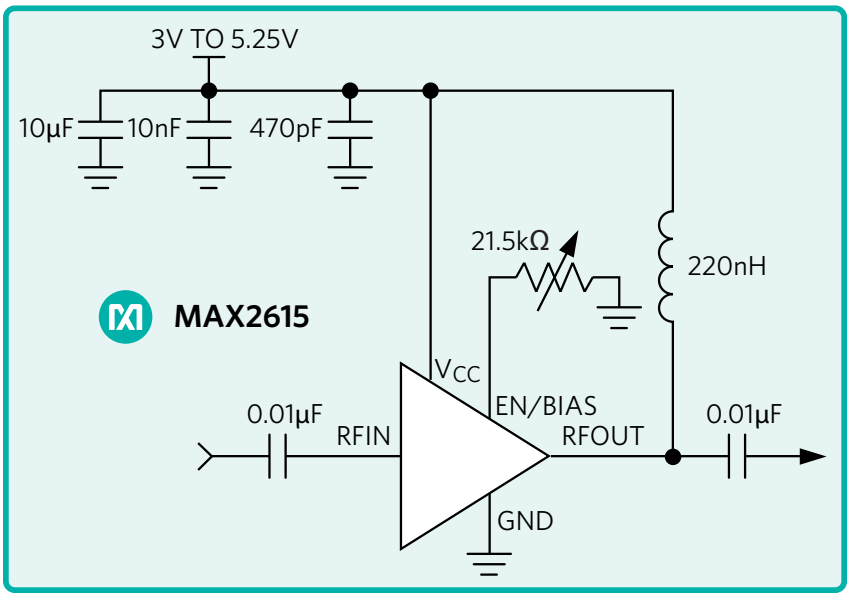


Table 1. Broadband Gain Blocks

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Noise Figure (dB)	Gain (dB)	Input IP3 (dBm)	Output IP3 (dBm)	Voltage (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/Pins
MAX2612	Flat-Frequency Response < 0.5dB Broadband Amplifier	40	4000	2.1	18.3	16.9	35.2	3 to 5.25	69	2.0 x 3.0	TDFN/8
MAX2613	Low-Noise Figure, Flat-Frequency Response < 0.5dB Broadband Amplifier	40	4000	2	18.6	12.6	31.2	3 to 5.25	51.2	2.0 x 3.0	TDFN/8
MAX2614	Low-Noise Figure, Flat-Frequency Response < 0.5dB Broadband Amplifier	40	4000	2	18.6	11.1	29.7	3 to 5.25	40.6	2.0 x 3.0	TDFN/8
MAX2615	Large OIP3, Flat-Frequency Response < 0.5dB Broadband Amplifier with Adjustable Bias	40	4000	2.2	18.5	19.1	37.6	3 to 5.25	81.5	2.0 x 3.0	TDFN/8
MAX2616	Large OIP3, Flat-Frequency Response <0.5dB Broadband Amplifier	40	4000	2.2	18.4	18.8	37.2	3 to 5.25	80.6	2.0 x 3.0	TDFN/8

See the parametric search for Broadband Gain Blocks

Low-Noise Amplifiers

As a leader in low-noise amplifiers (LNAs) for global navigation satellite systems (GNSS) or global positioning systems (GPS), our broad selection of LNAs offers best-in-class noise figure and gain and covers all GNSS bands and constellations.

Key Features

- Ultra-Low Noise Figure
- Broad Selection Covers All GNSS Constellations
- Smallest Packages and Fit Function
- Low External BOM
- Options with LDOs
- Best Linearity/mA

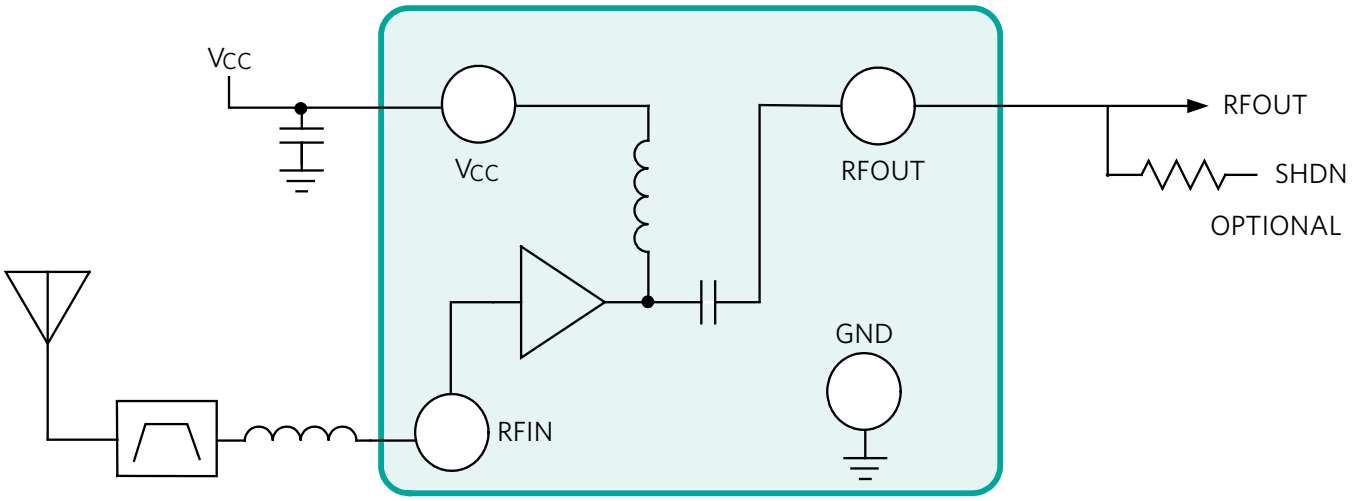


Table 2. Single GNSS Low-Noise Amplifiers

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Noise Figure (dB)	Gain (dB)	Output IP3 (dBm)	Voltage (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2655	LNA with Adjustable-IP3 and Shutdown for GPS Applications	1400	1700	1.45	14.1	16.9	2.7 to 5.5	5.9 to 10.1	2.0 x 2.1	SC70/6
MAX2657	Low-Noise Amplifier for GPS and GLONASS	1563	1620	0.8	19.5	16	1.6 to 3.3	4.1	0.86 x 1.26	WLP/6
MAX2658	Low-Noise Amplifier for GPS and GLONASS	1563	1620	0.8	17.7	22.2	1.6 to 3.3	7.7	0.86 x 1.26	WLP/6
MAX2659	Low-Noise Amplifier for GPS and GNSS	1450	1750	0.8	20.5	15.5	1.6 to 3.6	4.1	1.0 x 1.5	µDFN/6**
MAX2667	GPS/GNSS Ultra-Low-Noise-Figure Low-Noise Amplifier	1575	1610	0.65	19.5	16	1.6 to 3.3	4.1	0.86 x 1.26	WLP/6
MAX2674	GPS/GNSS LNA with Antenna Switch and Bias	1575	1575	0.75	18	16	1.6 to 3.6	4.5	0.86 x 1.26	WLP/6*
MAX2676	GPS/GNSS LNA with Antenna Switch and Bias	1575	1575	0.75	15	20	1.6 to 3.6	4.5	0.86 x 1.26	WLP/6*
MAX2679	GPS/GNSS Ultra-Low Current Low-Noise Amplifier	1575	1575	0.95	19		1.08 to 1.98	1	0.83 x 0.83	WLP/4
MAX2679B	GPS/GNSS Ultra-Low Current Low-Noise Amplifier	1575	1575	1.03	16.5		1.08 to 1.98	0.6	0.83 x 0.83	WLP/4
MAX2686	GPS/GNSS Low-Noise Amplifier	1575	1610	0.75	19	16	1.6 to 3.3	4.1	0.86 x 0.86	WLP/4
MAX2686L	GPS/GNSS Low-Noise Amplifier with Integrated LDO	1575	1610	0.88	19	15	1.6 to 4.2	5	0.86 x 0.86	WLP/4
MAX2688	GPS/GNSS Low-Noise Amplifier	1575	1610	0.8	15.4	19.4	1.6 to 3.3	4.1	0.86 x 0.86	WLP/4
MAX2691	L2 Band GPS Low-Noise Amplifier	1150	1300	0.93	17.5	14.5	1.6 to 3.6	4.3	0.86 x 0.86	WLP/4
MAX2693L	GPS/GNSS Low-Noise Amplifier with Integrated LDO	1575	1610	1.05	18.4	4.1	1.6 to 4.2	1.8	0.86 x 0.86	WLP/4
MAX2694	High Linearity GPS/GNSS Low-Noise Amplifier	1575	1610	0.97	11.6	18.45	1.6 to 3.6	4.5	0.86 x 0.86	WLP/4

*Antenna Bias, Antenna Switch
**Automotive – AECQ 100-qualified

See the parametric search for Low-Noise Amplifiers

Table 3. Dual GNSS Low-Noise Amplifiers

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	AMP1 Noise Figure (dB)	AMP1 Gain (dB)	AMP1 Output IP3 (dBm)	AMP2 Noise Figure (dB)	AMP2 Gain (dB)	AMP2 Output IP3 (dBm)	Voltage (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2670	GPS/GNSS Dual LNA, +34dB Gain, Automotive Qualified	1575	1575	1	17.8	5.8	2	17	16	3 to 5.5	25	3.0 x 3.0	TQFN (Dual)/10
MAX2678	GPS/GNSS Front-End Amplifier	1575	1575	0.9	17	5	1.8	18	20	3 to 5.25	25	3.0 x 3.0	TDFN/10
MAX12000	Integration of Two Low-Noise GPS Amplifiers into a Smaller Package	1575	1575	1	17.8	5.8	2	17	16	3 to 5.5	25	3.0 x 3.0	TQFN (Dual)/10

Table 4. Other Low-Noise Amplifiers

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Noise Figure (dB)	Gain (dB)	Output IP3 (dBm)	Voltage (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/Pins
MAX2180A	AM/FM Car Antenna Low-Noise Amplifier	0.148	162.5	2.75	6		6 to 24	75	4.0 x 4.0	TQFN/24*
MAX2181A	FM Automotive Low-Noise Amplifier	76	162.5	2.7	8.5		4.75 to 5.25	56	3.0 x 3.0	TQFN/16*
MAX2181	FM Automotive Low-Noise Amplifier	76	162.5	2.75	6		8 to 15	56	3.0 x 3.0	TQFN/16*
MAX2371	100MHz to 1GHz LNA with 20dB Step Attenuator, 45dB VGA, and Shutdown	100	1000	1.8	15	13.5	2.65 to 3.3	2.5 to 3.5	3.0 x 3.0	QFN/12, TQFN/12
MAX2373	100MHz to 1GHz LNA with 20dB Step Attenuator, 45dB VGA, and Shutdown	100	1000	1.8	15	14.5	2.65 to 3.3	2.5 to 3.5	3.0 x 3.0	QFN/12, TQFN/12
MAX2611	DC-to-Microwave, General Purpose Amplifier	0	1100	3.5	18.5	13	5	16	2.2 x 2.8	SOT143/4, SOT23/4, SOT/4,
MAX2630	VHF-to-Microwave, 3V, General-Purpose Amplifier with Internal Bias	100	1000	3.8	13.4	-1	2.7 to 5.5	6.6	2.2 x 2.8	SOT143/4, SOT23/4, SOT/4
MAX2632	VHF-to-Microwave, 3V, General-Purpose Amplifier with Adjustable Bias	100	1000	3.8	13.4	-1	2.7 to 5.5	6.6	2.7 x 2.9	SOT23/5, SOT/5
MAX2633	VHF-to-Microwave, 3V, General-Purpose Amplifier with Adjustable Bias and Shutdown	100	1000	3.8	13.4	-1	2.7 to 5.5	6.6	2.7 x 2.9	SOT23/6, SOT/6
MAX2634	315MHz/433MHz Low-Noise Amplifier for Automotive RKE	100	1000	1.25	15.5	-0.5	2.2 to 5.5	2.5	2.0 x 2.2	SOT143/4,
MAX2640	SiGe LNA for Applications in the 400MHz to 1500MHz Range	400	1500	0.9	15.1	5.1	2.7 to 5.5	3.5	2.7 x 2.9	SOT23/6, SOT/6

Table 4. Other Low-Noise Amplifiers (Continued)

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Noise Figure (dB)	Gain (dB)	Output IP3 (dBm)	Voltage (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/Pins
MAX2641	SiGe LNA for Applications in the 1400MHz to 2500MHz Range	1400	2500	1.3	14.4	10.4	2.7 to 5.5	3.5	2.7 x 2.9	SOT23/6, SOT/6
MAX2642	SiGe, High IP3, LNA with Gain-Step, Adjustable IP3 and On-Chip Output Matching	800	1000	1.35	16.7	16.7	2.7 to 5.5	5.3	2.0 x 2.1	SC70/6
MAX2643	SiGe, High IP3, LNA with Shutdown, Adjustable IP3, and On-Chip Output Matching	800	1000	1.35	16.7	16.7	2.7 to 5.5	5.1	2.0 x 2.1	SC70/6
MAX2644	2.4GHz SiGe, High IP3 Low-Noise Amplifier with Adjustable IP3 and On-Chip Output Matching	2400	2500	2	17	14	2.7 to 5.5	2.7 to 7.0	2.0 x 2.1	SC70/6
MAX2645	3.5GHz SiGe, Low-Noise Amplifier with Gain-Step and Adjustable IP3	3400	3800	2.3	14.4	25	3 to 5.5	2.7 to 9.2	3.0 x 4.9	µMAX®-EP/10, µMAX/10
MAX2650	5V, 1GHz General-Purpose Amplifier	0	1000	3.6	19	10	4.5 to 5.5	18	2.2 x 2.8	SOT143/4, SOT23/4, SOT/4
MAX2685	Low-Cost 900MHz LNA and Downconversion Mixer	800	1000	1.4	15		2.7 to 5.5	0.1µA	6.0 x 4.9	QSOP/16
MAX2692	High-Gain WLAN Low-Noise Amplifier; 802.11a, 802.11b	2200	2900	1.1	18.2	15.2	1.6 to 3.6	4	0.86 x 0.86	WLP/4
MAX2695	WiMAX® Low-Noise Amplifier	2700	4500	1.2	15.6	12.6	1.6 to 3.6	4	0.86 x 0.86	WLP/4

* Automotive - AECQ100-qualified.

Variable Gain Amplifiers/Voltage Variable Attenuators

Our variable gain amplifiers (VGAs) and voltage variable attenuators (VVAs) ensure excellent control of the RF signal amplitude and dynamic range. With unmatched integration and features, they are used in the most demanding wireless applications.

Table 5. Variable Gain Amplifiers/Variable Voltage Attenuators

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Gain Control	Channels	Analog Attenuation Range	Digital Attenuation Range (dB)	Digital Attenuator Step Size (dB)	Gain (max) (dB)	Noise Figure (dB)	IIP3 (dBm)	OIP3 (dBm)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2027	50MHz to 400MHz Digitally Controlled Variable-Gain Amplifier	50	400	Digital	1		23	1	15.5	4.7		34.7	4.75 to 5.25	60	6.4 x 6.5	TSSOP-EP/20, TSSOP/20
MAX2055	30MHz to 300MHz Digitally Controlled Variable-Gain Differential ADC Driver/ Amplifier	30	300	Digital	1		23	1	20	5.8		40	4.75 to 5.25	240	6.4 x 6.5	TSSOP/20
MAX2056	800MHz to 1000MHz Variable-Gain Amplifier with Analog Gain Control	800	1000	Analog	1	44			15.5	4.5		39	4.75 to 5.25	136	6.0 x 6.0	TQFN/36
MAX2057	1700MHz to 2500MHz Variable-Gain Amplifier with Analog Gain Control	1300	2700	Analog	1	42			15.5	6		37	4.75 to 5.25	180	6.0 x 6.0	TQFN/36
MAX2058	700MHz to 1200MHz High-Linearity, SPI-Controlled DVGA with Integrated Loopback Mixer	700	1200	Digital	1		62	1	10.5	6.8		32.3	4.75 to 5.25	158	6.0 x 6.0	TQFN/40
MAX2059	1700MHz to 2200MHz High-Linearity, SPI-Controlled DVGA with Integrated Loopback Mixer	1700	2200	Digital	1		56	1	10.9	8.1		31.8	4.75 to 5.25	217	6.0 x 6.0	TQFN/40

Table 5. Variable Gain Amplifiers/Variable Voltage Attenuators (Continued)

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Gain Control	Channels	Analog Attenuation Range	Digital Attenuation Range (dB)	Digital Attenuator Step Size (dB)	Gain (max) (dB)	Noise Figure (dB)	IIP3 (dBm)	OIP3 (dBm)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2064	50MHz to 1000MHz, High-Linearity, Serial/Analog-Controlled VGA	50	1000	Analog	1	32.9			22	4.4		41	4.75 to 5.25	143	7.0 x 7.0	TQFN/48
MAX2065	50MHz to 1000MHz High-Linearity, Serial/Parallel-Controlled Analog/Digital VGA	50	1000	Analog + Digital	1	31	31	1	19.4	6.5		42	3.135 to 5.25	124	6.0 x 6.0	TQFN/40
MAX2066	50MHz to 1000MHz High-Linearity, Serial/Parallel-Controlled Digital VGA	50	1000	Digital	1		31	1	20.5	5.2		42.4	3.135 to 5.25	121	6.0 x 6.0	TQFN/40
MAX2067	50MHz to 1000MHz High-Linearity, Serial/Analog-Controlled VGA	50	1000	Analog	1		31		21.9	4		43	3.135 to 5.25	123	6.0 x 6.0	TQFN/40
MAX2090	50MHz to 1000MHz Analog VGA with Threshold Alarm Circuit and Error Amplifier for Level Control	50	1000	Analog	1	37			25.5	4		38	4.75 to 5.8	85	5.0 x 5.0	TQFN/20
MAX2091	50MHz to 500MHz Analog VGA, 1735MHz to 1935MHz Upconverting Mixer with Image Filtering, Threshold Alarm Circuit and Error Amplifier for Level Control	50	500	Analog	1	37			23	5.4		24.5	4.75 to 5.8	254	5.0 x 5.0	TQFN/20

Table 5. Variable Gain Amplifiers/Variable Voltage Attenuators (Continued)

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Gain Control	Channels	Analog Attenuation Range	Digital Attenuation Range (dB)	Digital Attenuator Step Size (dB)	Gain (max) (dB)	Noise Figure (dB)	IIP3 (dBm)	OIP3 (dBm)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2092	700MHz to 2700MHz Analog VGA with Threshold Alarm Circuit and Error Amplifier for Level Control	700	2700	Analog	1	40.4			18.1	5.2		32.5	4.75 to 5.8	93	5.0 x 5.0	TQFN/20
MAX19790	250MHz to 4000MHz Dual, Analog Voltage Variable Attenuator	250	4000	Analog	1, 2	44.7			-4.4	4.4		31.9	4.75 to 5.25	7.3	6.0 x 6.0	TQFN/36
MAX19791	50MHz to 4000MHz Dual Analog Voltage Variable Attenuator with On-Chip 10-Bit SPI-Controlled DAC	50	4000	Analog + Digital	1, 2	46	46		-3.9		37.4		3.15 to 3.45 ,4.75 to 5.25	13	6.0 x 6.0	TQFN/36
MAX19792	500MHz to 4000MHz Dual Analog Voltage Variable Attenuator with On-Chip 10-Bit SPI-Controlled DAC	500	4000	Analog + Digital	1, 2	46.4	46.4		-5.2		37.9		3.15 to 3.45 ,4.75 to 5.25	13	6.0 x 6.0	TQFN/36
MAX19793	1500MHz to 6000MHz Dual Analog Voltage Variable Attenuator with On-Chip 10-Bit SPI-Controlled DAC	1500	6000	Analog + Digital	1, 2	46.6	46.6		-7.6		37		3.15 to 3.45, 4.75 to 5.25	13	6.0 x 6.0	TQFN/36
MAX19794	10MHz to 500MHz Dual Analog Voltage Variable Attenuator with On-Chip 10-Bit SPI-Controlled DAC	10	500	Analog + Digital	1, 2	44.7	44.7		-3		34.4		3.15 to 3.45, 4.75 to 5.25	13	6.0 x 6.0	TQFN/36

See the parametric search for Variable Gain Amplifiers/Variable Voltage Attenuators

High-Performance Broadband Mixers

Our broad portfolio of RF mixers offers the lowest noise and highest linearity performance, featuring superior IIP3, noise figure, and spurious suppression.

