

# ESSENTIAL ANALOG PRODUCT BRIEFS

*A portfolio of high-performance analog ICs*



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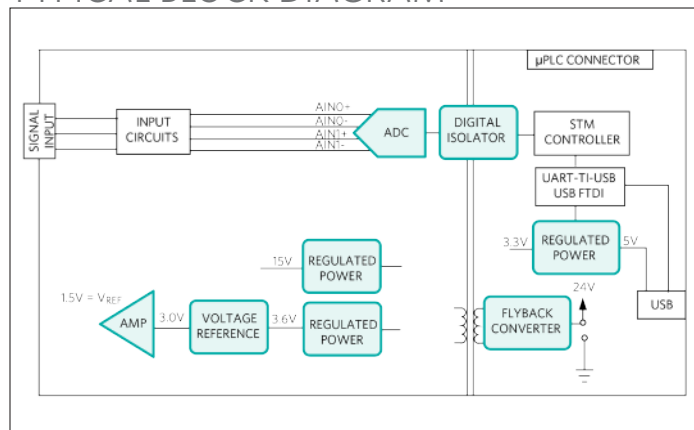
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### TYPICAL BLOCK DIAGRAM



### BENEFITS

- **High Resolution** - Precision measurements enabled by high resolution parts (8 to 24 bits)
- **Low Power** - Pin-compatible, upgradeable families provide design flexibility and low development costs
- **Small Footprints** - Integrated features and small packages reduce total solution size and cost
- **High Precision** - Best-in-class THD and linearity

### PORTFOLIO

- More than 400 SAR ADCs, more than 35ΣΔ ADCs
- 30 ADCs with > 18-bit resolution
- 55 ADCs with 16-bit resolution
- 10 ADCs with 24-bit resolution

### FOCUS PRODUCTS

Product	Resolution (Bits)	Channels	Sample Rate	Supply Voltage (V)	Power (mW)	Current Consumption	Package	Description
<b>MAX1139</b>	10	12	94.4ksps	3.3V	2.97	670μA at 94.4ksps 0.5μA in power-down mode	QSOP-16	I <sup>2</sup> C, Low-Power ADCs
<b>MAX11103</b>	12	2	3Msps	3.3V	5.2	3.3mA converting 1.3μA standby	μMAX®-10, TDFN-10	SPI, Small, Low-Power Serial ADC
<b>MAX11128*</b>	12	16	1Msps	3.3V	5.4	1.8mA converting 2μA standby	TQFN-28	SPI, Serial ADC with SampleSet™
<b>MAX11270</b>	24	1	64ksps	3.3V	10	2.4mA converting 1μA sleep	TSSOP-24	SPI, 130dB SNR with PGA, Sigma Delta ADC
<b>MAX11040K</b>	24	4	64ksps	3.3V	75	36mA converting 0.4μA shutdown	TSSOP-39	SPI, Simultaneous-Sampling, Cascadable, Sigma-Delta ADCs
<b>MAX11410</b>	24	10	1.92ksps	3.3V	1.29 bypass mode	390μA bypass mode 0.5μA sleep mode	TQFN-28	SPI, Low-Power, Delta-Sigma ADC with PGA
<b>MAX1230</b>	12	16	300ksps	5V	14	2.3mA converting 0.2μA shutdown	QSOP-24 TQFN-28	SPI, ADC with FIFO, Temp Sensor, Internal Reference
<b>MAX11168</b>	16	1	500ksps	5V	25	7.4mA converting 0.01μA shutdown	μMAX-10	SPI, SAR ADC with Internal Reference
<b>MAX11046</b>	16	8	250ksps	5V	240	55mA converting 20μA shutdown	TQFP-64 TQFN-56	SPI, Low Power, Diff SAR ADC
<b>MAX1300</b>	16	4-, 8-	115ksps	5V	79	17mA converting 1μA standby	TSSOP-24	SPI, ±12V, Multi-Range ADC






\*Automotive-qualified.