Key Features

- Exceptional Linearity Increases the Receiver's Immunity to Strong Blockers
- Low Noise Figure Enhances Receiver Sensitivity
- Covers Multiple Frequency Protocols (400MHz to 4GHz) with Flexible Configurations, to Support a Wide Range of Applications
- Exceptional Input IP3 Performance Versus Current Consumption Ratio
- Lower Cost Than Competitive Solutions

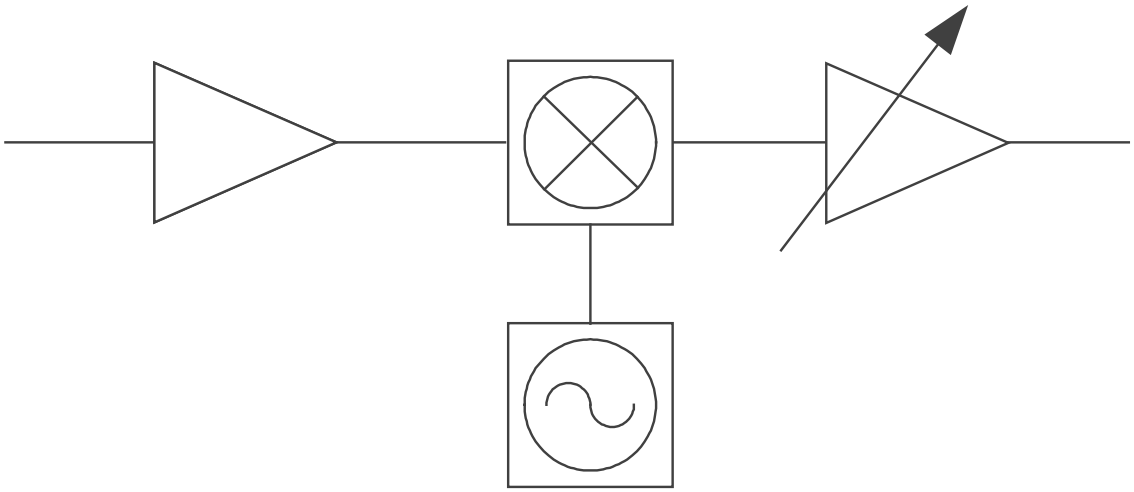


Table 6. Upconverting/Downconverting Mixers

Part No.	Description	Channels	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Freq. (min) (MHz)	LO Freq. (max) (MHz)	IF Freq. (min) (MHz)	IF Freq. (max) (MHz)	Gain (dB)	Input IP3 (dBm)	LO Leakage at RF (dBm)	3.3V Supply Current (mA)	5V Supply Current (mA)	Footprint (mm x mm)	Package/ Pins
MAX2029	High-Linearity, 815MHz to 1000MHz Upconversion/ Downconversion Mixer with LO Buffer/Switch	1	815	1000	570	900	0	250	-6	39	-23		85	5.0 x 5.0	TQFN/20
MAX2031	High-Linearity, 815MHz to 1000MHz Upconversion/Downconversion Mixer with LO Buffer/ Switch	1	815	1000	650	1250	0	250	-7.4	36	-25.5		85	5.0 x 5.0	TQFN/20
MAX2032	High-Linearity, 650MHz to 1000MHz Upconversion/Downconversion Mixer with LO Buffer/ Switch	1	650	1000	650	1250	0	250	-7.4	31	-25.5		85	5.0 x 5.0	TQFN/20
MAX2039	High-Linearity, 1700MHz to 2200MHz Upconversion/Downconversion Mixer with LO Buffer/Switch	1	1500, 1700	2000, 2200	1500	2000	0	350	-7.5	33.5	-18		104	5.0 x 5.0	TQFN/20
MAX2041	High-Linearity, 1700MHz to 3000MHz Upconversion/Downconversion Mixer with LO Buffer/Switch	1	1700	3000	1900	3000	0	350	-7.3	33.5	-17.5		104	5.0 x 5.0	TQFN/20
MAX2042A	SiGe, High-Linearity, 1600MHz to 3900MHz Upconversion/ Downconversion Mixer with LO Buffer	1	1600	3900	1300	4000	50	500	-7.3	32	-29	122	140	5.0 x 5.0	TQFN/20
MAX2044	SiGe, High-Linearity, 2300MHz to 4000MHz Upconversion/ Downconversion Mixer with LO Buffer	1	2300	4000	2600	4300	50	500	-7.7	33.5	-28.5	121	138	5.0 x 5.0	TQFN/20
MAX2051	SiGe, High-Linearity, 850MHz to 1550MHz Up/Downconversion Mixer with LO Buffer	1	850	1550	1200	2250	50	1000	-7.5	33.4	-35.7		105	5.0 x 5.0	TQFN/20
MAX2410	Low-Cost RF Up/Downconverter with LNA and PA Driver	1	800	2400	800	2400	350	700	16.2	3.3	-52	20 (RX Mode) 30 (TX Mode)	22 (RX Mode) 34 (TX Mode)	6.0 x 9.9	QSOP/28
MAX2411A	1.9GHz LNA, Downconverter, Upconverter, Driver and LO Buffer with Shutdown	1	800	2400	800	2400	350	700	15	10	-49	20 (RX Mode) 30 (TX Mode)	22 (RX Mode) 34 (TX Mode)	6.0 x 9.9	QSOP/28

Table 7. Upconverting Mixers

Part No.	Description	Channels	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Freq. (min) (MHz)	LO Freq. (max) (MHz)	IF Freq. (min) (MHz)	IF Freq. (max) (MHz)	Gain (dB)	Input IP3 (dBm)	LO Leakage at RF (dBm)	3.3V Supply Current (mA)	5V Supply Current (mA)	Footprint (mm x mm)	Package/ Pins
MAX2660	400MHz to 2.5GHz Upconverter Mixer with Single-Ended IF	1	400	2500	600	2500	40	500	7	-1.1	-22	4.8	4.8	2.7 x 2.9	SOT23/6, SOT/6
MAX2661	400MHz to 2.5GHz Upconverter Mixer with Single-Ended IF	1	400	2500	600	2500	40	500	10.7	-3.6	-22.9	8.3	8.3	2.7 x 2.9	SOT23/6, SOT/6
MAX2663	400MHz to 2.5GHz Upconverter Mixer with Single-Ended IF	1	400	2500	600	2500	40	500	3.4	-2.7	-22.7	3	3	2.7 x 2.9	SOT23/6, SOT/6
MAX2671	400MHz to 2.5GHz Upconverter Mixer with LO-Buffer and Single-Ended IF	1	400	2500	600	2500	40	500	11.2	-1.6	-40.3	11.8	11.8	2.7 x 2.9	SOT23/6, SOT/6
MAX2673	400MHz to 2.5GHz Upconverter Mixer with LO-Buffer and Differential IF	1	400	2500	600	2500	40	500	12.3	-4.7	-29.4	20.5	20.5	3.0 x 4.9	µMAX/8

See the parametric search for Upconverting Mixers

Table 8. Downconverting Mixers

Part No.	Description	Channels	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Freq. (min) (MHz)	LO Freq. (max) (MHz)	IF Freq. (min) (MHz)	IF Freq. (max) (MHz)	Gain (dB)	Input IP3 (dBm)	Noise Figure (dB)	3.3V Supply Current (mA)	5V Supply Current (mA)	Footprint (mm x mm)	Package/ Pins
MAX2680	SiGe Downconverter Mixer with Shutdown	1	400	2500	400	2500	10	500	11.6	-12.9	6.3	5		2.7 x 2.9	SOT23/6, SOT/6
MAX2681	SiGe Downconverter Mixer with Shutdown	1	400	2500	400	2500	10	500	14.2	-6.1	7	8.7		2.7 x 2.9	SOT23/6, SOT/6
MAX2682	SiGe Downconverter Mixer with Shutdown	1	400	2500	400	2500	10	500	14.7	-1.8	6.5	15		2.7 x 2.9	SOT23/6, SOT/6
MAX2690	Low-Noise, 2.5GHz Downconverter Mixer	1	400	2500	700	2500	10	500	7.9	7.6	10	16		3.0 x 5.0	µMAX/10, µMAX/8,
MAX9984	SiGe High-Linearity, 400MHz to 1000MHz Downconversion Mixer with LO Buffer/Switch	1	400	1000	325	850	50	250	8.1	25	9.3		222	5.0 x 5.0	TQFN/20
MAX9985	Dual, SiGe, High-Linearity, 700MHz to 1000MHz Downconversion Mixer with LO Buffer/Switch	2	700	1000	570	865	50	250	6	28.5	10.5		400	6.0 x 6.0	TQFN/36
MAX9986	SiGe High-Linearity, 815MHz to 995MHz Downconversion Mixer with LO Buffer/Switch	1	815	995	960	1180	50	250	10	23.6	9.3		222	5.0 x 5.0	TQFN/20
MAX9986A	SiGe High-Linearity, 815MHz to 1000MHz Downconversion Mixer with LO Buffer/Switch	1	815	1000	960	1180	50	250	8.2	25	10		213	5.0 x 5.0	TQFN/20
MAX9993	High-Linearity 1700MHz to 2200MHz Downconversion Mixer with LO Buffer/Switch	1	1700	2200	1400	2000	40	350	8.5	23.5	9.5		202	5.0 x 5.0	TQFN/20

Table 8. Downconverting Mixers (Continued)

Part No.	Description	Channels	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Freq. (min) (MHz)	LO Freq. (max) (MHz)	IF Freq. (min) (MHz)	IF Freq. (max) (MHz)	Gain (dB)	Input IP3 (dBm)	Noise Figure (dB)	3.3V Supply Current (mA)	5V Supply Current (mA)	Footprint (mm x mm)	Package/ Pins
MAX9994	SiGe High-Linearity, 1700MHz to 2200MHz Downconversion Mixer with LO Buffer/Switch	1	1400	2200	1400	2000	40	350	8.3	26.2	9.7		206	5.0 x 5.0	TQFN/20
MAX9995	Dual, SiGe, High-Linearity, 1700MHz to 2200MHz Downconversion Mixer with LO Buffer/Switch	2	1700	2200	1400	2000	40	350	6.1	25.6	9.8		332	6.0 x 6.0	TQFN/36
MAX9996	SiGe High-Linearity, 1700MHz to 2200MHz Downconversion Mixer with LO Buffer/Switch	1	1700	2200	1900	2400	40	350	8.3	26.5	9.7		206	5.0 x 5.0	TQFN/20
MAX19985A	Dual, SiGe, High-Linearity, 700MHz to 1000MHz Downconversion Mixer with LO Buffer/Switch	2	700	1000	900	1300	50	500	8.7	25.5	9	280	330	6.0 x 6.0	TQFN/36
MAX19993	Dual, SiGe, High-Linearity, 1200MHz to 1700MHz Downconversion Mixer with LO Buffer/Switch	2	1200	1700	1000	1560	50	500	6.4	27	9.8	275	337	6.0 x 6.0	TQFN/36
MAX19994A	Dual, SiGe, High-Linearity, 1200MHz to 2000MHz Downconversion Mixer with LO Buffer/Switch	2	1200	2000	1450	2050	50	500	8.4	25	9.8	264	330	6.0 x 6.0	TQFN/36
MAX19995	Dual, SiGe, High-Linearity, 1700MHz to 2200MHz Downconversion Mixer with LO Buffer/Switch	2	1700	2200	1400	2000	50	500	9	24.8	9	212	297	6.0 x 6.0	TQFN/36
MAX19995A	Dual, SiGe, High-Linearity, 1700MHz to 2200MHz Downconversion Mixer with LO Buffer/Switch	2	1700	2200	1750	2700	50	500	8.7	24.8	9.2	242	350	6.0 x 6.0	TQFN/36
MAX19996	SiGe, High-Linearity, High-Gain, 2000MHz to 3000MHz Downconversion Mixer with LO Buffer	1	2000	3000	1800	2550	50	500	8.7	24.5	9.6	149.5	230	5.0 x 5.0	TQFN/20

Table 8. Downconverting Mixers (Continued)

Part No.	Description	Channels	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Freq. (min) (MHz)	LO Freq. (max) (MHz)	IF Freq. (min) (MHz)	IF Freq. (max) (MHz)	Gain (dB)	Input IP3 (dBm)	Noise Figure (dB)	3.3V Supply Current (mA)	5V Supply Current (mA)	Footprint (mm x mm)	Package/ Pins
MAX19996A	SiGe, High-Linearity, 2000MHz to 3900MHz Downconversion Mixer with LO Buffer	1	2000	3900	2100	4000	50	500	8.7	24.5	9.8	150	230	5.0 x 5.0	TQFN/20
MAX19997A	Dual, SiGe, High-Linearity, 1800MHz to 2900MHz Downconversion Mixer with LO Buffer	2	1800	2900	1950	3400	50	500	8.7	24	10.3	279	388	6.0 x 6.0	TQFN/36
MAX19999	Dual, SiGe, High-Linearity, 3000MHz to 4000MHz Downconversion Mixer with LO Buffer	2	3000	4000	2650	3700	50	500	8.3	24	10.5	279	388	6.0 x 6.0	TQFN/36

See the parametric search for Downconverting Mixers

Table 9. Vector Multipliers

Part No.	Description	Solutions	Applications	Freq. (min) (MHz)	Freq. (max) (MHz)	3dB BW (MHz)	Gain Control Range (dB)	IIP3 (dBm)	V_{CC} (V)	I_{CC} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2046	1740MHz to 2060MHz High-Gain Vector Multiplier	DCS, PCS	Base stations	1740	2060	260	15	15	4.75 to 5.25	160	5.0 x 5.0	TQFN/32

See the parametric search for Vector Multipliers

I/Q Modulators and Demodulators

We provide the industry's highest linearity, lowest noise modulator, and demodulator cores which enable unprecedented levels of dynamic range for wideband systems. All are pin-pin compatible, allowing coverage for multiband systems.

Table 10. I/Q Modulators/Demodulators

Part No.	Description	Band/ Freq. (MHz)	OIP3 (dBm)	LO Leakage (dBm)	IIP3 (dBm)	NF (dB)	Sideband Suppression (dBc)	I/Q Gain Imbalance (dB)	I/Q Phase Imbalance (deg)	Min Demodulation 3dB Bandwidth (MHz)	Voltage (V)	Current (mA)	Footprint (mm x mm)
MAX2021	High-Dynamic-Range, Direct Upconversion 750MHz to 1200MHz Quadrature Modulator/ Demodulator	750 to 1200	21	-32	35.2	9.3	43.5	0.06	0.15	> 550	5	271	6.0 x 6.0
MAX2022	High-Dynamic-Range, Direct Upconversion 1500MHz to 3000MHz Quadrature Modulator/ Demodulator	1500 to 3000	23.3	-40	39	9.4	47.3	0.3	0.5	> 500	5	292	6.0 x 6.0
MAX2023	High-Dynamic-Range, Direct Upconversion 1500MHz to 2300MHz Quadrature Modulator/ Demodulator	1500 to 2500	23.5	-54	38	9.6	48	0.025	0.56	> 1000	5	295	6.0 x 6.0
MAX2150	3.0V Wideband I/Q Modulator with Sig-ma-Delta Fractional-N Synthesizer	700 to 2300	14				34				3	72	5.0 x 5.0
MAX2306	CDMA IF VGA and I/Q Demodulator with VCO and Synthesizer	40 to 300			3.4	6.4	40			4.2 (0.5dB BW)	2.7		5.0 x 5.0
MAX2308	CDMA IF VGA and I/Q Demodulator with VCO and Synthesizer	70 to 300			3.4	6.4	40			4.2 (0.5dB BW)	2.7		5.0 x 5.0
MAX2309	CDMA IF VGA and I/Q Demodulator with VCO and Synthesizer	70 to 300			3.4	6.4	40			4.2 (0.5dB BW)	2.7		5.0 x 5.0
MAX2370	Complete 450MHz Quadrature Transmitter	450					40				2.7	134	7.0 x 7.0

See the parametric search for I/Q Modulators/Demodulators

High-Speed ADCs and DACs

Our high-speed ADCs, DACs, and AFEs are used in a variety of applications including wireless communications, cable access, instrumentation, radar, military, and other applications.