### FEATURE SELECTOR GUIDE


Integrated Reference	True Differential inputs	Beyond-the-Rails™	SampleSet	Simultaneous Sampling	Post Mux Conditioning
Conserve space in your design by including an ADC with an internal reference.	For maximum noise reduction, better SNR and high-performance applications, use an ADC with a differential input. A differential ADC measures the voltage difference between two signals instead of one signal and ground.	Eliminate the need for multiple power supplies by using an ADC that can accept high voltage (such as +12V) signals while operating from a low-voltage (3V to 5V) supply range.	On a multiplexed ADC, individually control the sample rate of each channel.	ADCs can take two or more analog measurements simultaneously to detect phase differences and time align with other ADCs.	Lower your solution cost and size by using a post mux conditioning ADC. Instead of requiring an op amp on each input signal, only one is needed on the mux output.
<a href="#">MAX11046</a> <a href="#">MAX11168</a> <a href="#">MAX1300</a> <a href="#">MAX11040K</a>	<a href="#">MAX11259</a> <a href="#">MAX11270</a> <a href="#">MAX11200</a> <a href="#">MAX11040K</a>	<a href="#">MAX1300</a> <a href="#">MAX11046</a> <a href="#">MAX11168</a> <a href="#">MAX1308</a>	<a href="#">MAX11131</a> <a href="#">MAX11129</a> <a href="#">MAX11137</a> <a href="#">MAX11126</a>	<a href="#">MAX11046</a> <a href="#">MAX11040K</a> <a href="#">MAX11060</a> <a href="#">MAX1379</a>	<a href="#">MAX11328</a>

### RELATED RESOURCES




#### Reference Designs

-  [MAXREFDES82#](#): Smart Force Sensor
-  [MAXREFDES75#](#): 24-Bit Weigh Scale with a 16-Bit DAC, 0 to 10V Output
-  [Santa Fe \(MAXREFDES5#\)](#): 16-Bit High-Accuracy Multi-Input Isolated Analog Front-End (AFE)
-  [MAXREFDES1150#](#): Smart Pill Bottle
-  [MAXREFDES1154#](#): Configurable 4-Channel RTD/TC Measurement System Using the MAX11410
-  [MAXREFDES1152#](#): Four-Channel Universal Analog Input Using the MAX11270




#### Design Solution

-  [Design Solution: Improve Ultrasound Image Clarity with the Right ADC](#)

#### Application Notes

-  [AN5384](#): Noise, ENOB and Effective Resolution in Analog to Digital Converter Circuits
-  [AN5282](#): Process High-Voltage Input Levels into a Low-Voltage ADC Without Losing Much SNR
-  [AN1080](#): Understanding SAR ADCs: Their Architecture and Comparison with Other ADCs

#### Tutorials

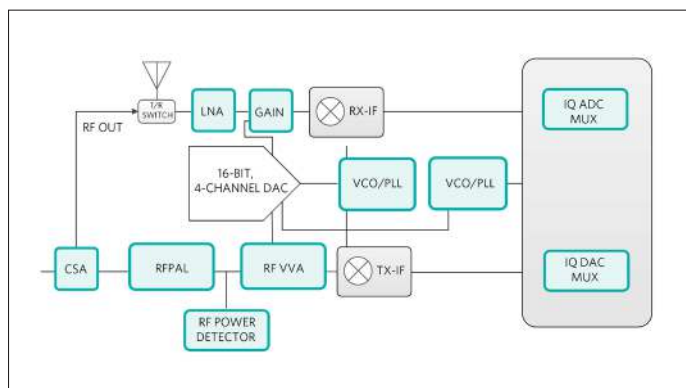
-  [The ABCs of ADCs: Understanding How ADC Errors Affect System Performance](#)
-  [AN1870](#): Sigma-Delta ADCs
-  [AN641](#): Types of ADCs and DACs

Our comprehensive portfolio of voltage and current DACs span different ranges of resolution and output voltage, ensuring the right product for your application. Features such as fast settling time, low power operation, internal references, and buffered/unbuffered outputs provide energy and space savings.

### BENEFITS

- Broad portfolio of low-power DACs from 4 bits to 20 bits (up to 32 channels) support a wide range of output voltages and currents
- Fast settling times and rail-to-rail operation ideal for precision applications
- Unique resolution/channel count configurations for both voltage and current outputs

### BLOCK DIAGRAM



### FOCUS PRODUCTS





Product	Output Type	Resolution (Bits)	Channels	Settling Time ( $\mu$ s)	VREF	Key Features
MAX5216	Voltage Buffered	16	1	14	External	High accuracy, 80 $\mu$ A low supply current
MAX5715	Voltage Buffered	12	4	4.5	Internal/ External	Ultra small, high accuracy
MAX5717/ MAX5719	Voltage Buffered	16/20	1	0.75	External	Lowest glitch energy
MAX5541	Voltage Buffered	16	1	1	External	Fast settling, high accuracy
MAX5550	Current Buffered	10	2	30	Internal	30mA output current
MAX5774	Voltage Buffered	14	32	20	External	High-channel density
MAX5825	Voltage Buffered	12	8	4.5	Internal/ External	Ultra-small solution
DS4424	Current Buffered	7	4	—	External	Source-sink current DAC
MAX5134	Voltage Buffered	16	4	5	Internal/ External	Low power, high precision, pin-programmable power-up

### FEATURE SELECTOR GUIDE



Product	Key Features	Resolution (Bits)	Channels	Settling Time (μs)	Application
<b>DS4424</b>	Source-sink current DAC	7	4	—	Power-supply margining
<b>MAX5112/MAX5113</b>	High-current/high-channel count	14	9	15	Tunable laser diode biasing
<b>MAX5216</b>	High-accuracy, 80μA low-supply current	16	1	14	Industrial
<b>MAX5217</b>	Rail-to-rail operation	16	1	18	Industrial
<b>MAX5541</b>	Fast settling, high accuracy	16	1	1	Industrial, test and measurement
<b>MAX5550</b>	30mA output current	10	2	30	Optical modules
<b>MAX5621</b>	High-resolution, high-channel count	16	16	—	Test and measurement
<b>MAX5702</b>	Fast settling, high accuracy	12	2	4.5	Industrial, communications
<b>MAX5705</b>	User-configurable asynchronous I/O function	12	1	6.3	Industrial
<b>MAX5715</b>	Ultra-small, high accuracy	12	4	4.5	Communications
<b>MAX5717/MAX5719</b>	Lowest glitch energy, fast settling	16/20	1	0.75	Precision instrumentation
<b>MAX5774</b>	High-channel count	14	32	20	Test and measurement
<b>MAX5816</b>	Low-power, selectable internal reference	12	4	4.5	Industrial, communications
<b>MAX5825</b>	High-channel count	12	8	4.5	Test and measurement

### RELATED RESOURCES

#### Application Notes

-  **AN5581: Challenge the Conventional - Make Unipolar DACs Bipolar**
-  **AN5610: High-Performance, High-Accuracy 4-20mA Current-Loop Transmitter Meets Toughest Industrial Requirements**
-  **AN5083: Digital-to-Analog Converter Fine-Tunes Reference Output**
-  **AN807: Force/Sense DAC Applications**

#### Reference Designs

-  **MAXREFDES60#: 16-Bit Analog Output Micro PLC**
-  **MAXREFDES74#: 18-Bit Precision Data Acquisition System**