Key Features

- Highly Flexible and Configurable
  - ADC: Programmable Data Timing and Clock Divider
  - DAC: Programmable I/Q Gain Matching
- Interleaved Data Mode for Single/Dual-Port Operation
  - Standby and Power-Down Operation Modes
- Pin-Compatible Speed/Resolution for Design Flexibility
  - Complementary RF Signal Chain Solutions: PLL/VCOs, Mod/Demods, Mixers, VGAs, Gain Blocks, Log Amps

Analog RF Receiver/Transmitter

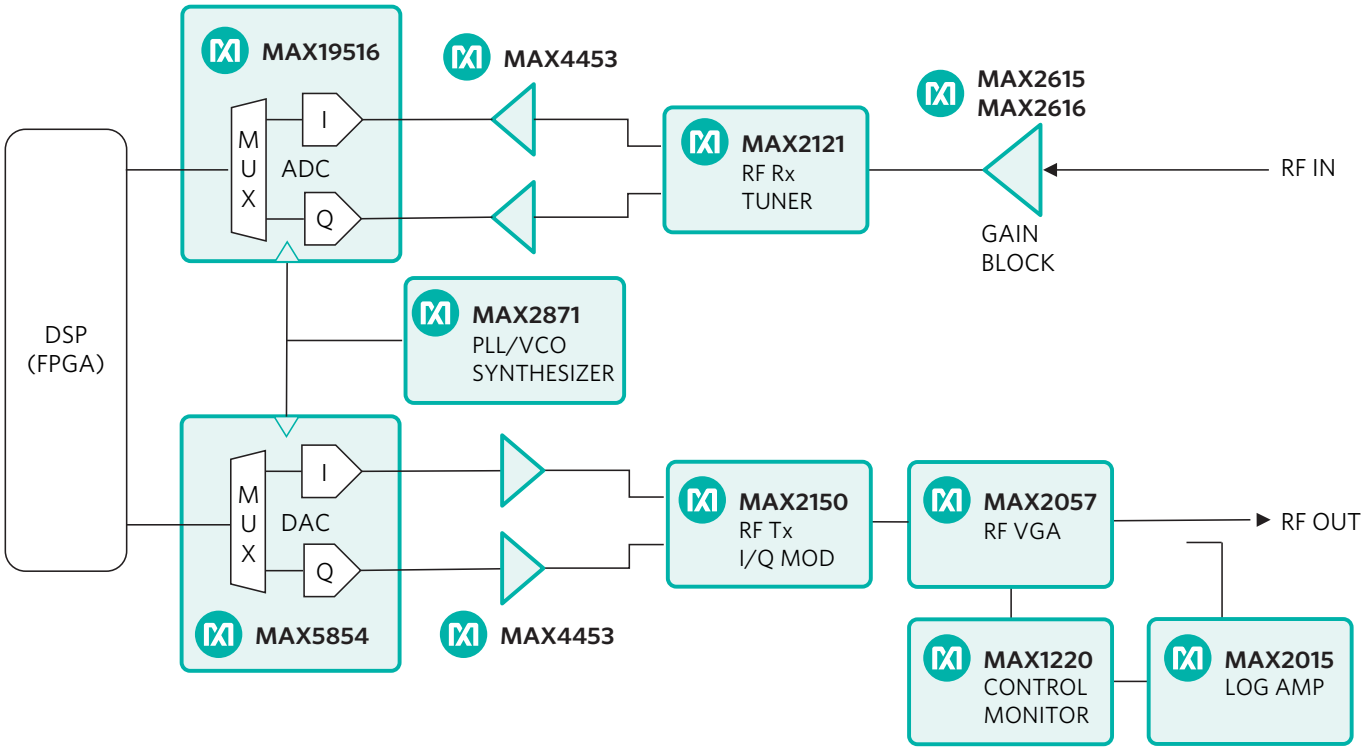


Table 11. High-Speed ADCs (> 5Msps)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX105	Dual, 6-Bit, 800Msps ADC with On-Chip Wideband Input Amplifier	2	6	800	200	45	36.4	37	-44.5	400	650	µP/8, De-muxed, LVPECL	Ext., Int. +2.5	±0.4	3.3, 5	TQFP/80
MAX1002	Low-Power, 60 MSPS, Dual, 6-Bit ADC	2	6	60	20	53	37			55	87				3.3, 5	SSOP/36
MAX1003	Low-Power, 90MSPS, Dual 6-Bit ADC	2	6	90	20	38	37			55	84				3.3, 5	SSOP/36
MAX1127	Quad, 12-Bit, 65Msps, 1.8V ADC With Serial LVDS Outputs	4	12	65	19.32	92	69.5	69.6	-91	100	313	LVDS, Serial	Ext., Int. +1.24	1.4	1.8	QFN/68
MAX1126	Quad, 12-Bit, 40Msps, 1.8V ADC With Serial LVDS Outputs	4	12	40	19.3	89	69.1	69.2	-88.7	100	297	LVDS, Serial	Ext., Int. +1.24	1.4	1.8	QFN/68
MAX1123	1.8V, 10-Bit, 210Msps ADC with LVDS Outputs for Wideband Applications	1	10	210	180	66.3	56.5	57		600	255	µP/10, LVDS	Ext., Int. +1.24	1.25	1.8	QFN/68
MAX1124	1.8V, 10-Bit, 250Msps ADC with LVDS Outputs for Wideband Applications	1	10	250	180	68.3	56	56.3		600	265	µP/10, LVDS	Ext., Int. +1.24	1.25	1.8	QFN/68

Table 11. High-Speed ADCs (> 5Msps) (Continued)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX1180	Dual, 10-Bit, 105Msps, 3.3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	10	105	20	72	58.1	58.5	-70	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3.3	TQFP-EP/48, TQFP/48
MAX1181	Dual, 10-Bit, 80Msps, 3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	10	80	20	73	58.5	59	-70	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP-EP/48 , TQFP/48
MAX1182	Dual, 10-Bit, 65Msps, 3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	10	65	20	77	58.5	59	-76	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP/48
MAX1183	Dual, 10-Bit, 40Msps, 3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	10	40		73	59	59.6	-73	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP-EP/48, TQFP/48
MAX1184	Dual, 10-Bit, 20Msps, 3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	10	20		74	59.4	59.5	-74	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP-EP/48, TQFP/48
MAX1185	Dual, 10-Bit, 20Msps, 3V, Low-Power ADC with Internal Reference and Multiplexed Parallel Outputs	2	10	20		74	59.4	59.5	-72	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP/48
MAX1186	Dual, 10-Bit, 40Msps, 3V, Low-Power ADC with Internal Reference and Multiplexed Parallel Outputs	2	10	40		72	59.2	59.4	-71	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP-EP/48, TQFP/48

Table 11. High-Speed ADCs (> 5Msps) (Continued)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX1190	Dual, 10-Bit, 120Msps, 3.3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	10	120		67	57.5	58.5	-65	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3	TQFP-EP/48, TQFP/48
MAX1191	Ultra-Low-Power, 7.5Msps, Dual, 8-Bit ADC	2	8	7.5		69	48.6	48.7	-68	440		µP/10	Ext., Int. +2.048	±1.024	1.8, 3	TQFN/28
MAX1192	Ultra-Low Power, 22Msps, Dual 8-Bit ADC	2	8	22		70	48.6	48.6	-70	440		µP/10	Ext., Int. +2.048	±1.024	1.8, 3	TQFN/28
MAX1193	Ultra-Low Power, 45Msps, Dual 8-Bit ADC	2	8	45		70	48.5	48.5	-70	440		µP/10	Ext., Int. +2.048	±1.024	1.8, 3	TQFN/28
MAX1195	Dual, 8-Bit, 40Msps, 3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	8	40		68.7	48.5	48.6	-69	400		µP/10	Ext., Int. +2.048	±1.024	3	TQFP-EP/48, TQFP/48
MAX1196	Dual, 8-Bit, 40Msps, 3V, Low-Power ADC with Internal Reference and Multiplexed Parallel Outputs	2	8	40		68.9	48.4	48.5	-69	400		µP/10	Ext., Int. +2.048	±1.024	3	TQFP-EP/48, TQFP/48
MAX1198	Dual, 8-Bit, 100Msps, 3.3V, Low-Power ADC with Internal Reference and Parallel Outputs	2	8	100		66	48.1	48.3	-64	400		µP/10	Ext., Int. +2.048	±1.024	2.5, 3.3	TQFP-EP/48, TQFP/48,

Table 11. High-Speed ADCs (> 5Msps) (Continued)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX1211	65Msps, 12-Bit, IF Sampling ADC	1	12	65	175	79.7	66.5	66.8	-78.7	700					2, 3.3	TQFN/40
MAX1214	1.8V, 12-Bit, 210Msps ADC for Broadband Applications	1	12	210	100	74.2	65	65.6		700	454	µP/12, LVDS	Ext., Int. +1.24	1.454	1.8, 3.3	QFN/68
MAX1420	12-Bit, 60Msps, 3.3V, Low-Power ADC with Internal Reference	1	12	60	15	72	63	66	-69	150	75	µP/12	Ext., Int. +1.024		3.3	LQFP/48
MAX1421	12-Bit, 40Msps, 3.3V, Low-Power ADC with Internal Reference	1	12	40	15	70	63.5	66	-69	150	57.5	µP/12	Ext., Int. +1.024		3.3	LQFP/48
MAX1422	12-Bit, 20Msps, 3.3V, Low-Power ADC with Internal Reference	1	12	20	15	74	65	67	-72	150	42	µP/12	Ext., Int. +1.024		3.3	LQFP/48
MAX1425	5V, 10-Bit, 20Msps ADC	1	10	20		69	59	59	-69	400	31.5	µP/10	2.5		3.3, 5	SSOP/28
MAX1426	5V, 10-Bit, 10Msps ADC	1	10	10		72	60	61	-70	400	32.3	µP/10	2.5		3.3, 5	SSOP/28

Table 11. High-Speed ADCs (> 5Msps) (Continued)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX1434	Octal, 10-Bit, 50Msps, 1.8V ADC With Serial LVDS Outputs	8	10	50	19.3	85	61.1	61.1	-91	100	426	Serial LVDS	Ext., Int. +1.24	1.4	1.8, 3.3	TQFP/100
MAX1436B	Octal, 12-Bit, 40Msps, 1.8V ADC With Serial LVDS Outputs	8	12	40	19.3	90	69.6	69.6	-92	100	436	Serial LVDS	Ext., Int. +1.24	1.4	1.8, 3.3	TQFP/100
MAX1437	Octal, 12-Bit, 50Msps, 1.8V ADC With Serial LVDS Outputs	8	12	50	19.3	90	69.7	69.7	-90	100	427	Serial LVDS	Ext., Int. +1.24	1.4	1.8, 3.3	TQFP/100
MAX1437B	Octal, 12-Bit, 50Msps, 1.8V ADC With Serial LVDS Outputs	8	12	50	20	93	69.7	70.1	-93	100	348	Serial LVDS	Ext., Int. +1.24	1.4	1.8, 3.3	TQFN/68
MAX1438	Octal, 12-Bit, 65Msps, 1.8V ADC With Serial LVDS Outputs	8	12	65	19.3	90	69.6	69.6	-92	100	507	Serial LVDS	Ext., Int. +1.24	1.4	1.8, 3.3	TQFP/100
MAX1444	10-Bit, 40Msps, 3V, Low-Power ADC with Internal Reference	1	10	40	20	90	59	59.5	-72.2	400	23.5	µP/10	Ext., Int. +2.048	±1.024	2.7, 3	TQFP/32
MAX1446	10-Bit, 60Msps, 3V, Low-Power ADC with Internal Reference	1	10	60	20	73	59	59.5	-70	400	37	µP/10	Ext., Int. +2.048	±1.024	2.7, 3	TQFP/32
MAX1448	10-Bit, 80Msps, 3V, Low-Power ADC with Internal Reference	1	10	80	20	73	59	58.5	-69	400	48	µP/10	Ext., Int. +2.048	±1.024	2.7, 3	TQFP/32
MAX1449	10-Bit, 105Msps, 3.3V, Low-Power ADC with Internal Reference	1	10	105	20	72	59	58.5	-70	400	68	µP/10	Ext., Int. +2.048	±1.024	2.7, 3	TQFP/32

Table 11. High-Speed ADCs (> 5Msps) (Continued)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX12527	Dual, 65Msps, 12-Bit, IF Sampling ADC	2	12	65	175	80.2	69.3	69.8	-78.9	750	620	µP/12	Ext., Int. +2.048	±1	1.8, 3.3	TQFN/68
MAX12553	14-Bit, 65Msps, 3.3V ADC	1	14	65	175	80.7	70	70.9	-78.9		118	µP/14	Ext., Int. +2.048	±1	3.3	TQFN-CU/40, TQFN/40
MAX12555	14-Bit, 95Msps, 3.3V ADC	1	14	95	175	74.7	69.8	72.1	-73.6		160.8	µP/14	Ext., Int. +2.048	±1	3.3	TQFN/40
MAX12557	Dual, 65Msps, 14-Bit, IF/Baseband Sampling ADC	2	14	65	175	79.5	71.5	72.5	-78.3	750	610	µP/14	Ext., Int. +2.048	±1	1.8, 3.3	TQFN/68
MAX12558	Dual, 80Msps, 14-Bit, IF/Baseband Sampling ADC	2	14	80	175	79	70.6	71.7	-77.1	750	251	µP/14	Ext., Int. +2.048	±1	1.8, 3.3	TQFN/68
MAX19191	Ultra-Low-Power, 10Msps, 8-Bit ADC	1	8	10	440	70	48.6	48.6	-69	440		µP/8	Ext., Int. +2.048	±1.024	1.8, 3	TQFN/28
MAX19192	Ultra-Low-Power, 10Msps, Dual 8-Bit ADC	2	8	10	440	70	48.6	48.6	-69	440		µP/8	Ext., Int. +2.048	±1.024	1.8, 3	TQFN/28
MAX19505	Dual-Channel, 8-Bit, 65Msps ADC	2	8	65	70	77	49.3	49.8	-72	850	85	Selectable Dual/ Mux'd CMOS	Int. +1.25	0.4 to 1.4	1.8, 2.5, 3.3	TQFN/48

Table 11. High-Speed ADCs (> 5Msps) (Continued)

Part No.	Description	Input Channel	Resolution (Bits)	Sample Rate (max ≤) (Msps)	AC Specs (@ f_{IN}) (MHz)	SFDR (min) (dBc)	SINAD (dB)	SNR (dB)	THD (dB)	Full Pwr. BW (min) (MHz)	I_{CC} (typ) (mA)	Data Bus Interface	Ref. (V)	V_{IN} (V)	V_{SUPPLY} (V)	Package/ Pins
MAX19506	Dual-Channel, 8-Bit, 100Msps ADC	2	8	100	70	77	49.3	49.8	-72	850	63	Selectable Dual/ Mux'd CMOS	Int. +1.25	0.4 to 1.4	1.8, 2.5, 3.3	TQFN/48
MAX19507	Dual-Channel, 8-Bit, 130Msps ADC	2	8	130	70	77	49.3	49.8	-72	850	82	Selectable Dual/ Mux'd CMOS	Int. +1.25	0.4 to 1.4	1.8, 2.5, 3.3	TQFN/48
MAX19515	Dual-Channel, 10-Bit, 65Msps ADC	2	10	65	70	77	59.6	60.1	-79	850	47	Selectable Dual/ Mux'd CMOS	Int. +1.25	0.4 to 1.4	1.8, 2.5, 3.3	TQFN/48
MAX19516	Dual-Channel, 10-Bit, 100Msps ADC	2	10	100	70	83	59.5	60	-79	850	63	Selectable Dual/ Mux'd CMOS	Int. +1.25	0.4 to 1.4	1.8, 2.5, 3.3	TQFN/48
MAX19517	Dual-Channel, 10-Bit, 130Msps ADC	2	10	130	70	82	59.4	59.8	-78	850	82	Selectable Dual/ Mux'd CMOS	Int. +1.25	0.4 to 1.4	1.8, 2.5, 3.3	TQFN/48
MAX19538	12-Bit, 95Msps, 3.3V ADC	1	12	95	175	76.2	59	68.4	-74.7		159	µP/12	Ext., Int. +2.048	±1	1.8, 3.3	TQFN/40
MAX19586	High-Dynamic-Range, 16-Bit, 80Msps ADC with -82dBFS Noise Floor	1	16	80	70	84.3	77.4	79.2		600	348	µP/16	Ext., Int.	2.56	1.8, 3.3	TQFN/56
MAX19588	High-Dynamic-Range, 16-Bit, 100Msps ADC with -82dBFS Noise Floor	1	16	100	70	82.1	77.1	79		600	400	µP/16	Ext., Int.	2.56	1.8, 3.3	TQFN/56

See the parametric search for High-Speed ADCs

MAX5871

Fully Integrated Baseband-to-RF Wideband Transmitter

The MAX5871 high-performance interpolating and modulating 16-bit 5.9Gsps RF DAC can directly synthesize up to 600MHz of instantaneous bandwidth from DC to frequencies greater than 2.8GHz. The device enables multi-standard and multi-band transmitters in wireless communications applications. The device meets spectral mask requirements for a broad set of communication standards including multicarrier GSM, UMTS, and LTE.

Key Features

- Enables Software-Defined Radio Transmitter
  - Up to 600MHz IBW from DC to 2.8GHz
  - Eliminates I and Q Imbalance and LO Feedthrough
  - Digital Up-Conversion Simplifies RF Design
- Direct RF Synthesis for Wireless Communications
  - 5.898Gsps DAC Output Update Rate
  - High Linearity and Low Noise-14-Bit RF DAC
  - Interpolation and Quadrature Modulation
- Highly Flexible and Configurable
  - 4-Lane 10Gbps JESD2048 Data Interface
  - 1Hz/10Hz/100Hz/1kHz/10kHz NCO Resolution
  - 5/6/6.67/8/10/12/13.33/16/20/2x Interpolation
  - Integrated Clock Multiplying PLL+VCO
- Multidevice Synchronization via Subclass 0 and 1
- Low Power Dissipation: 2.5W at 5Gsps
- Operating Junction Temperature: -40°C to +110°C

Applications

- Cellular Infrastructure
- Multi-Standard and Multi-Band Radios
- Macro-Cell Base Stations and Remote Radio Heads
- Point-to-Point Microwave Links

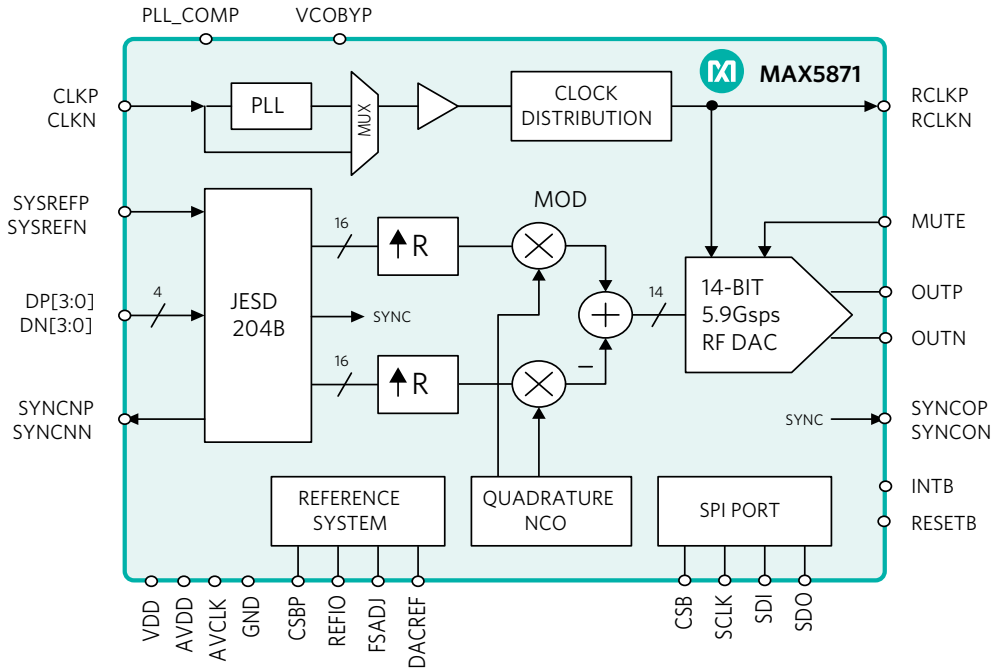


Table 12. High-Speed DACs (> 1.5Gsps)

Part No.	Description	Resolution (bits)	f_{CLK} (Msps)	Channels	RF Synthesis Bandwidth	SFDR (@ f_{OUT}) (dBc)	DNL (±LSB)	INL (±LSB)	I_{OUT} (mA)	P_{DISS} (mW)	Interface	V_{SUPPLY} (V)	Package/ Pins	ECCN Code
MAX5850	14-Bit 3.072Gsps RF DAC with JESD204B Interface	14	3072	1	1.5GHz	74 @ 1000MHz	1.5	3	40	2400	JESD204B	1, 1.8	FCB-GA/144	3A001.a.5.b.2
MAX5857	16-Bit, 5.9Gsps Wideband Interpolating and Modulating RF DAC with JESD204B Interface	16	5900	1	Direct RF synthesis of 1200mHz bandwidth up to 2.8GHz	74 @ 1000MHz	1.5	3	40	2700	JESD204B	1, 1.8	FCB-GA/144	3A001.a.5.b.2
MAX5868	16-Bit, 5Gsps Interpolating and Modulating RF DAC	16	5000	1	Direct RF synthesis of 500MHz bandwidth up to 2.4GHz		1.5	3	30	1500	Interleaved, LVDS	1, 1.8	CSB-GA/144	5A991.g
MAX5869	16-Bit, 5.9Gsps Interpolating and Modulating RF DAC with JESD204B Interface	16	5900	1	Direct RF synthesis of 600MHz bandwidth up to 2.8GHz	74 @ 1000MHz	1.5	3	30	2500	JESD204B	1, 1.8	MFC LFB-GA/144	5A991.b.1
MAX5871	Fully Integrated Baseband-to-RF Wideband Transmitter	16	5898	1	Direct RF Synthesis of 600MHz bandwidth up to 2.8GHz	68 @ 1842MHz	1.5	3	30	2500	JESD204B	1, 1.8	MFCLF-BGA/144	5A991.b.1
MAX5879	14-Bit, 2.3Gsps Direct RF Synthesis DAC with Selectable Frequency Response	14	2300	1	Synthesize signal bandwidths to more than 1GHz	73 @ 1800MHz			80	2300	Interleaved, LVDS	1.8, 3.3	CSB-GA/256	3A001.a.5.b
MAX5881	12-Bit, 4.3Gsps Cable Downstream Direct RF Synthesis DAC	12	4300	1	Directly synthesize multiple channels in the 50MHz to 1000MHz				28	1160	Interleaved, LVDS	1.8, 3.3	CSB-GA/169	3A001.a.5.b
MAX5882	14-Bit, 4.6Gsps Cable Downstream Direct RF Synthesis DAC	14	4600	1	Direct RF synthesis from 47MHz to 1003MHz				80	2300	Interleaved, LVDS	1.8, 3.3	CSB-GA/256	3A001.a.5.b.2

Table 12. High-Speed DACs (> 1.5Gsps) (Continued)

Part No.	Description	Resolution (bits)	f_{CLK} (Msps)	Channels	RF Synthesis Bandwidth	SFDR (@ f_{OUT}) (dBc)	DNL (±LSB)	INL (±LSB)	I_{OUT} (mA)	P_{DISS} (mW)	Interface	V_{SUPPLY} (V)	Package/ Pins	ECCN Code
MAX5855	16-Bit, 4.9Gsps Wideband Interpolating and Modulating RF DAC With JESD204B Interface	16	4900	1	Direct RF synthesis of 1000MHz bandwidth up to 2.45GHz	74 @ 1000MHz	1.5	3	40	2700	JESD2048	1, 1.8	FCBGA/144	EAR99
MAX19692	12-Bit, 2.3Gsps Multi-Nyquist DAC	12	2300	1	Digital synthesis of signals with more than 1.5GHz bandwidth	68 @ 1200MHz	0.9	1.3	20	760	Interleaved, LVDS	1.8, 3.3	CSBGA/169	3A001.a.5.b
MAX19693	12-Bit, 4Gsps High-Dynamic Performance Wideband DAC	12	4000	1	Digital synthesis of signals with more than 1.5GHz bandwidth	70 @ 800MHz	0.8	1.2	20	1180	Interleaved, LVDS	1.8, 3.3	CSBGA/169	3A001.a.5.b

Table 13. High-Speed DACs (40Msps to 1.5Gsps)

Part No.	Description	Resolution (bits)	f_{CLK} (Msps)	Channels	SFDR (@ f_{OUT}) (dBc)	THD (@ f_{OUT}) (dBc)	DNL (±LSB)	INL (±LSB)	I_{OUT} (mA)	P_{DISS} (mW)	Interface	V_{SUPPLY} (V)	Package/ Pins
MAX5180	10-Bit, 40MHz, Simultaneous Update, Current Output DAC	10	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.5	0.5		20.7	Parallel	3	QSOP/28
MAX5181	10-Bit, 40MHz, Current Output DAC	10	40	1	70 @ 2.2MHz	-68 @ 2.2MHz	0.5	0.5		17.7	Parallel	3	QSOP/24
MAX5182	10-Bit, 40MHz, Alternate-Phase Update, Current Output DAC	10	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.5	0.5		20.7	Parallel	3	QSOP/28
MAX5183	10-Bit, 40MHz, Simultaneous Update, Voltage Output DAC	10	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.5	0.5		20.7	Parallel	3	QSOP/28
MAX5184	10-Bit, 40MHz, Voltage Output DAC	10	40	1	70 @ 2.2MHz	-68 @ 2.2MHz	0.5	0.5		17.7	Parallel	3	QSOP/24, TQFN/24
MAX5185	10-Bit, 40MHz, Alternate-Phase Update, Voltage Output DAC	10	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.5	0.5		20.7	Parallel	3	QSOP/28
MAX5186	8-Bit, 40MHz, Simultaneous Update, Current Output DAC	8	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.25	0.25		20.7	Parallel	3	QSOP/28
MAX5187	8-Bit, 40MHz, Current Output DAC	8	40	1	70 @ 2.2MHz	-68 @ 2.2MHz	0.25	0.25		17.7	Parallel	3	QSOP/24
MAX5188	8-Bit, 40MHz, Alternate-Phase Update, Current Output DAC	8	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.25	0.25		20.7	Parallel	3	QSOP/28
MAX5189	8-Bit, 40MHz, Simultaneous Update, Voltage Output DAC	8	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.25	0.25		20.7	Parallel	3	QSOP/28
MAX5190	8-Bit, 40MHz, Voltage Output DAC	8	40	1	70 @ 2.2MHz	-68 @ 2.2MHz	0.25	0.25		17.7	Parallel	3	QSOP/24

Table 13. High-Speed DACs (40Msps to 1.5Gsps) (Continued)

Part No.	Description	Resolution (bits)	f_{CLK} (Msps)	Channels	SFDR (@ f_{OUT}) (dBc)	THD (@ f_{OUT}) (dBc)	DNL (±LSB)	INL (±LSB)	I_{OUT} (mA)	P_{DISS} (mW)	Interface	V_{SUPPLY} (V)	Package/ Pins
MAX5191	8-Bit, 40MHz, Alternate-Phase Update, Voltage Output DAC	8	40	2	70 @ 2.2MHz	-68 @ 2.2MHz	0.25	0.25		20.7	Parallel	3	QSOP/28
MAX5851	Dual, 8-Bit, 80Msps, Current-Output DAC	8	80	2	66.5 @ 10MHz	-72 @ 10MHz	0.05	0.05		172	Parallel	3, 3.3	TQFN/40
MAX5852	Dual, 8-Bit, 165Msps, Current-Output DAC	8	165	2	67 @ 10MHz	-71 @ 10MHz	0.05	0.05		190	Parallel	3, 3.3	TQFN/40
MAX5853	Dual, 10-Bit, 80Msps, Current-Output DAC	10	80	2	78 @ 10MHz	-76 @ 10MHz	0.2	0.25		173	Parallel	3, 3.3	TQFN/40
MAX5854	Dual, 10-Bit, 165Msps, Current-Output DAC	10	165	2	78 @ 10MHz	-76 @ 10MHz	0.2	0.25		190	Parallel	3, 3.3	TQFN/40
MAX5856A	Dual, 8-Bit, 300Msps, Current-Output DAC with 4x/2x/1x Interpolation Filters and PLLs	8	300	2	68 @ 20MHz	-70 @ 5MHz	0.07	0.15		432	Parallel	3	TQFP/48
MAX5858	Dual, 10-Bit, 300Msps, Current-Output DAC with 4x/2x/1x Interpolation Filters	10	300	2	75 @ 20MHz	-72 @ 5MHz	0.25	0.5		504	Parallel	3	TQFP/48
MAX5858A	Dual, 10-Bit, 300Msps, Current-Output DAC with 4x/2x/1x Interpolation Filters and PLL	10	300	2	73 @ 20MHz	-72 @ 5MHz	0.25	0.5		438	Parallel	3	TQFP/48
MAX5873	12-Bit, 200Msps High-Dynamic Performance, Dual DAC with CMOS Inputs	12	200	2	78 @ 16MHz		0.13	0.2		255	Parallel	1.8, 3.3	QFN/68
MAX5883	3.3V, 12-Bit, 200Msps High-Dynamic Performance DAC with CMOS Inputs	12	200	1	74 @ 16MHz		0.2	0.3		132	Parallel	3.3	QFN/48
MAX5884	3.3V, 14-Bit, 200Msps High-Dynamic Performance DAC with CMOS Inputs	14	200	1	74 @ 16MHz		0.5	0.8		134	Parallel	3.3	QFN/48

Table 13. High-Speed DACs (40Msps to 1.5Gsps) (Continued)

Part No.	Description	Resolution (bits)	f_{CLK} (Msps)	Channels	SFDR (@ f_{OUT}) (dBc)	THD (@ f_{OUT}) (dBc)	DNL (±LSB)	INL (±LSB)	I_{OUT} (mA)	P_{DISS} (mW)	Interface	V_{SUPPLY} (V)	Package/ Pins
MAX5885	3.3V, 16-Bit, 200Msps High-Dynamic Performance DAC with CMOS Inputs	16	200	1	76 @ 16MHz		2	3.9		135	Parallel	3.3	QFN/48
MAX5886	3.3V, 12-Bit, 500Msps High-Dynamic Performance DAC with Differential LVDS Inputs	12	500	1	76 @ 30MHz		0.15	0.2		130	Parallel, LVDS	3.3	QFN/68
MAX5887	3.3V, 12-Bit, 500Msps High-Dynamic Performance DAC with Differential LVDS Inputs	14	500	1	76 @ 30MHz		0.5	0.8		130	Parallel, LVDS	3.3	QFN/68
MAX5888	3.3V, 16-Bit, 500Msps High-Dynamic Performance DAC with Differential LVDS Inputs	16	500	1	76 @ 40MHz		2	3.9		130	Parallel, LVDS	3.3	QFN/68
MAX5888A	3.3V, 16-Bit, 500Msps High-Dynamic Performance DAC with Differential LVDS Inputs	16	500	1	76 @ 40MHz		1.3	2.6		130	Parallel, LVDS	3.3	SOIC(N)/8
MAX5874	14-Bit, 200Msps High-Dynamic Performance, Dual DAC with CMOS Inputs	14	200	2	78 @ 16MHz		0.7	1		260	Parallel	1.8, 3.3	QFN/68
MAX5875	16-Bit, 200Msps High-Dynamic Performance, Dual DAC with CMOS Inputs	16	200	2	78 @ 16MHz		2	3		260	Parallel	1.8, 3.3	QFN/68
MAX5876	12-Bit, 250Msps High-Dynamic Performance, Dual DAC with LVDS Inputs	12	250	2	75 @ 16MHz		0.1	0.2	20	289	Parallel, LVDS	1.8, 3.3	QFN/68
MAX5877	14-Bit, 250Msps High-Dynamic Performance, Dual DAC with LVDS Inputs	14	250	2	75 @ 16MHz		0.2	0.5	20	287	Parallel, LVDS	1.8, 3.3	QFN/68
MAX5878	16-Bit, 250Msps High-Dynamic Performance, Dual DAC with LVDS Inputs	16	250	2	76 @ 16MHz		2	3		294	Parallel, LVDS	1.8, 3.3	QFN/68
MAX5889	12-Bit, 600Msps High-Dynamic Performance DAC with LVDS Inputs	12	600	1	83 @ 16MHz		0.15	0.25	20	263	Parallel, LVDS	1.8, 3.3	QFN/68

Table 13. High-Speed DACs (40Msps to 1.5Gsps) (Continued)

Part No.	Description	Resolution (bits)	f_{CLK} (Msps)	Channels	SFDR (@ f_{OUT}) (dBc)	THD (@ f_{OUT}) (dBc)	DNL (±LSB)	INL (±LSB)	I_{OUT} (mA)	P_{DISS} (mW)	Interface	V_{SUPPLY} (V)	Package/ Pins
MAX5890	14-Bit, 600Msps High-Dynamic Performance DAC with LVDS Inputs	14	600	1	84 @ 16MHz		1.6	3.8		255, 267	Parallel, LVDS	1.8, 3.3	QFN/68
MAX5891	16-Bit, 600Msps High-Dynamic Performance DAC with LVDS Inputs	16	600	1	84 @ 16MHz		1.6	3.8		255, 267	Parallel, LVDS	1.8, 3.3	QFN/68
MAX5893	12-Bit, 500Msps Interpolating and Modulating Dual DAC with CMOS Inputs	12	500	2	88 @ 10MHz		0.5	1		511	Parallel	1.8, 3.3	QFN/68
MAX5894	14-Bit, 500Msps Interpolating and Modulating Dual DAC with CMOS Inputs	14	500	2	90 @ 10MHz		0.5	1	20	896	Parallel	1.8, 3.3	QFN/68
MAX5895	16-Bit, 500Msps Interpolating and Modulating Dual DAC with CMOS Inputs	16	500	2	90 @ 10MHz		1	3		511	Parallel	1.8, 3.3	QFN/68
MAX5898	16-Bit, 500Msps Interpolating and Modulating Dual DAC with Interleaved LVDS Inputs	16	500	2	89 @ 10MHz		1	3	20	340	Interleaved, LVDS	1.8, 3.3	QFN/68

See the parametric search for High-Speed DACs

Analog Front-Ends/Fast CODECs

Our high-speed analog front-end (HS AFE) ICs combine high-speed and low-speed data converters in a single device to help meet size, cost, and power targets for mobile products. Our high-speed AFEs are optimized for high dynamic performance and ultra-low power and are ideal for wideband communication applications operating in full-duplex (FD) or half-duplex (HD) mode. Our high-speed AFEs will help you achieve fast time to market with low initial investment and proven capability.