#### Tutorial

-  **Tutorial 641: Types of ADCs and DACs**



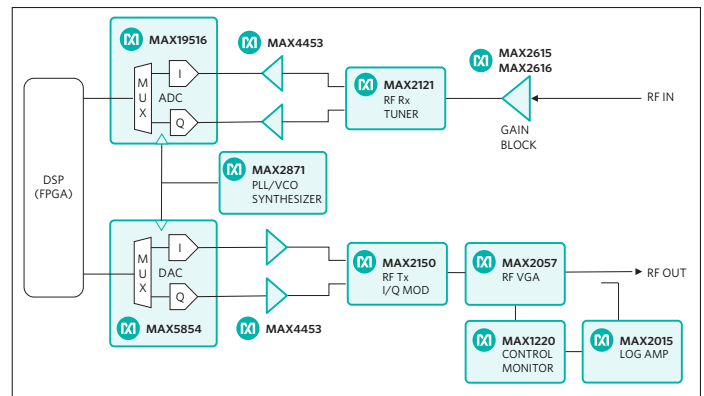
## ADC/DAC FEATURES AND BENEFITS

- 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

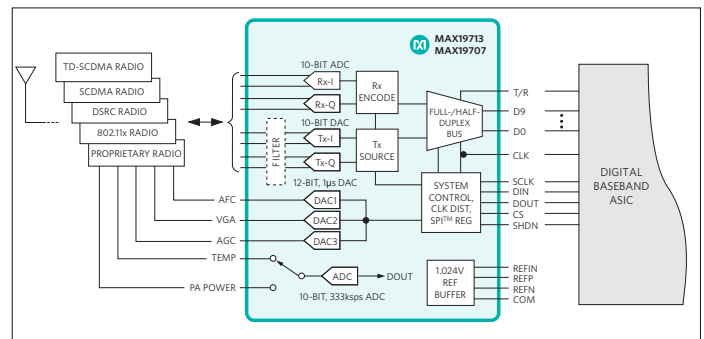
## AFE FEATURES AND BENEFITS

- 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

## ANALOG RF RECEIVER/TRANSMITTER



## FULL AND HALF DUPLEX ANALOG FRONT-END



## FOCUS PRODUCTS

Product	Description	Performance	Power	Pin-Compatible Family
<b>MAX19516</b>	Dual 10-Bit, 100Msp ADC	60dBFS SNR at 70MHz 82dBc SFDR at 70MHz	57mW/channel	10Msp/8-Bit 65Msp/100Msp/130Msp
<b>MAX5854</b>	Dual 10-Bit, 165Msp DAC	73dBc SFDR at 40MHz 65.5dB ACLR at 30.7MHz	95mW/channel	10Msp/8-Bit 80Msp/165Msp
<b>MAX19713</b>	Dual 10-Bit, 45Msp AFE	ADC: 54.1dB SNR at 5.5MHz DAC: 70.3dBc SFDR at 2.2MHz	92mW Full-Duplex	7.5Msp/11Msp/22Msp/45Msp Full-Duplex and Half-Duplex
<b>MAX5857</b>	Single 16-Bit, 5.9Gsp RF DAC	1.2GHz BW from DC to 2.8GHz	2.7W @ 4.9Gsp	5.9Gsp, 600MHz TBW

## RELATED RESOURCES

- AN4466: Aperture Jitter Calculator for ADCs
- AN3853: Equalizing Techniques Flatten DAC Frequency Response
- AN5519: Navigate the AFE and Data-Converter Maze in Mobile Wireless Terminals
- AN5317: Implementing a Direct RF Transmitter for Wireless Communications
- High-Speed ADCs Portfolio
- High-Speed DACs Portfolio
- High-Speed AFEs Portfolio
- High-Performance RF Building Blocks
- RF Transceiver/Receiver/Transmitter Portfolio

## HIGH-SPEED ADCs

Product	Resolution (Bits)	Sample Rate (MSPS)	Input Channels	Data-Bus Interface	Supply Voltage (V)
MAX105/7	6	800/400	2	LVDS	5 and 3.3
MAX1003/2	6	90/60	2	CMOS	5 and 3.3/5
MAX19507/6/5	8	130/100/65	2	CMOS	1.8 or 2.5 to 3.3V
MAX1198/7/5	8	100/60/40	2	CMOS	3
MAX1196	8	40	2	CMOS, mux	3
MAX1193/2/1	8	45/22/7.5	2	CMOS, mux	3
MAX19191/2	8	10	1/2	CMOS/mux	3
MAX19517/6/5	10	130/100/65	2	CMOS	1.8 or 2.5 to 3.3V
MAX1190	10	120	2	CMOS	3.3
MAX1180/1/2/3/4	10	105/80/65/40/20	2	CMOS	3.3/3/3/3/3
MAX1186/5	10	40/20	2	CMOS, mux	3
MAX1425/6	10	20/10	1	CMOS	5 and 3.3
MAX19538	12	95	1	CMOS	3.3
MAX1209/11	12	80/65	1	CMOS	3.3
MAX1208/6	12	80/40	1	CMOS	3.3
MAX12527	12	65	2	CMOS	3.3
MAX1127/6	12	65/40	4	LVDS	1.8
MAX1420/1/2	12	60/40/20	1	CMOS	3
MAX12555/3	14	95/65	1	CMOS	3.3
MAX12558/7	14	80/65	2	CMOS	3.3
MAX1205	14	1	1	CMOS	5/3.3
MAX19588/6	16	100/80	1	CMOS	3.3

## HIGH-SPEED DACs

Product	Resolution (Bits)	Update Rate (MSPS)	Output Channels	Data-Bus Interface	Supply Voltage (V)
MAX5190/87	8	40	1	CMOS	2.7 to 5.5
MAX5186/88/89/91	8	40	2	CMOS	2.7 to 5.5
MAX5184/1	10	40	1	CMOS	2.7 to 5.5
MAX5180/2/3/5	10	40	2	CMOS	2.7 to 5.5
MAX5852/1	8	165/80	2	CMOS	3
MAX5854/3	10	165/80	2	CMOS	3
MAX5856A/58A	8/10	300	2	CMOS	3.3
MAX5883/4/5	12/14/16	200	1	CMOS	3.3
MAX5873/4/5	12/14/16	200	2	CMOS	1.8, 3.3
MAX5876/7/8	12/14/16	250	2	LVDS	1.8, 3.3
MAX5886/7/8	12/14/16	500	1	LVDS	3.3
MAX5893/4/5	12/14/16	500	2	CMOS	1.8, 3.3
MAX5898	16	500	2	LVDS	1.8, 3.3
MAX5889/90/91	12/14/16	600	1	LVDS	1.8, 3.3
MAX19692/3	12	2300/4000	1	LVDS	1.8, 3.3
MAX5881	12	4300	1	LVDS	1.8, 3.3
MAX5879	14	2300	1	LVDS	1.8, 3.3
MAX5882	14	4600	1	LVDS	1.8, 3.3
MAX5868	16	4960	1	LVDS	1.0, 1.8
MAX5869	16	5898	1	JESD204B	1.0, 1.8
MAX5850	14	3072	1	JESD204B	1.0, 1.8
MAX5855	16	4900	1	JESD204B	1.0, 1.8
MAX5857	16	5900	1	JESD204B	1.0, 1.8
MAX5871	16	5900	1	JESD204B	1.0, 1.8

## ANALOG FRONT-ENDS (AFEs)

Product	ADCs (Bits)	ADC Sample Rate (MSPS)	DACs (Bits)	DAC Update Rate (MSPS)	Supply Voltage (V)
MAX5866/5/4/3	2 x 8	60/40/22/7.5	2 x 10	60/40/22/7.5	3.3
MAX19707/8	2 x 10	45/11	2 x 10	45/22/11/7.5	3.3
MAX19713	2 x 10	45	2 x 10	45/22/11/7.5	3.3

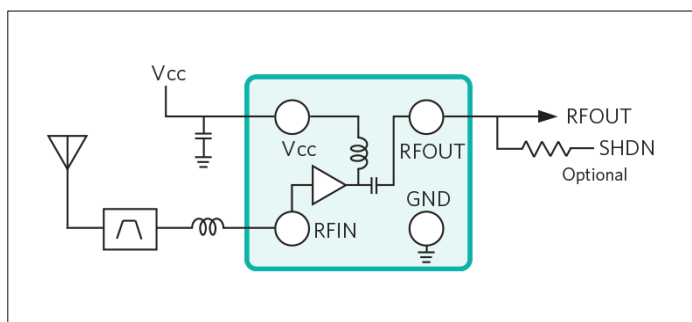


As a leader in GPS low-noise amplifiers, our broad selection of LNAs offers best-in-class noise figure and gain, and covers all GNSS constellations.

## BENEFITS

- Ultra-low noise figure, high gain, and best linearity/ mA provide high-performance operation
- Smallest packages and low external BOM reduce total solution size
- Integrated LDOs ideal for battery-powered applications
- Pin-for-pin compatibility facilitates design flexibility

## TYPICAL FUNCTIONAL DIAGRAM



## FOCUS PRODUCTS


Product	Description	RF Freq Range (MHz)	Noise Figure (dB)	Gain (dB)	Input IP3 (dBm)	I <sub>SUPPLY</sub> (mA)	Footprint (mm x mm)	Package/Pins
<b>MAX2693L</b>	GNSS L1/E1/G1/B1 with LDO	1575 to 1610	1.05	18.4	-14.3	1.8	0.86 x 0.86	WLP/4
<b>MAX2686</b>	GNSS L1/E1/G1/B1	1575 to 1610	0.75	19	-3	4.1	0.86 x 0.86	WLP/4
<b>MAX2686L</b>	GNSS L1/E1/G1/B1 with LDO	1575 to 1610	0.88	19	-4.1	5	0.86 x 0.86	WLP/4
<b>MAX2679/B</b>	GNSS L1/E1/G1/B1/L5/B2a/E5a	1176 to 1575	0.95/1.03	19/16.5	-17/-19	1/0.6	0.83 x 0.83	WLP/4
<b>MAX2659*</b>	GNSS L1/E1/G1/B1/L2/L5/B2a/E5a/L6/E6	1278 to 1575	0.8	20.5	-5	4.1	1.0 x 1.5	μDFN/6

\*Automotive-qualified.