Key Features

- Eliminates Analog Converters from Digital Baseband ASIC
- No NRE
- Faster Time-To-Market
- No Mixed-Signal Test
- Use Fine-Geometry CMOS
- Lower Implementation Risk
- Highly Integrated: Dual 10-Bit ADCs+DACs, Auxiliary ADC/DACs for Monitor/Control, Optional Tx Filter
- Ultra-Low Power Extends Battery Life
- Complementary RF Transceiver Portfolio for Signal Chain Solution

Full- and Half-Duplex Analog Front-End

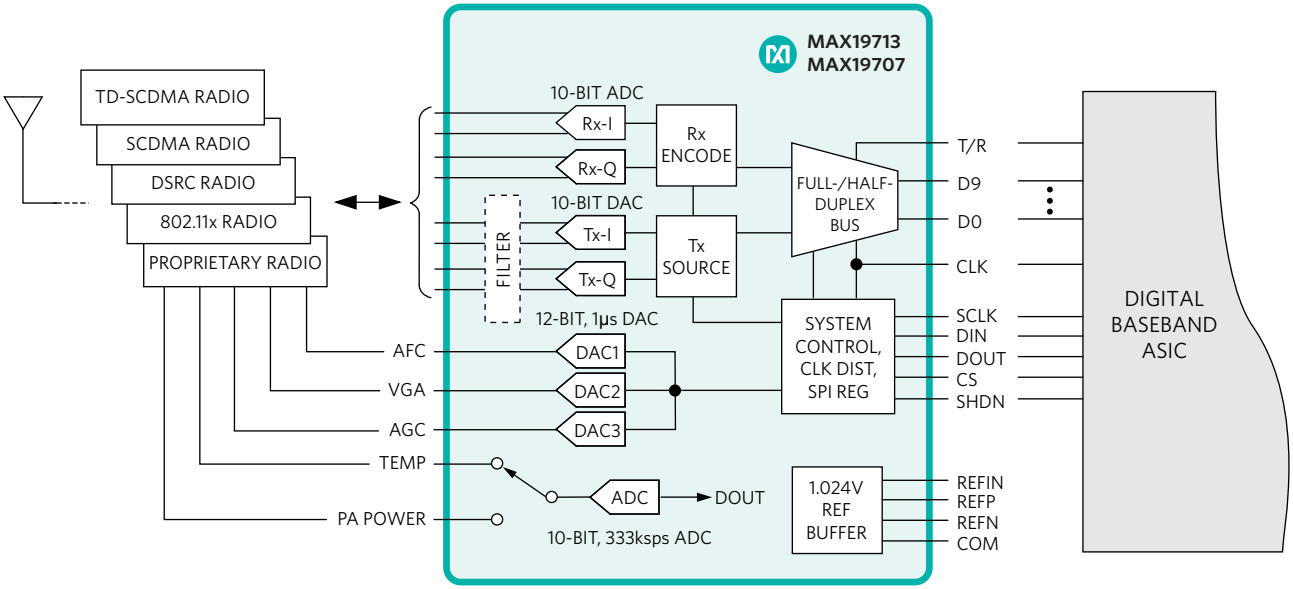


Table 14. Analog Front-Ends

Part No.	Description	Input Chan. (ADC)	Conv. Speed (ADC) (Msps)	SNR (@ f_{IN}) (dB)	Resolution (DAC) (bits)	Output Chan. (DAC)	Speed (DAC) (Msps)	SFDR (@ f_{OUT}) (dBc).	THD (@ f_{OUT}) (dBc)	Noise Spectral Density (@ f_{OUT}) (dBFS/Hz)	Data Bus Interface	Ref. Voltage (V)	V_{SUPPLY} (V)	Package/ Pins
MAX1005	IF Undersampler	1	15	44 @ 10.7MHz	7	1	15	39 @ 15MHz	-28 @ 15MHz		Parallel	Int	2.7 to 5.5	QSOP/16
MAX5863	Ultra-Low-Power, High Dynamic Performance 7.5Msps Analog Front-End	2	7.5	48.6 @ 1.875MHz	10	2	7.5	73 @ 620kHz	-71 @ 620kHz	-127 @ 620kHz	Parallel	Int/ Ext	1.8, 2.7 to 3.3	TQFN/48
MAX5864	Ultra-Low-Power, High Dynamic Performance 22Msps Analog Front-End	2	22	48.6 @ 5.5MHz	10	2	22	71.7 @ 2.2MHz	-70 @ 2.2MHz	-128.4 @ 2.2MHz	Parallel	Int/ Ext	1.8, 2.7 to 3.3	TQFN/48
MAX5865	Ultra-Low-Power, High Dynamic Performance 40Msps Analog Front-End	2	40	48.5 @ 5.4MHz	10	2	40	72.3 @ 2.2MHz	-70 @ 2.2MHz	-130.6 @ 2.2MHz	Parallel	Int/ Ext	1.8, 2.7 to 3.3	TQFN/48
MAX5866	Ultra-Low-Power, High Dynamic Performance 60Msps Analog Front-End	2	60	48.4 @ 10MHz	10	2	60	69.5 @ 2.2MHz	-60.6 @ 6MHz	-130.8 @ 6MHz	Parallel	Int/ Ext	2.7 to 3.3, 2.7	TQFN/48
MAX19707	10-Bit, 45Msps, Ultra-Low-Power Analog Front-End	2	45	54.2 @ 5.5MHz	10	2	45	73.2 @ 2.2MHz	-71 @ 2.2MHz	-130.6 @ 2.2MHz	Multiplexed, Parallel	Int/ Ext	1.8, 2.7 to 3.3	TQFN/48
MAX19713	10-Bit, 45Msps, Full-Duplex Analog Front-End	2	45	54.1 @ 5.5MHz	10	2	45	70.3 @ 2.2MHz	-68.1 @ 2.2MHz	-129 @ 2.2MHz	Multiplexed, Parallel	Int/ Ext	1.8, 2.7 to 3.3	TQFN/56

See the parametric search for Analog Front-Ends

QAM Modulators and Digital Upconverters

We offer the industry's highest density symbols-to-QAM RF solutions on the market. With a capacity of up to 160 QAM channels and 6 OFDM channels, our QAM modulators are highly flexible and configurable and allow the fastest time-to-market at the lowest power and cost per QAM.

Key Features

- High-Density, Symbols-to-QAM RF Solution
- Highly Flexible and Configurable on Per Channel Basis
- Scalable Capacity from 8 QAM to 128 QAM Channels Via Pin-Compatible Family
- Significantly Less Power/QAM than Competing Solutions Reduces Cooling and Operating Costs
- Rich Feature Set Eases RF Design
- Complementary VCO/PLL Clock Solution

Symbols-To-RF Wideband Transmitter

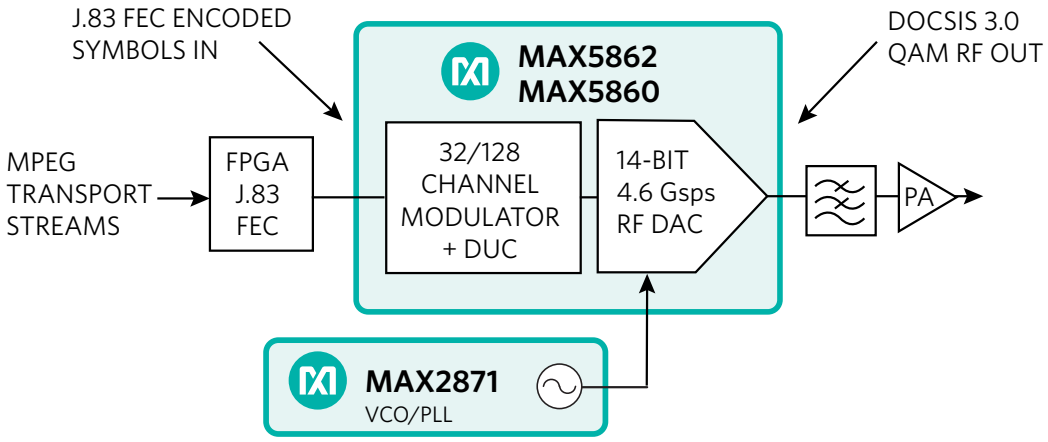


Table 15. QAM Modulators

Part No.	Description	Resolution (bits)	Update Rate (Msps)	Modulation	Capacity Range	Capacity Type	Input Interface	Output Interface	fOUT (MHz)	RF-DAC	PDISS (@ Max Capacity) (mW)	Voltage (V)	Features	Footprint (mm x mm)	Package/Pins
MAX5860	Scalable High-Density Downstream Cable QAM Modulator	14	4600	QAM	32 to 128	Scalable	CMOS	Differential Analog RF	1000	Integrated	5700	1, 1.8, 3.3	DOCSIS 3.0 Compliant, Fully Agile QAMs 50MHz to 1000MHz	12 x 17	FCBGA/280
MAX5861	DOCSIS 3.1 High-Density SCQAM and OFDM Downstream Cable Modulator	14	4915	OFDM SCQAM	160+6 x 192 MHz	Fixed	LVDS SSTL	Differential Analog RF	1218	Integrated	5900	0.9, 1.8, 3.3	DOCSIS 3.1 Compliant Fully Agile up to 1218MHz	12 x 18	FCCSP/308
MAX5862	High-Density Downstream Cable QAM Modulator	14	4600	QAM	8, 16, 24, 32	Fixed	CMOS	Differential Analog RF	1000	Integrated	4200	1, 1.8, 3.3	DOCSIS 3.0 Compliant, Fully Agile QAMs 50MHz to 1000MHz	12 x 17	FCBGA/280

See the parametric search for QAM Modulators

Broadband, High-Performance PLL/VCOs

Our broadband RF synthesizers with integrated VCOs feature a combination of high performance, power consumption, and ease of integration, enabling a flexible solution across many applications.

Key Features

- Contiguous Coverage from 23.5MHz to 6000MHz Supports Many Wireless Protocols and Applications
- Ultra-Low In-Band Phase Noise and up to 140MHz PFD Frequency Ideal for High-Performance Applications
- Dual Differential Outputs with Programmable Output Power, and Selectable Output Frequency Provide Design Flexibility
- Continuous Frequency Coverage per Sub-Band Over -40°C to +85°C Ensures "Glitch-Less" Operation
- Output Phase Reset and Adjustment Enables Phase Synchronization of Multiple Synthesizers
- Pin- and Software-Compatible Between MAX2870/MAX2871 and ADF4350/ADF4351

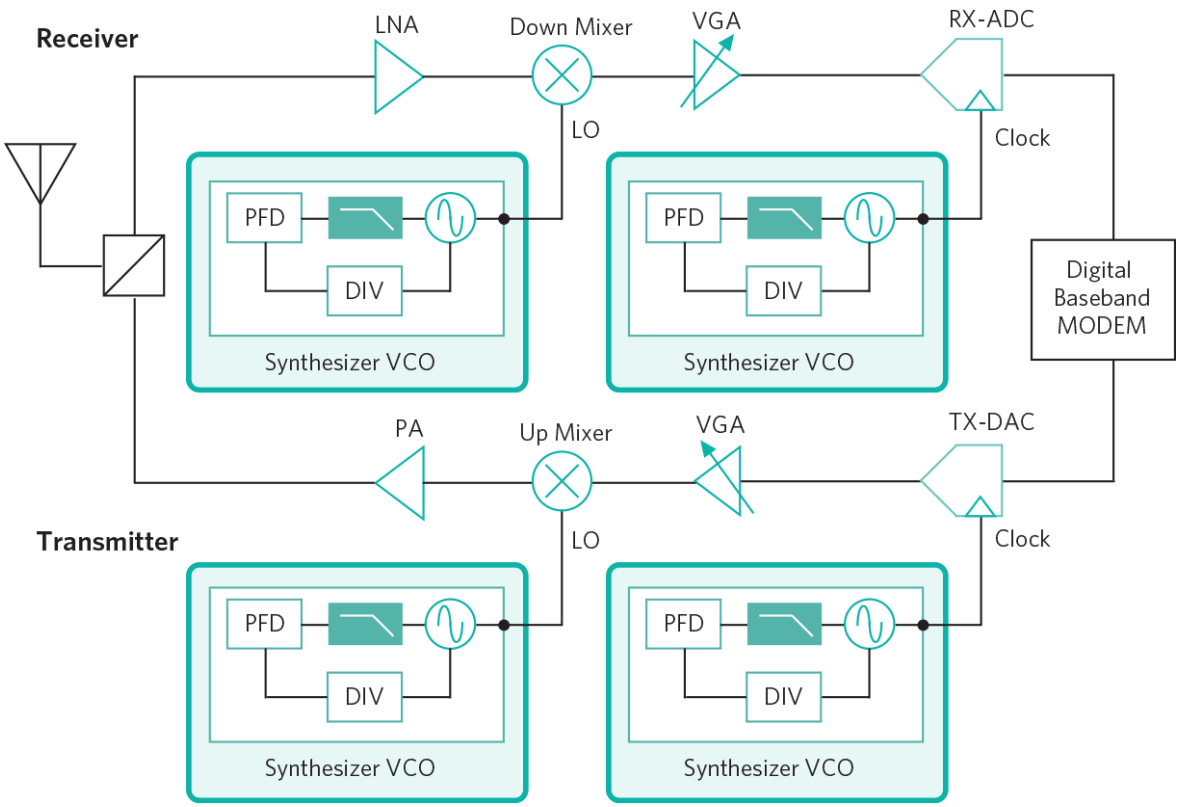


Table 16. Stand-Alone VCOs

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Driver Outputs	PLL Driver Outputs	P_{OUT} (min) (dBm)	P_{OUT}(max) (dBm)	Phase Noise (dBc/Hz) at 10kHz	Phase Noise (dBc/Hz) at 10kHz	V_{TUNE} (min) (V)	V_{TUNE} (max) (V)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2605	45MHz to 75MHz VCO with Differential Outputs, On-Chip Varactor and Feedback Capacitors. Requires an external inductor to set the oscillation frequency.	45	75	Yes	Yes	-10	-10		-117	0.4	2.4	2.7 to 5.5	1.9	2.7 x 2.9	SOT23/6, SOT/6
MAX2606	70MHz to 150MHz VCO with Differential Outputs, On-Chip Varactor and Feedback Capacitors. Only requires an external inductor to set the oscillation frequency.	70	150	Yes	Yes	-10	-10		-112	0.4	2.4	2.7 to 5.5	2.1	2.7 x 2.9	SOT23/6, SOT/6
MAX2607	150MHz to 300MHz VCO with Differential Outputs, On-Chip Varactor and Feedback Capacitors. Only requires an external inductor to set the oscillation frequency.	150	300	Yes	Yes	-10	-10		-107	0.4	2.4	2.7 to 5.5	2.1	2.7 x 2.9	SOT23/6, SOT/6
MAX2608	300MHz to 500MHz VCO with Differential Outputs, On-Chip Varactor and Feedback Capacitors. Only requires an external inductor to set the oscillation frequency.	300	500	Yes	Yes	-10	-10		-100	0.4	2.4	2.7 to 5.5	2.7	2.7 x 2.9	SOT23/6, SOT/6
MAX2609	500MHz to 650MHz VCO with Differential Outputs, On-Chip Varactor and Feedback Capacitors. Only requires an external inductor to set the oscillation frequency.	500	650	Yes	Yes	-10	-10		-93	0.4	2.4	2.7 to 5.5	3.6	2.7 x 2.9	SOT23/6, SOT/6
MAX2620	10MHz to 1050MHz VCO with Differential Outputs and Low-Power Shutdown Mode	10	1050	Yes	Yes	-16	-2	-102	-125	0.5	3.5	2.5 to 5.25	9	3.0 x 4.9	µMAX/8

Table 16. Stand-Alone VCOs (Continued)

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Driver Outputs	PLL Driver Outputs	P_{OUT} (min) (dBm)	P_{OUT} (max) (dBm)	Phase Noise (dBc/Hz) at 10kHz	Phase Noise (dBc/Hz) at 10kHz	V_{TUNE} (min) (V)	V_{TUNE} (max) (V)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2622	855MHz to 881MHz Monolithic VCO with Integrated Tank and Low-Power Shutdown Mode	855	881	No	Yes	-3	-3	-78	-101	0.4	2.4	2.7 to 5.5	9	3.0 x 4.9	µMAX/8
MAX2623	885MHz to 950MHz Monolithic VCO with Integrated Tank and Low-Power Shutdown Mode	885	950	No	Yes	-3	-3	-78	-101	0.4	2.4	2.7 to 5.5	9	3.0 x 4.9	µMAX/8
MAX2624	947MHz to 998MHz Monolithic VCO with Integrated Tank and Low-Power Shutdown Mode	947	998	No	Yes	-3	-3	-78	-101	0.4	2.4	2.7 to 5.5	9	3.0 x 4.9	µMAX/8
MAX2750	2400MHz to 2500MHz Monolithic VCO with Integrated Tank and Low-Power Shutdown Mode	2400	2500	No	Yes	-3	-3		-95	0.4	2.4	2.7 to 5.5	11.3	3.0 x 4.9	µMAX/8
MAX2751	2120MHz to 2260MHz Monolithic VCO with Integrated Tank and Low-Power Shutdown Mode	2120	2260	No	Yes	-3	-3		-95	0.4	2.4	2.7 to 5.5	9.7	3.0 x 4.9	µMAX/8
MAX2752	2025MHz to 2165MHz Monolithic VCO with Integrated Tank and Low-Power Shutdown Mode	2025	2025	No	Yes	-3	-3		-95	0.4	2.4	2.7 to 5.5	10	3.0 x 4.9	µMAX/8
MAX2754	151.2GHz Monolithic VCO with Linear Modulation Input and Low-Power Shutdown Mode	1145	1250	No	Yes	-5	-5	-80	-100	0.4	2.4	2.7 to 5.5	13.7	3.0 x 4.9	µMAX/8

See the parametric search for Stand-Alone VCOs

Table 17. High-Performance PLL/VCOs

Part No.	Description	Synthesizer Mode	Oper. Freq. (min) (MHz)	Oper. Freq. (max) (MHz)	Prog. P_{OUT} (dBm)	Differential RF Outputs	Inband Noise Floor (dBc/Hz)	V_{TUNE} min (V)	V_{TUNE} max (V)	Closed Loop Phase Noise (dBc/Hz) at 10kHz Fc 6GHz	Closed Loop Phase Noise (dBc/Hz) at 100kHz Fc 6GHz	RMS Jitter (typ) (ps RMS)	EVM @ 2.1GHz (typ) (%)	V_{SUPPLY} (V)	Package/ Pins
MAX2870	23.5MHz to 6000MHz Fractional/ Integer-N Synthesizer/VCO	Fractional, Integer	23.5	6000	-4 to +5	2	-226.4	0.5	2.5	-130	-140	0.25	0.35	3.0 to 3.6	TQFN/32
MAX2871	23MHz to 6000MHz Fractional/Integer-N Synthesizer/VCO	Fractional, Integer	23.5	6000	-4 to +5	2	-229	0.5	V_{SUPPLY} - 0.5	-130	-140	0.2		3.0 to 3.6	TQFN/32
MAX2880	12.4GHz Fractional-N PLL	Fractional, Integer	250	12400			-229	0.5	V_{SUPPLY} - 0.5	-100	-105	0.14		3.0 to 3.6	TQFN/20

See the parametric search for High-Performance PLL/VCOs

Table 18. VCO Buffers/Splitters

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	LO Driver Out-puts	PLL Driver Outputs	P_{OUT} (min) (dBm)	P_{OUT} (max) (dBm)	Gain (dB)	Reverse Isolation (dB)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2470	DCS/PCS Band +14dBm to +20dBm LO Buffer with ±1dB Variation	10	500	Yes	Yes	-16	-1	> 14	64	2.7 to 5.5	3.6 to 5.5	2.7 x 2.9	SOT23/6, SOT/6
MAX2471	10MHz to 500MHz VCO Buffer Amplifier with Differential Inputs and Differential Outputs	10	500	Yes	Yes	-14	0	>14	64	2.7 to 5.5	5.5	2.7 x 2.9	SOT23/6, SOT/6
MAX2472	500MHz to 2500MHz VCO Buffer Amplifier with Single-Ended Input, Dual Outputs and Adjustable Bias Current	500	2500	Yes	Yes	-10	-2	14	49	2.7 to 5.5	5.2	2.7 x 2.9	SOT23/6, SOT/6
MAX2473	500MHz to 2500MHz VCO Buffer Amplifier with Single-Ended Input and Single-Ended Output	500	2500	Yes	Yes	-10	-2	14	49	2.7 to 5.5	2.7 to 4.8	2.7 x 2.9	SOT23/6, SOT/6
MAX9988	+14dBm to +20dBm LO Buffer/Splitter with ±1dB Variation	1500	2200	Yes	Yes	14.2	19.5		48	4.75 to 5.25	162	5.0 x 5.0	TQFN/20
MAX9989	+14dBm to +20dBm LO Buffer with ±1dB Variation	700	1100	Yes	Yes	14.3	19.7		48	4.75 to 5.25	105	5.0 x 5.0	TQFN/20
MAX9990	+14dBm to +20dBm LO Buffer with ±1dB Variation	1500	2200	Yes	Yes	14.2	19.5		48	4.75 to 5.25	111	5.0 x 5.0	TQFN/20

See the parametric search for VCO Buffers/Splitters

GNSS Tuners

We continue to offer the widest selection of GNSS receivers/tuners. Coupled with an external baseband processor, customers can achieve unparalleled position, navigation, and timing (PNT) accuracy. Designed on our advanced, low-power SiGe BiCMOS process technology, all GNSS receivers offer the highest performance and integration at the lowest cost. They are compatible with virtually all GNSS baseband hardware and GNSS software-based receiver designs.