## APPLICATION REFERENCE

Part Number	Smartphone	Wearables	Road	Agriculture	Maritime	Surveying	Timing	Rail	Aviation
<b>MAX2693L</b>		X							
<b>MAX2686</b>	X	X	X	X	X	X	X	X	X
<b>MAX2686L</b>	X	X	X		X				
<b>MAX2679/B</b>	X	X	X		X		X		
<b>MAX2659</b>	X	X	X		X		X		

## RELATED RESOURCES

 AN4286: Providing Additional Low-Frequency Rejection with the MAX2659 GPS Low-Noise Amplifier (LNA)

 AN3642: Choosing a Low-Noise Amplifier

 AN4264: Increasing the IP3 of the MAX2659 Low-Noise Amplifier (LNA)

 AN5429: IP3 and Intermodulation Guide

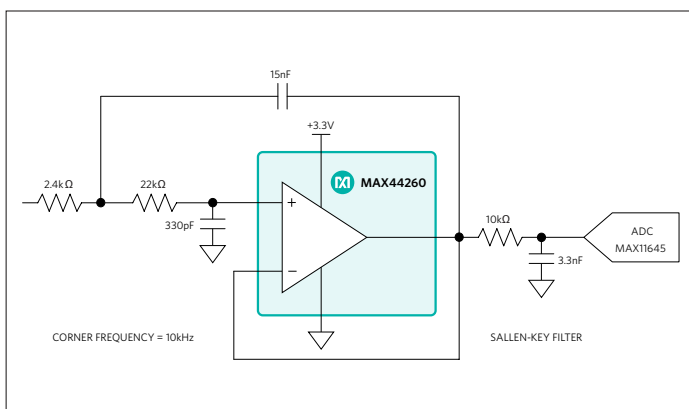
# HIGH-PRECISION LOW-NOISE OP AMPS FOR HIGH SYSTEM ACCURACY

As a leading supplier of operational amplifiers for over 30 years, our broad range of op amps includes a unique combination of high speed, precision, low noise, and low-voltage operation.

## BENEFITS

- Large portfolio of tiny, low-power op amps for a wide operating range (1.8V to 36V) supports many applications
- Highest precision, lowest noise amps drive high resolution ADCs and support the highest system accuracy
- Low offset voltages and low drift enhance system accuracy, ideal for high-precision applications
- Lowest power consumption available ideal for portable consumer and medical applications

## TYPICAL OPERATING CIRCUIT



## FOCUS PRODUCTS

Product	No. of Amps	Supply Current per Amp (max)	Gain Bandwidth	Supply Voltage (V)	Noise	Voltage Offset (max)	Package
MAX4230	1	1.1mA	10MHz	2.7 to 5.5	15nV/√Hz at 1kHz	68mV	SC70-6, μDFN
MAX4238*/39*	1	600μA	1MHz/6.5MHz	2.7 to 5.5	1.5μVp-p from DC to 10Hz	3.5μV/0.1μV	TDFN-6, SOT23-6
MAX40006	1	4.5μA	300kHz	1.7 to 5.5	440nV/√Hz at 10kHz	200μV	0.73mm x 1.07mm WLP-6, SOT23
MAX40007	1	900nA	20MHz	1.7 to 5.5	513nV/√Hz at 1kHz	1.3mV	WLP, SOT23-6
MAX40075*/77/78/79/87/88/89	1/2/4	< 1μA	10MHz	2.7 to 5.5	4.2nV/√Hz at 30kHz	450μV	SOT23-6, WLP-6
MAX40100	1	66μA	1.5MHz	1.6 to 5.5	42nV/√Hz at 1kHz	10μV	WLP-6
MAX44211	1	1000μA	9kHz	2.7 to 5.5	120nV/√Hz at 100kHz		4mm x 4mm TDFN-20
MAX44241/46/43	1/2/4	550μA	5MHz	2.7 to 36	9nV/√Hz at 1kHz	5μV	μMAX-8, SOT23-5, SOIC-8, SOIC-14, TSSOP-14
MAX44242	2	1.6mA	10MHz	2.7 to 20	5nV/√Hz at 1kHz	600μV	SOT23-8
MAX44259/60/61/63/80/90	1/2	1200μA	15MHz	1.8 to 5.5	12.7nV/√Hz at 10kHz	50μV	SOT23-5, SC70-8 SC70/UTLGA-6

\*Automotive-qualified.

## RELATED RESOURCES

 AN5597: Simulation Shows How Real Op Amps Can Drive Capacitive Loads

 AN4699: Overview of Sensor Signal Paths

 AN3642: Choosing a Low-Noise Amplifier

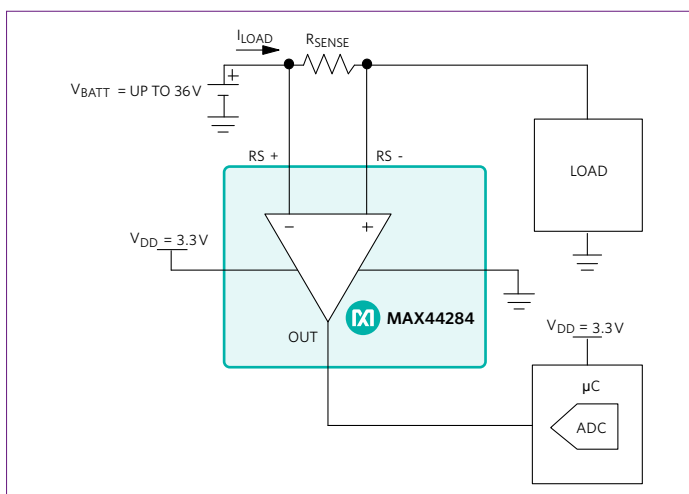
 AN4437: Zero-Drift Instrumentation Amplifier Takes the Strain Out of Sensor Measurements

Our high-side and low-side current-sense amplifiers feature very low input offset voltage and wide common-mode voltage to provide accurate measurements over a wide dynamic range, from milliamps to tens of amps.

## BENEFITS

- Low input offset voltage supports high-precision measurements
- High-side or low-side sensing amps with a wide range of common mode voltage, from below ground to 76V, enable accurate measurements for many applications
- Power monitors provide instantaneous current and voltage readings

## TYPICAL APPLICATION CIRCUIT





## FOCUS PRODUCTS

Product	Common-Mode Voltage Range (V)	Supply Voltage (V)	Gain Accuracy % @ 25°C (max)	Voltage Offset (max)	Supply Current (typ)	Output Format	Package
<a href="#">MAX4080/81</a>	4.5 to 76	4.5 to 76	0.6	100μV	75μA	Voltage	μMAX-8 SO-8
<a href="#">MAX4372/73/74</a>	0 to 28	2.7 to 28	0.18	0.3mV	30μA	Voltage	3x2 UCSP, SOT23-5
<a href="#">MAX44284</a>	-0.1 to +36	1.7 to 5.5	0.15	10mV	21μA	Voltage	1.3mm x 0.9mm SOT23-6 WLP-6
<a href="#">MAX9611/12</a>	0 to 60	2.7 to 5.5	0.5	300mV	1600μA	Integrated ADC	μMAX-10
<a href="#">MAX9918*/19*/20*</a>	-20 to +75	4.5 to 5.5	0.6	200mV	1000μA	Voltage	SO-8
<a href="#">MAX44298</a>	-0.1 to 0.1	3 to 5.5	2.5		1000μA	Voltage Current Power	2.4mm x 2.4mm WLP-16
<a href="#">MAX44286</a>	1.6 to 5.5	1.6 to 5.5	0.23	30mV	12.5μA	Voltage	0.78mm x 0.78mm WLP-4
<a href="#">MAX34406-09</a>	2.5 to 13.2	2.7 to 3.6	2	191mV	1000μA	Integrated ADC	0.78mm x 0.78mm WLP-4
<a href="#">MAX9938</a>	1.6 to 28	1.6 to 28	0.5	500μV	1μA	Voltage	μDFN-6, SOT23-5, UCSP-4
<a href="#">MAX40056*</a>	-0.1 to +65	2.7 to 5.5	1.5	300μV	30μA		WLP-8, μMAX-8
<a href="#">MAX9634</a>	1.6 to 28	1.6 to 28	0.5	0.25	0.5	Voltage	SOT23-5, UCSP, WLP-4

\*Automotive-qualified.

## RELATED RESOURCES

 [AN5073: Accurate High-Side Current-Sense Amplifier Monitors PWM Load Current](#)

 [AN3888: Performance of Current-Sense Amplifiers with Input Series Resistors](#)

 [AN4837: Protect Current-Sense Amplifiers from Negative Overvoltage](#)

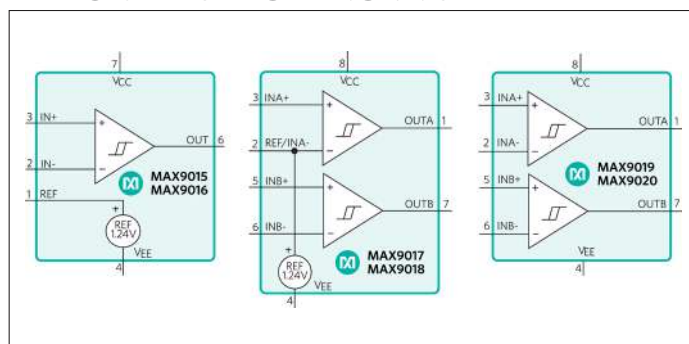
# COMPARATORS OFFER SMALLEST SIZE AND LOWEST POWER

Our large portfolio of advanced comparators feature the lowest power consumption and smallest packages available. With options for high-speed operation and integrated references, we have comparators to meet all your design needs.