MAX2771
Multiband Universal GNSS Receiver

The newest addition to the family of GNSS tuners is the **MAX2771**, a next-generation GNSS receiver covering E5/L5, L2, E6, E1/L1 bands and GPS, GLONASS, Galileo, QZSS, IRNSS, and BeiDou navigation satellite systems on a single chip. It eliminates the need for external IF filters by implementing on-chip monolithic filters and requires very few external components to implement a low-cost GNSS RF receiver solution. In addition, its integrated ADC, which is programmable from 1 to 3 bits, makes it highly configurable and the most flexible receiver on the market.

Key Features

- Multi-Constellation Support: GPS, Galileo, GLONASS, BeiDou, IRNSS, QZSS, SBAS
- Multiband Support: L1, L2, L5, E1, E5, E6, B1, B2, B3
- Programmable IF Bandwidths of 2.5MHz, 4.2MHz, 8.7MHz, 16.4MHz, 23.4MHz, 36MHz
- Supports Wideband Carriers for Precision Applications (e.g., GPS L5, Galileo E5)
- Operates in Low IF or Zero IF Mode
- Programmable IF Center Frequency
- Fractional-N Synthesizer with Integrated VCO Supports Wide Range of Reference Frequencies
- On-Chip LNAs to Support Multiple Bands
- 1.4dB Cascaded Noise Figure and 110dB of Cascaded Gain with Gain Control Range of 59dB from PGA
- Supply Voltage Range: 2.7V to 3.3V
- 28-Pin, RoHS-Compliant, Lead-Free TQFN Package (5mm x 5mm)

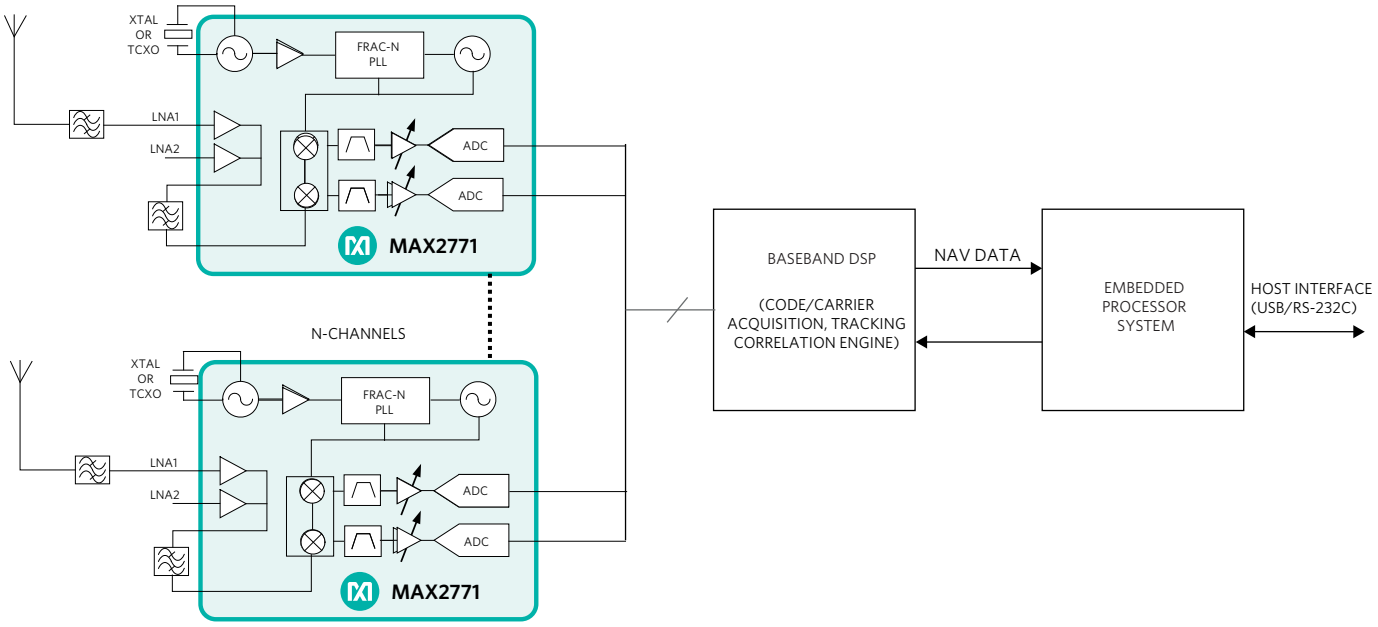


Table 19. GNSS Receivers

Part No.	Description	Band/ Frequency (MHz)	Ref. Clock Frequency (MHz)	IF Output Bits (CMOS)	Cascaded Gain (dB)	Programmable IF Filter 3dB BW Support (MHz)	Noise Figure (typ) (dB)	V_{SUPPLY} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2769	Low-Power GPS and GLONASS Receiver with Low-IF, Zero-IF, and Software Interface	1550 to 1610	4.2 to 4.41 (12.5mV steps)	1 to 3	110	2.5, 4.2, 9.66	1.4	2.7 to 3.3	15	5.0 x 5.0	TQFN/28
MAX2769B	High-Performance, Automotive Grade GPS, GLONASS, Galileo, and Compass Receiver with Low-IF, Zero-IF, and Software Interface	1550 to 1610	8 to 32	1 to 3	110	2.5, 4.2, 9.66	1.4	2.7 to 3.3	25	5.0 x 5.0	TQFN/28
MAX2769C	High-Performance, GPS, GLONASS, Galileo, and Beidou Receiver with Low-IF, Zero-IF, and Software Interface	1550 to 1610	8 to 32	1 to 3	110	2.5, 4.2, 9.66	1.4	2.7 to 3.3	25	5.0 x 5.0	TQFN/28
MAX2771	High-Performance, Truly Universal GNSS Receiver	1160 to 1290, 1525 to 1610	8 to 32	1 to 3	110	2.5, 4.2, 9.66, 16.4, 23.4, 36	1.4	2.7 to 3.3	24	5.0 x 5.0	TQFN/28

See the parametric search for GNSS Receivers

DVB/Satcom Tuners/DAB

Tuner ICs are tunable radio frequency receivers designed to extract signals from standard channels. They include products for digital TV and satellite broadband. Our automotive tuners support the industry-defined standards.

MAX2223
Ultra-Wideband, Direct Conversion, L-Band Satellite Tuner

The **MAX2223** low-cost, direct-conversion tuner IC is designed for satellite set-top and very small aperture terminal (VSAT) applications. The device directly converts the L-Band (925MHz to 2175MHz) satellite signals from the LNB to baseband using a broadband I/Q down converter.

The MAX2223 supports an RF bandwidth of 1GHz and, with its excellent phase noise and image rejection, ensures low-signal error rates and low packet errors needed to support HTS (High Throughput Satellite) terminals.

Key Features

- 925MHz to 2175MHz Frequency Range
- Monolithic VCO
  - Low Phase Noise: -97dBc/Hz at 10kHz
  - No Calibration Required
- High Dynamic Range: -75dBm to 0dBm
- 1GHz RF Bandwidth Supported
- Single +3.3V ±5% Supply
- Low-Power Standby Mode
- Address Pin for Multituner Applications
- Differential I/Q Interface
- I^2C 2-Wire Serial Interface
- Very Small, 5mm x 5mm, 28-Pin TQFN Package

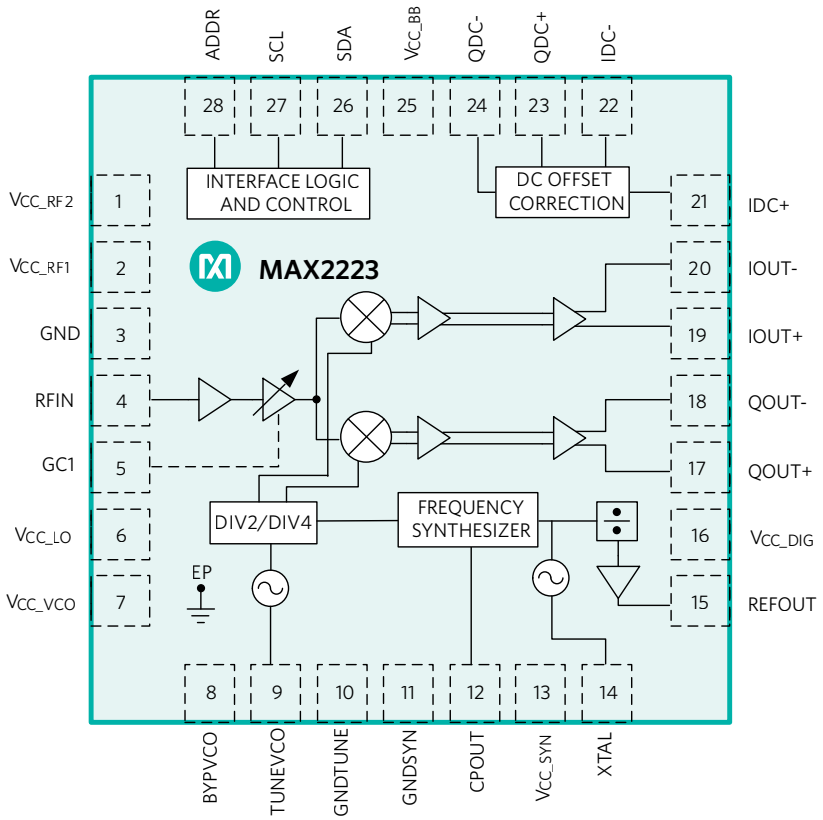


Table 20. DVB/Satcom Tuners

Part No.	Description	Applications	Input Freq. (MHz)	IF Output Freq. (MHz)	Ref. Clock Freq. (MHz)	Dynamic Range (dBm)	Phase noise (dBc/Hz) at 10KHz	In band IIP3 (dBm)	Programmable IF Filter BW Support (MHz)	Noise Figure (typ) (dB)	V_{CC} (V)	I_{CC} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2112	Direct Conversion Tuner for DVB-S2	DVB-S2	925 to 2175	40	12 to 30	-75 to 0	-97	2	4 to 40	8	3.13 to 3.47	100	5.0 x 5.0	TQFN/28
MAX2120	Direct Conversion Tuner for DVB-S	DVB-S	925 to 2175	40	4 to 8	-75 to 0	-82	2	4 to 40	8	3.13 to 3.47	100	5.0 x 5.0	TQFN/28
MAX2121	Complete Direct-Conversion L-Band Tuner	VSAT	925 to 2175	123.75	12 to 30	-75 to 0	-97	2	123.75	8	3.13 to 3.47	148	5.0 x 5.0	TQFN/28
MAX2121B	L-Band Tuner with Programmable Baseband Filter	DBS, Navigation, Set-Top Boxes, VSAT	925 to 2250		12 to 30	-75 to 0	-97	2	40 to 124	8	3.13 to 3.47	148	5.0 x 5.0	TQFN/28
MAX2135A*	ISDB-T/ DVB-T Diversity Tuner	DVB-T, ISDB-T (13 segments)	93 to 105, 173 to 227, 473 to 859	4.5	16 to 18, 32 to 36	-99 to +10	-95		6 to 8	UHF = 3.7, VHF = 4.8 to 5.5	2.7 to 3.47	70	7.0 x 7.0	TQFN/56
MAX2136A*	Global Automotive TV Tuner	ATSC/ ATSC-M/H, CMMB, DAB, DTMB/ GB20600, DVB-T/ DVB-T2, ISDB-T (13 segments)	44 to 108, 167 to 254, 469 to 891		16 to 36	-100 to +10	-95		1.084 to 7.920	8 UHF = 3.7, VHF = 4.8 to 5.5	2.7 to 3.47	70	5.0 x 5.0	TQFN/32
MAX2223	Ultra-Wideband, Direct Conversion, L-Band Satellite Tuner	VSAT	925 to 2175	500	12 to 30	-75 to 0	-96	16	500	8	3.13 to 3.47	140	5.0 x 5.0	TQFN/28

* Automotive - AECQ100-qualified.

See the parametric search for DVB/Satcom Tuners

MAX12005
Satellite IF Switch

The **MAX12005** satellite IF switch IC is designed for multi-user applications supporting two quad universal low-noise blocks (LNBs) to be matrix-switched to four satellite receivers. The system can be easily expanded to accept 16 satellite IF inputs using the cascade option and one additional satellite IF switch IC. A configuration of eight satellite IF inputs to eight satellite receivers is also possible by using two ICs and adding eight input splitters. The insertion loss of these splitters can be compensated by a +6dB or +12dB input gain select.

Key Features

- 8-Input-to-4-Output Matrix Switch
- Expandable to 16 Inputs with Cascade Master/Slave Option
- 950MHz to 2150MHz Operation
- Greater than 30dB Switch Isolation
- 0/+6/+12dB Input Stage Gain Selection Compensates for Splitter Insertion Loss Gain Step for All Input Stages Commonly Controlled Through an Analog Select Pin
- Four Integrated DiSEqC 2.0 Decoders with Integrated Oscillator
- Alternate Tone/Voltage Detection
- ESD Protected to 2kV HBM

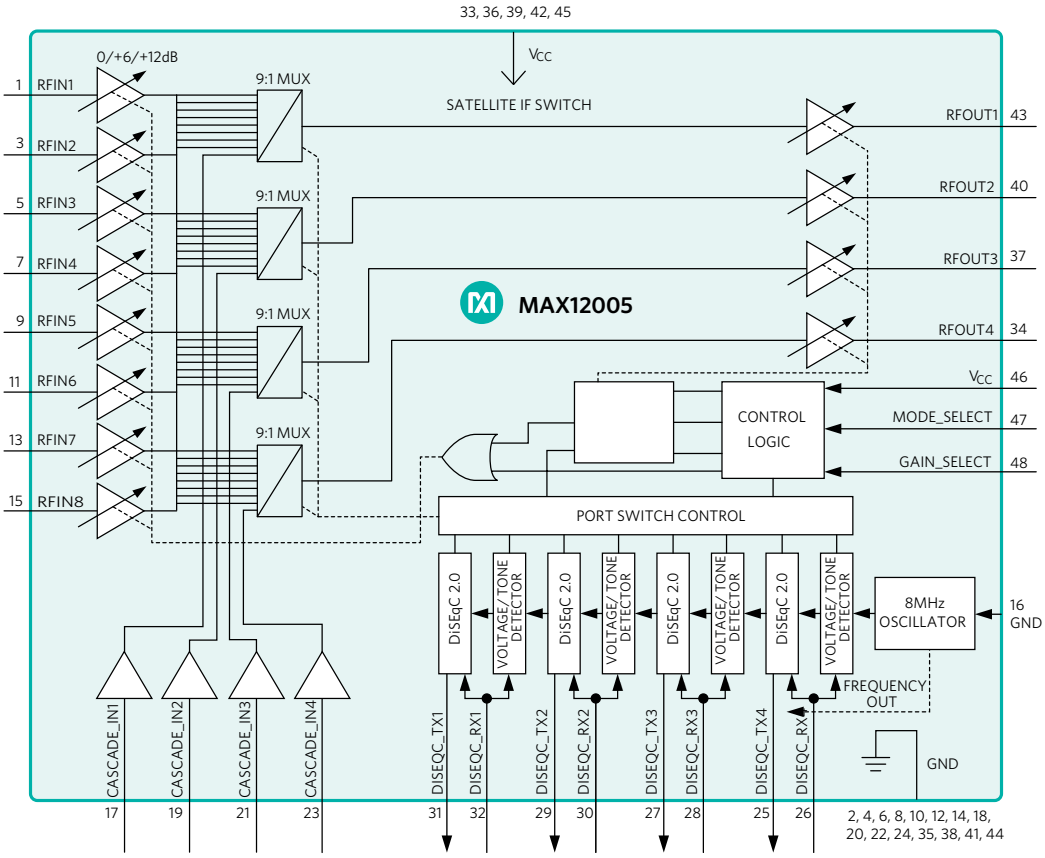


Table 21. Digital Radios

Part No.	Description	Applications	Band/Freq. (MHz)	Ref. Clock Freq. (MHz)	IF Output Freq. (MHz)	Noise Figure (typ) (dB)	V_{SUPPLY} (V)	I_{SUPPLY} (mA)
MAX2175*	RF-to-Bits Tuner for AM, FM, DAB, DRM and HD	AM, DAB, DRM, FM, HD	76 to 90, 87 to 108, 168 to 240, 1452 to 1492				3.1 to 3.5	
MAX2173*	RF-to-Bits Tuner for DAB, T-DMB, and FM	DAB, FM, T-DMB	76 to 90, 87 to 108, 168 to 240, 1452 to 1492	24.576		2.7	3.1 to 3.5	135
MAX2172*	Low IF Tuner for DAB, T-DMB and FM	DAB, FM, T-DMB	87 to 108, 168 to 240, 1452 to 1492	24.576	2.048	2.9	2.7 to 3.5	61
MAX2170*	Low IF Tuner for DAB and T-DMB	DAB, T-DMB	168 to 240, 1452 to 1492	24.576	2.048	2.9	2.7 to 3.5	62
MAX2171	Low IF Tuner for DAB and T-DMB	DAB, T-DMB	87 to 108, 168 to 240, 1452 to 1492	24.576	2.048	3	2.7 to 3.5	62
MAX2140*	SDARS Receiver with Fractional-N PLL, LNA, RF AGC, IF AGC, and Differential I/Q Interface	2.4GHz ISM, SDARS, Satellite	2200 to 2500					

* Automotive - AECQ100-qualified.

Power Amplifiers

Power amplifiers provide amplification of a signal for use in transmitting radio frequency signals through an antenna within a defined frequency range. Our power amplifiers support the 900MHz, 1.9GHz, and 2.4GHz bands for ISM, DECT, and wireless headset applications.

Table 22. Power Amplifiers

Part No.	Description	Solutions	Applications	Freq. (min) (MHz	Freq. (max) (MHz)	P_{OUT} (dBm)	Voltage (V)	Current (mA)	Efficiency (%)	Features	Low Power Shut-down	Footprint (mm x mm)	Package/ Pins
MAX2248	1.9GHz, +20dBm Power Amplifier	Cordless, DECT	Cordless, DECT Phones, Wireless Headsets	1880	1930	20	2.7 to 5.5	105	23	Digital Power Control, Integrated Input Matching	Yes	3.0 x 3.0	TQFN/16
MAX2265	2.7V, Single-Supply, Cellular-Band Linear Power Amplifier	900MHz, Cellular	AMPS, CDMA, TDMA	824	849	28	2.7 to 5	83	37		Yes	5.0 x 6.4	TSSOP-EP/16, TSSOP/16
MAX2235	+3.6V, 1W Autoramping Power Amplifier for 900MHz Applications	900MHz, Cellular	AMPS, AMR, GSM, ISM	800	1000	30	2.7 to 5.5	610	47	Autor-amping	Yes	6.4 x 6.5	TSSOP-EP/20, TSSOP/20
MAX2601	3.6V, 1W RF Power Transistor for 900MHz Applications	400MHz, 900MHz	Cordless, ISM	0	1000	29	0 to 6		58			4.9 x 6.0	SOIC(N)-EP/8, SOIC/8
MAX2602	3.6V, 1W RF Power Transistor for 900MHz Applications with Integrated Diode for Biasing	400MHz, 900MHz	Cordless, ISM	0	1000	29	0 to 6		58	Integrated Diode for Biasing		4.9 x 6.0	SOIC(N)-EP/8, SOIC/8
MAX2232	900MHz ISM-Band, 250mW Power Amplifier with Analog and Programmable RF Power Ramping	900MHz	AMR, ISM	800	1000	24	2.7 to 5.5		44	Analog Gain Control, Program-mable RF Power Ramping	Yes	3.9 x 6.0	QSOP-EP/16, QSOP/16
MAX2233	900MHz ISM-Band, 250mW Power Amplifier with Digital Gain Control	900MHz	AMR, ISM	800	1000	24	2.7 to 5.5		44	Digital Gain Control		3.9 x 6.0	QSOP-EP/16, QSOP/16

See the parametric search for Power Amplifiers

DOCSIS PGAs

Our integrated CATV upstream amplifiers are designed to meet and exceed the DOCSIS 3.0 and DOCSIS 3.1 requirements while minimizing power consumption. Using the high-voltage CMOS process, the devices deliver high dynamic range and provide excellent distortion performance.

Table 23. DOCSIS PGAs

Part No.	Description	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	3dB Band-width (MHz)	Gain Range (dB)	Noise Figure at Higher Gain (dB)	Output P1dB at Higher Gain (dBmV)	Second Harmonic Distortion (dBc)	Third-Harmonic Distortion (dBc)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX3520	DOCSIS 3.0 Upstream Amplifier	5	85	275	-28 to +34	11	74	-66	-66	5	360	5.0 x 5.0	TQFN-EP/20
MAX3521	DOCSIS 3.0 Upstream Amplifier	5	85	275	-25 to +37	11	76	-69	-65	5	475	5.0 x 5.0	TQFN-EP/20
MAX3522B	DOCSIS 3.1 Programmable Gain Amplifier	5	204	350	-24.3 to +26.2	12	> 79	-57	-60	5	1100	8.0 x 8.0	TQFN-EP/56
MAX3523	Low-Power DOCSIS 3.1 Programmable Gain Amplifier	5	204	350	-24 to +38	14	> 79	-65	-60	5	700	5.0 x 5.0	TQFN-EP/20
MAX3523B	Low-Power DOCSIS 3.1 Programmable Gain Amplifier	5	204	350	63	14	> 79	-65	-60	5	70	5.0 x 5.0	TQFN-EP/20

See the parametric search for DOCSIS PGAs

RF Predistortion/RF Power Amplifier Linearizers

Our RF Power Amplifier Linearizer (RFPAL) devices feature a programmable analog signal-processing architecture that effectively combines digital programmability with the simplicity, small size, and low power consumption of analog circuit design. The benefit provided by this architecture is a predistortion linearization solution with very low power consumption, wide bandwidth performance, and a compact system footprint.

These products have achieved broad acceptance in the cellular infrastructure, microwave point-to-point, and broadcast markets. Wide field deployment has proven these RFPAL devices to be robust solutions capable of dramatically increasing system efficiency and reducing costs in existing applications. They are now also enabling novel high performance, are cost-sensitive, and have very compact 5G/4G cellular small-cell designs used in heterogeneous network deployments.

SC1905

Plug 'n Play RF PA Linearizer for 4G/5G

The **SC1905** is a pin-compatible upgrade of the popular SC1894 RFPAL supporting signal bandwidths up to 100MHz. The SC1905 is a fully adaptive, RFin/RFout predistortion linearization solution optimized for a wide range of amplifiers, power levels, and communication protocols. The SC1905 uses the PA output and input signals to adaptively generate an optimized correction function in order to minimize the PA's self-generated distortion and impairments.

Key Features

- RF_{IN}/RF_{OUT} PA Linearizer SoC in Standard CMOS
- Low Power Consumption: 1280mW
- Frequency Range: 698MHz to 3800MHz
- Input Signal Bandwidth: 5MHz to 100MHz
- Reduces BOM Costs, Area, and Total Volume

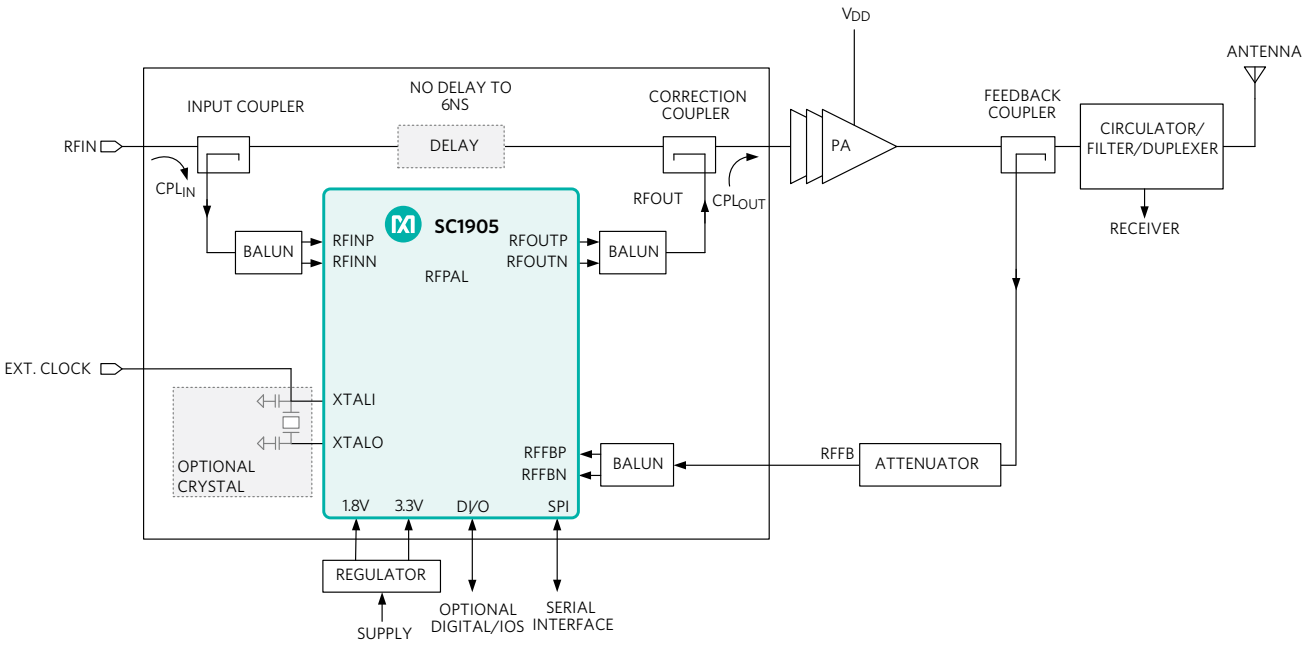


Table 24. RF Power Amplifier Linearizers

Part No.	Description	Frequency Range (MHz)	Input Signal Bandwidth (MHz)	PA Architecture	Paths	Supply Voltage (V)	Power Consumption (mW)	Footprint (mm x mm)	Package/Pins
SC1905	RFPAL for 5G +CBRS	698 to 3800	5 to 100	Closed Loop, Class AB, Doherty	1	3.3, 1.8	1280	9.0 x 9.0	QFN/64
SC2200	Dual RFPAL for MIMO Cellular BTS and Small Cells + Other MIMO Systems	698 to 2700	1.2 to 60	Closed Loop, Class AB, Doherty	2	1.8	2 x 950	11 x 11	QFN/80
SC1894	RFPAL for 3G/4G Cellular BTS/Small Cells + Microwave Backhaul + Broadcast	225 to 3800	1.2 to 75	Closed Loop, Class AB, Doherty	1	3.3, 1.8	1200	9.0 x 9.0	QFN/64
MAX2010	Adjustable RF Predistorter for 2G/3G + Feed-Forward PA	500 to 1100		Open-Loop Class AB	1	5	75	5.0 x 5.0	TQFN/28
MAX2009	Adjustable RF Predistorter for 2G/3G + Feed-Forward PA	1200 to 2500	Up to 100	Open-Loop Class AB	1	5	75	5.0 x 5.0	TQFN/28

See the parametric search for RF Power Amplifier Linearizers

RF Power Detectors

Our logarithmic and peak RF power detectors are designed to accurately convert RF signal power to an equivalent DC voltage. The wide dynamic range and excellent precision make the devices particularly useful for a variety of wireless applications, including automatic gain control (AGC), transmitter power measurements, and received signal-strength indication (RSSI).

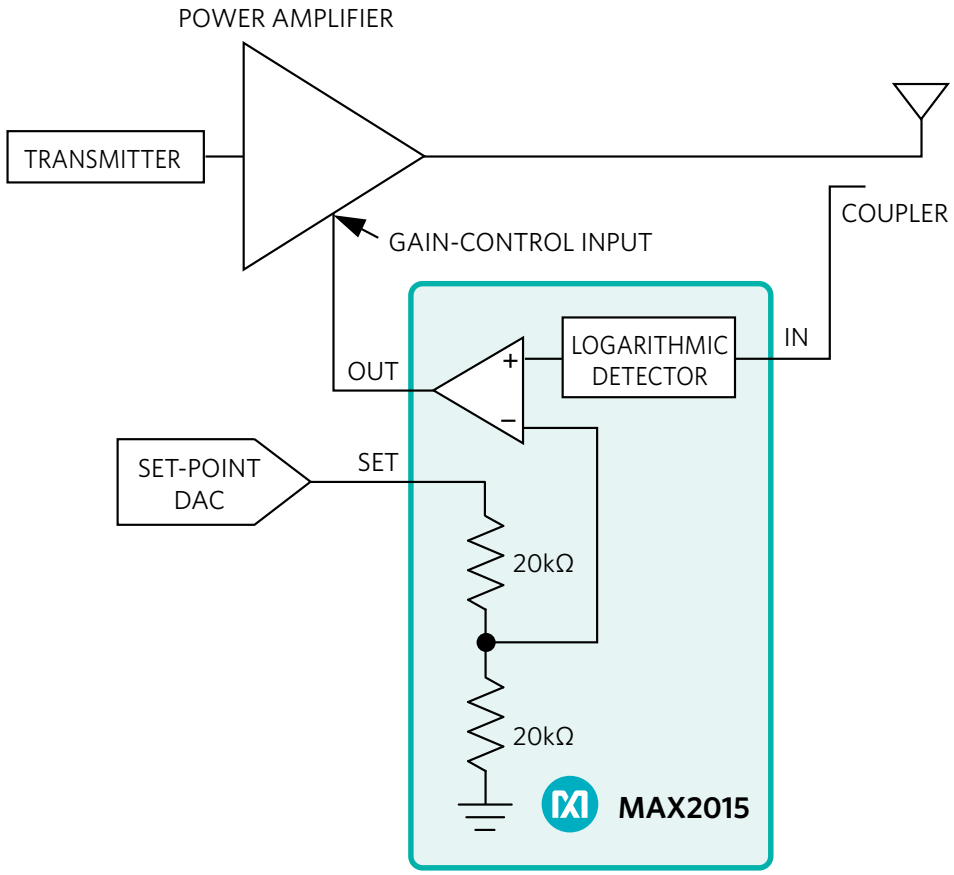


Table 25. RF Power Detectors

Part No.	Description	Detector Type	RF Freq. (min) (MHz)	RF Freq. (max) (MHz)	Dynamic Range (dB)	P_{RF} (50Ω Term) (dBm)	V_{CC} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/Pins
MAX2014	500MHz to 1100MHz Adjustable RF Predistorter	Log. Amp.	500	1000	75	-65 to +5	2.7 to 5.25	17.3	—	µMAX/8, TDFN-EP/8
MAX2015	0.1GHz to 3GHz 75dB Logarithmic Detector/ Controller	Log. Amp.	100	3000	75	-65 to +5	2.7 to 5.25	17.3	3.0 x 5.0	µMAX/8, TDFN-EP/8
MAX2016	LF to 2.5GHz Dual Logarithmic Detector/ Controller for Power, Gain, and VSWR Measurements	Log. Amp.		2500	80	-70 to +10	2.7 to 5.25	43	5.0 x 5.0	TQFN/28
MAX2204	RF Power Detector in SC70 Package	Peak	450	2500	21	-16 to +5	2.7 to 3.3	1.2	2.0 x 2.2	SC70/5
MAX4000	100MHz to 2.5GHz 45dB RF-Detecting Controller	Log. Amp.	100	2500	45	-45 to 0	2.7 to 5.5	5.9	1.5 x 1.5, 3.0 x 5.0	µMAX/8, UCSP/8, UCSP/9
MAX4001	100MHz to 2.5GHz 45dB RF-Detecting Controller	Log. Amp.	100	2500	45	-35 to +10	2.7 to 5.5	5.9	1.5 x 1.5, 3.0 x 5.0	µMAX/8, UCSP/8, UCSP/9
MAX4002	100MHz to 2.5GHz 45dB RF-Detecting Controller	Log. Amp.	100	2500	45	-30 to +15	2.7 to 5.5	5.9	1.5 x 1.5 , 3.0 x 5.0	µMAX/8, UCSP/8, UCSP/9
MAX4003	100MHz to 2.5GHz 45dB RF Power Detector in UCSP	Log. Amp.	100	2500	45	-45 to 0	2.7 to 5.5	5.9	1.5 x 1.5, 3.0 x 3.0, 3.0 x 3.5	µMAX/8, TDFN-EP/8, UCSP/8, UCSP/9
MAX9930	2MHz to 1.6GHz 45dB Log RF-Detecting Controller	Log. Amp.	2	1600	45	-45 to 0	2.7 to 5.25	7	3.0 x 5.0	µMAX/8
MAX9931	2MHz to 1.6GHz 45dB Log RF-Detecting Controller	Log. Amp.	2	1600	45	-35 to +10	2.7 to 5.25	7	3.0 x 5.0	µMAX/8
MAX9932	2MHz to 1.6GHz 45dB Log RF-Detecting Controller	Log. Amp.	2	1600	45	-30 to +15	2.7 to 5.25	7	3.0 x 5.0	µMAX/8
MAX9933	2MHz to 1.6GHz 45dB Log RF-Detector	Log. Amp.	2	1600	45	-45 to 0	2.7 to 5.25	7	3.0 x 5.0	µMAX/8

See the parametric search for RF Power Detectors

RF Transmitters, Receivers, and Transceivers

We offer a complete family of transmitters, receivers and transceivers for a variety of applications including 802.11x, DECT, home automation, security, remote sensors, automotive, and other ISM applications.

Table 26. > 1GHz Transceivers

Part No.	Description	Duplex Method	Frequency Range (MHz)	Inputs	Outputs	Tx OIP3 Power (max) (dBm)	Rx Noise Figure (dB)	V_{SUPPLY} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2410	Low-Cost RF Up/ Downconverter with LNA and PA Driver	TDD	800 to 2400	1 Rx	1 Tx	18	3.2	2.7 to 5.5	Rx: 20, Tx: 30	6.0 x 9.9	QSOP/28
MAX2411A	1.9GHz LNA, Downconverter, Upconverter, Driver and LO Buffer with Shutdown	TDD	800 to 2400	1 Rx	1 Tx	18	3.2	2.7 to 5.5	Rx: 20, Tx: 30	6.0 x 9.9	QSOP/28
MAX2550	Band I, V and VIII WCDMA Femtocell Transceiver with GSM Monitoring	FDD	824 to 849, 830 to 840, 865 to 894, 875 to 885, 880 to 915, 925 to 960, 1805 to 1880, 1920 to 1980, 2110 to 2170	2 Rx, 3 Monitor	2 Tx	0	3	2.7 to 3.6	Full-duplex high band: 298, Full-duplex low band: 300	7.0 x 7.0	TQFN/56
MAX2551	Band II and V WCDMA Femtocell Transceiver with GSM Monitoring	FDD	820 to 849, 865 to 894, 1850 to 1915, 1930 to 1995	-2 Monitor, 2 Rx	2 Tx	0	3	2.7 to 3.6	Full-duplex high band: 312, Full-duplex low band: 290	7.0 x 7.0	TQFN/56
MAX2552	Band III, IV, IX and X WCDMA Femtocell Transceiver with GSM Monitoring	FDD	865 to 894, 1710 to 1785, 1805 to 1880, 1930 to 1995, 2110 to 2170	1 Rx, 3 Monitor	1 Tx	0	3	2.7 to 3.6	Full-duplex high band: 300	7.0 x 7.0	TQFN/56
MAX2828	802.11a Transceiver	OFDM	4900 to 5875	1 Rx	1 Tx			2.7 to 3.6	Rx Mode: 135, Tx Mode: 142	8.0 x 8.0	TQFN/56

Table 26. > 1GHz Transceivers (Continued)

Part No.	Description	Duplex Method	Frequency Range (MHz)	Inputs	Outputs	Tx OIP3 Power (max) (dBm)	Rx Noise Figure (dB)	V_{SUPPLY} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX2829	Dual-Band 802.11a/b/g Transceiver		2400 to 2500, 4900 to 5875	Dual band, 1Rx	Dual band, 1 Tx			2.7 to 5.5	Rx Mode: 135, Tx Mode: 142	8.0 x 8.0	TQFN/56
MAX2830	2.4GHz to 2.5GHz 802.11g/b RF Transceiver with Power Amplifier and Rx/Tx/ Diversity Switch	OFDM	2400 to 2500	1 Rx	1 Tx	17.1	3.3	2.7 to 3.6	Rx: 82, Shutdown: 20µA, Tx: 104	7.0 x 7.0	TQFN/48
MAX2831	2.4GHz to 2.5GHz, 802.11g RF Transceiver with Integrated Power Amplifier	OFDM	2400 to 2500	1 Rx	1 Tx	18.5	2.6	2.7 to 3.6	Rx: 62, Shutdown: 20µA, Tx: 82	7.0 x 7.0	TQFN/48
MAX2832	2.4GHz to 2.5GHz, 802.11g RF Transceiver	OFDM	2400 to 2500	1 Rx	1 Tx	18.5	2.6	2.7 to 3.6	Rx: 62, Shutdown: 20µA, Tx: 86	7.0 x 7.0	TQFN/48
MAX2837	2.3GHz to 2.7GHz Wireless Broadband RF Transceiver	OFDM	2300 to 2700	1 Rx	1 Tx	0	2.3	2.7 to 3.6	Rx: 91, Shutdown: 10µA, Tx: 145	6.0 x 6.0	TQFN/48
MAX2838	3.3GHz to 3.9GHz Wireless Broadband RF Transceiver	OFDM	3300 to 3900	2 Rx	2 Tx	0	2.8	2.7 to 3.6	Rx: 103, Shutdown: 12µA, Tx: 152	6.0 x 6.0	TQFN/48
MAX2850	5GHz, 4-Channel MIMO Transmitter	OFDM	4900 to 5875	1 Rx	4-Channel Tx	-5	4.5		One transmitter is on: 188, Four transmitter is on: 505; Receive mode: 135	10 x 10	TQFN/68
MAX2851	5GHz, 5-Channel MIMO Receiver	OFDM	4900 to 5875	5-Channel Rx	1 Tx	-5	4.5		One receiver is on: 144, Five receivers are on: 367; Transmit mode: 183	10 x 10	TQFN/68
MAX2852	5GHz Receiver	OFDM	4900 to 5875	1 Rx	0 Tx		4.5		Rx Mode: 135: Shutdown: 10µA	10 x 10	TQFN/68

See the parametric search for > 1GHz Transceivers

Table 27. Sub-GHz Transceivers

Part No.	Description	Applications	Frequency Range (MHz)	Modulation Mode	Maximum Data Rate (kbps)	TX Output Power	RX Sensitivity	V_{SUPPLY} (V)	Operating Current (mA)	Footprint (mm x mm)	Package/ Pins
MAX7037	Sub-1GHz Ultra-Low-Power RF ISM Radio Transceiver with Integrated 8051 MCU	AMR, Cordless, ISM, Remote Controls, Remote Sensing, Security Systems, Smoke Alarms	300 to 928	FFSK/ FMSK/ASK	125	+6dBm	-100dBm	2.1V to 5.5V	Rx: 22	5.0 x 5.0	QFN/40
MAX7030	Low-Cost, 315MHz, 345MHz, and 433.92MHz ASK Transceiver	AMR, ISM, Remote Controls, Remote Sensing, Security Systems, Smoke Alarms	300 to 450	ASK/OOK	66	+10dBm	-114dBm	2.1V to 3.6V; 4.5V to 5.5V	Rx: < 6.7, Tx < 12.5	5.0 x 5.0	TQFN/32
MAX7032	Low-Cost, Crystal-Based, Programmable, ASK/FSK Transceiver	AMR, ISM, Remote Controls, Remote Sensing, Security Systems, Smoke Alarms	300 to 450	ASK/OOK/ FSK	66	+10dBm	-114dBm (ASK) -110dBm (FSK)	2.1V to 3.6V; 4.5V to 5.5V	Rx: < 6.7, Tx < 12.5	5.0 x 5.0	TQFN/32
MAX2510	IF Transceiver with Limiter/RSSI and Quadrature Modulator	AMR, Cordless, ISM	100 to 600	Quadrature		+1dBm		2.7V to 5.5V	Rx: 14, Tx: 17	6.0 x 9.9	QSOP/28
MAX2511	IF Transceiver with Limiter/RSSI and Image-Reject Upconverter Mixer	AMR, Cordless, ISM	200 to 440	Quadrature		+2dBm		2.7V to 5.5V	Rx: 24, Tx: 26	6.0 x 9.9	QSOP/28

Table 28. Sub-GHz Receivers

Part No.	Description	Band/ Freq. (MHz)	IF Output Freq. (MHz)	Modulation Mode	RX Sensitivity (dBm)	Maximum Data Rate (kbps)	V_{SUPPLY} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX1470	250MHz to 500MHz CMOS Superheterodyne ASK Receiver, with LNA, Image-Reject Mixer, PLL, VCO, IF Limiting Amplifier, RSSI, ASK Demodulator and Shutdown	250 to 500	10.7	ASK/OOK	-115	100	3.0V to 3.6V	5.5	6.3 x 9.7	TSSOP/28
MAX1471*	300MHz to 450MHz CMOS Superheterodyne ASK and FSK Receiver with Dual Baseband	300 to 450	10.7	ASK/OOK/ FSK	-114	66	2.4 to 3.6, 4.5 to 5.5	7	5.0 x 5.0	QFND/32, TQFN/32
MAX1473	300MHz to 450MHz CMOS Superheterodyne ASK Receiver, with LNA, AGC, Image-Reject Mixer, PLL, VCO, IF Limiting Amplifier, RSSI, ASK Demodulator and Shutdown	300 to 450	10.7	ASK/OOK	-115	100	2.4 to 3.6, 4.5 to 5.5	5.2	5.0 x 5.0, 6.3 x 9.7	TQFN/32, TSSOP/28
MAX7033	300MHz to 450MHz CMOS Superheterodyne ASK Receiver, with LNA, AGC, Image-Reject Mixer, PLL, VCO, IF Limiting Amplifier, RSSI, ASK Demodulator and Shutdown	300 to 450	10.7	ASK/OOK	-114	66	4.5 to 5.5	5.2	5.0 x 5.0, 6.3 x 9.7	TQFN/32, TSSOP/28
MAX7034*	315MHz/434MHz ASK Superheterodyne Receiver	300 to 450	10.7	ASK/OOK	-114	66	4.5 to 5.5	6.7		TSSOP/28
MAX7036*	300MHz to 450MHz ASK Receiver with Internal IF Filter	300 to 450	0.2	ASK/OOK	-109	66	3.3V/5V	5.5		TQFN/20
MAX7042*	308MHz/315MHz/418MHz/ 433.92MHz Low-Power FSK Superheterodyne Receiver	300 to 450	10.7	FSK	-110	66	2.4 to 3.6, 4.5 to 5.5	6.2	5.0 x 5.0	TQFN/32

* Automotive - AECQ100-qualified.

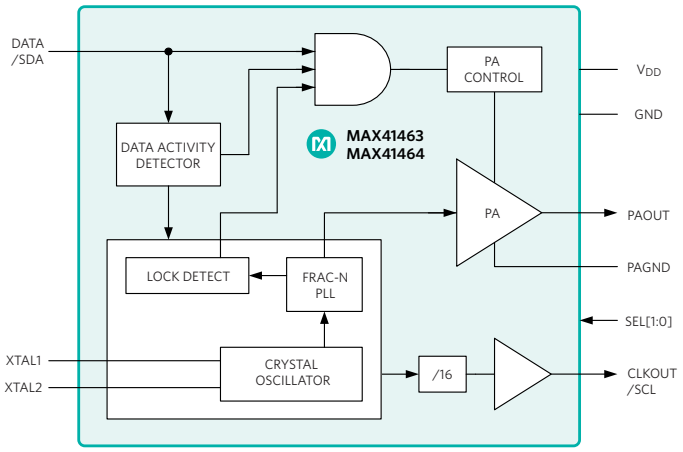
See the parametric search for Sub-GHz Transceivers

Sub-GHz Transmitters

Our sub-GHz transmitters offer the highest transmit output power while consuming the lowest supply current, extending both range and battery life, while offering the lowest implementation cost.

MAX41463/MAX41464
300MHz to 960MHz (G)FSK Transmitters with I²C Interface

The **MAX41463**/**MAX41464** are UHF sub-GHz ISM/SRD transmitters designed to transmit Frequency-Shift Keying (FSK), or Gaussian (G) FSK (or 2GFSK) data in the 286MHz to 960MHz frequency range. They integrate a fractional phase-locked-loop (PLL) so that a single, low-cost crystal can be used to generate commonly used worldwide sub-GHz frequencies. The fast response time of the PLL allows for frequency-hopping spread-spectrum protocols for increased range and security.

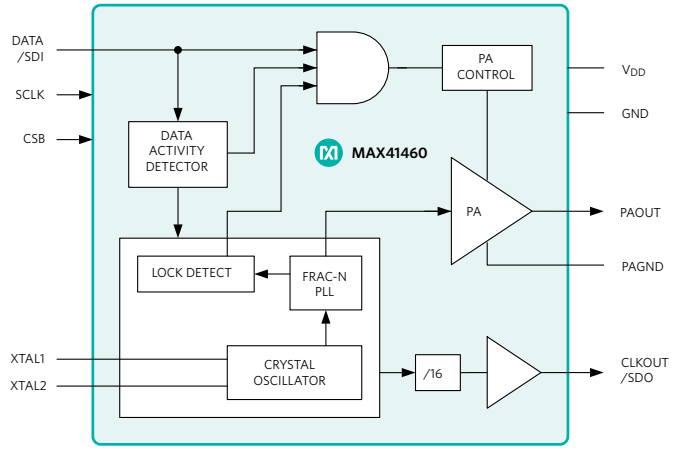


Key Features

- Low Implementation Cost
- Increased Range, Data Rates, and Security
- Extend Battery Life with Low Supply Current
- Ease-of-Use

MAX41460
300MHz to 960MHz ASK and (G)FSK Transmitter with SPI

The **MAX41460** is a UHF sub-GHz ISM/SRD transmitter designed to transmit on-off keying (OOK), amplitude-shift keying (ASK), frequency-shift keying (FSK), and Gaussian (G) FSK (or 2GFSK) data in the 286MHz to 960MHz frequency range. It integrates a fractional PLL so that a single, low-cost crystal can be used to generate commonly used worldwide sub-GHz frequencies.



Key Features

- Low Implementation Cost
- Increased Range, Data Rates, and Security
- Extend Battery Life with Low Supply Current
- Ease-of-Use

Table 29. Sub-GHz Transmitters

Part No.	Description	Band/ Freq. (MHz)	Tx Output Power (max) (dBm)	Modulation Supported	V_{SUPPLY} (V)	Footprint (mm x mm)	Package/ Pins
MAX1472	300MHz to 450MHz Low-Power, Crystal-Based ASK +10dBm Transmitter	300 to 450	+10.3	OOK/ASK	2.1 to 3.6	3.0 x 3.0	SOT23/8
MAX1479*	300MHz to 450MHz Low-Power, High Efficiency, Crystal-Based +10dBm ASK/FSK Transmitter	300 to 450	+10	ASK, OOK, and FSK	2.1 to 3.6	3.0 x 3.0	TQFN/16
MAX2370	Complete 450MHz Quadrature Transmitter	450	+10	Quadrature modulator	2.7 to 3.3	7.0 x 7.0	TQFN-EP/48
MAX2900	Complete Single-Chip 200mW Transmitter with 8-Channel Synthesizer, Modulator, PA, RF VCO, Baseband PN-Sequence Lowpass Filter	902 to 928	-7 to +23	BPSK, ASK, OOK, and FM	2.7 to 4.5	5.0 x 5.0	TQFN/28
MAX2902	Complete Single-Chip 200mW Transmitter with Modulator, PA, RF VCO, VCO Output Buffer, Baseband PN-Sequence	902 to 928	-7 to +23	BPSK, ASK, OOK, and FM	2.7 to 4.5	5.0 x 5.0	TQFN/28
MAX2903	Complete Single-Chip 200mW Transmitter with 2-Channel Synthesizer, Modulator, PA, RF VCO, VCO Output Buffer, Baseband PN-Sequence	867 to 870	-7 to +23	BPSK, ASK, OOK, and FM	2.7 to 4.5	5.0 x 5.0	TQFN/28
MAX2904	Complete Single-Chip 200mW Transmitter with Modulator, PA, RF VCO, VCO Output Buffer, Baseband PN-Sequence Lowpass Filter	867 to 870	-7 to +23	BPSK, ASK, OOK, and FM	2.7 to 4.5	5.0 x 5.0	TQFN/28
MAX7044	300MHz to 450MHz Low-Power, High Efficiency, Crystal-Based ASK +13dBm Transmitter	300 to 450	+12.5	OOK/ASK	2.1 to 3.6	3.0 x 3.0	SOT23/8
MAX7058	315MHz/390MHz Dual-Frequency ASK Transmitter	300 to 450	+10	OOK/ASK	2.1 to 3.6	4.0 x 4.0	TQFN/24

* Automotive - AECQ100-qualified.

Table 29. Sub-GHz Transmitters (Continued)

Part No.	Description	Band/ Freq. (MHz)	Tx Output Power (max) (dBm)	Modulation Supported	V_{SUPPLY} (V)	Footprint (mm x mm)	Package/ Pins
MAX7060*	300MHz to 450MHz Frequency-and-Output-Power Programmable ASK/FSK Transmitter	300 to 450	+14 (Tx Power with 5V Supply) +10 (Tx Power at 2.1V Supply)	ASK/FSK	2.1 to 3.6; 4.5 to 5.5	4.0 x 4.0	TQFN/24
MAX41460	300MHz to 960MHz ASK/FSK Transmitter with SPI Interface	300 to 960	+16	ASK/OOK/FSK/(G)FSK	1.8 to 3.6	3.0 x 3.0	µMAX/10
MAX41461	300MHz to 960MHz ASK Transmitter with Preset Frequency or I^2C Interface	300 to 960	+16	ASK/OOK	1.8 to 3.6	3.0 x 3.0	µMAX/10
MAX41462	300MHz to 960MHz ASK Transmitter with I^2C Interface	300 to 960	+16	ASK/OOK	1.8 to 3.6	3.0 x 3.0	µMAX/10
MAX41463	300MHz to 960MHz FSK Transmitter with Preset Frequency or I^2C Interface	300 to 960	+16	FSK/(G)FSK	1.8 to 3.6	3.0 x 3.0	µMAX/10
MAX41464	300MHz to 960MHz FSK Transmitter with Preset Frequency or I^2C Interface	300 to 960	+16	FSK/(G)FSK	1.8 to 3.6	3.0 x 3.0	µMAX/10

* Automotive - AECQ100-qualified.

See the parametric search for Sub-GHz Transmitters

AISG Transceivers

We were the first supplier to offer an AISG-compliant, fully integrated transceiver for base stations and tower-mounted equipment, the MAX9947. Available in a small, 3mm x 3mm 16-pin TQFN package, the MAX9947 is both AISG 1.0 and 2.0-compliant, while the MAX11947 is also AISG 3.0-compliant.

Table 30. AISG Transceivers

Part No.	Description	Applications	TX ON Power (dBm)	TX OFF Power (dBm)	RX Threshold (dBm)	V_{SUPPLY} (V)	I_{SUPPLY} (mA)	Footprint (mm x mm)	Package/ Pins
MAX9947	AISG Integrated Transceiver	AISG 1.0, AISG 2.0	+1 to +6.28	-40	-15	3.0 to 5.5	35	3.0 x 3.0	TQFN/16
MAX11947	4-Channel AISG 3.0 Integrated Modem	AISG 1.0, AISG 2.0, AISG 3.0	Contact Maxim						

Related Resources

- Webpages

  Wireless and RF

- User Guide
  - User Guide 6827: MAX2771 PLL Loop Filter Calculator User Guide
  - User Guide 6444: MAX2769/MAX2769C PLL Loop Filter Calculator User Guide
  - User Guide 6837: RFPAL Advanced GUI Installation Guide
  - User Guide 6838: SC1905 Hardware Design Guide
  - User Guide 6904: MUXDAC Data Source User Guide
- White Paper
  - White Paper: Navigating the GNSS Landscape for More Precise, Power-Efficient Receivers
- Tutorial
  - Tutorial 5300: RF Basics
- Application Notes
  - Application Note 4652: Simplify AISG Control Systems by Integrating the Hardware Discrete Transceiver
  - Application Note 5100: General Layout Guidelines for RF and Mixed-Signal PCBs
  - Application Note 5446: Direct-Sampling DACs in Theory and Application
  - Application Note 6269: Understanding the Operation of the Frequency Synthesizer in Maxim's RF Transceivers
  - Application Note 6320: Linearizing Microwave Transmission Power Amplifiers Using the SC1894
  - Application Note 6323: Optimizing Your Power Amplifier for Predistortion with RF PA Linearizer (RFPAL)
  - Application Note 6443: Tuning the MAX2248 for 2.4GHz Applications
  - Application Note 6544: Backhaul Alternatives for 4G/5G HetNet Base Stations Part 1 - Equipment Trends and Solution Toolbox
  - Application Note 6545: Backhaul Alternatives for 4G/5G HetNet Base Stations Part 2 – PTP Microwave and Broadband Satellite Systems
  - Application Note 6616: How to Configure the MAX2769C ADC Registers for DSP Interface Mode
  - Application Note 6883: Concerned About GNSS Inaccuracy? Expand Your Constellations
  - Application Note 7073: How to Extend the Reach of Your Low-Current Wireless Design Using the MAX4146X

Learn more

For more information, visit:
www.maximintegrated.com/RF

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