## BENEFITS

- Large portfolio of low-cost, low-power comparators with small packages provides options for many applications
- High-speed comparators enable minimal system delay for overvoltage/undervoltage conditions
- Ultra-low quiescent currents ideal for portable devices, energy harvesting, and system monitoring applications

## TYPICAL TIMING DIAGRAM



## FOCUS PRODUCTS


Product	No. of Comparators	Supply Current (max)	Propagation Delay	Supply Voltage (V)	Internal reference	Output Type	Temp Range (°C)	Package
MAX999	1	6500µA	4.5ns	2.7 to 5.5	No	Push-pull	-40 to +125	5-SOT23
MAX9015*/16	1	1.5µA	6µs	1.8 to 5.5	Yes, 1% to 6% accurate	Open drain/push-pull	-40 to +85	8-SOT23
MAX9017*/18*	2	1.5µA	6µs	1.8 to 5.5	Yes, 1% to 6% accurate	Open drain/push-pull	-40 to +85	8-SOT23
MAX9031	1	55µA	228ns	2.5 to 5.5	No	Open drain	-40 to +125	5-SC70, 5-SOT23
MAX9060/61/62/63/64	1	0.7µA	15µs	1.0 to 5.5	Yes, 6% accurate	Open drain/push-pull	-40 to +85	5-SOT23, 1mm x 1mm 4-USCP
MAX9647/48	1	100µA	100ns	1.8 to 5.5	No	Open drain	-40 to +125	5-SC70, 5-SOT23
MAX40000/1	1	1.7µA	3.2µs	1.7 to 5.5	Yes, 1% accurate	Open drain/push-pull	-40 to +125	6-WLP/6-SOT23
MAX40002/3/4/5	1	1.1µA	9µs	1.7 to 5.5	Yes, 6% accurate	Open drain/push-pull	-40 to +125	6-WLP/5-SOT23
MAX40008/9	1	25µA	0.22µs	1.7 to 5.5	No	Open-drain/push-pull	-40 to +125	6-WLP/6-SOT23
MAX49017*	1	2.55µA	3.2µs	1.7 to 5.5	Yes, 1% accurate	Push-pull	-40 to +125	8-TDFN

\*Automotive-qualified.

## RELATED RESOURCES

 Tutorial 886: Selecting the Right Comparator

 AN6378: How To Monitor State-Of-Charge In Small Batteries With Tiny, Ultra-Low-Power Comparators

 AN4061: Measuring the Output Jitter of the MAX999 Comparator

 AN3616: Adding Extra Hysteresis To Comparators

## FEATURE SELECTOR GUIDE

Product	No. of Comparators	Supply Current per Comp (max) (μA)	Propagation Delay	Supply Voltage (V)	Int. Ref.	Output Type	Temp. Range (°C)	Package
<a href="#">MAX9030/31</a>	1	55	0.18μs	2.5 to 5.5	No	Push-pull	-40 to +125	SC70-5/6, SOT23-5/6
<a href="#">MAX9032*/34</a>	2/4	55	0.18μs	2.5 to 5.5	No	Push-pull	-40 to +125	SOT23-8, μMAX-8, SO-14, TSSOP-14
<a href="#">MAX9647/48</a>	1	100	100ns	1.8 to 5.5	No	Open drain	-40 to +125	SC70-5, SOT23-5
<a href="#">MAX9060/61</a>	1	0.7	15μs	1.0 to 5.5	Yes, 6% accurate	Open drain/push-pull	-40 to +85	SOT23-5, 1x1mm USCP-4
<a href="#">MAX9065</a>	2 (Window detector)	1.0	25μs	1.0 to 5.5	Yes, 3.8% to 6% accurate	Open drain/push-pull	-40 to +85	SOT23-5, 1x1mm UCSP-4
<a href="#">MAX9019/20</a>	2	1.5	6μs	1.8 to 5.5	Yes, 1% accurate	Open drain/push-pull	-40 to +85	SOT23-8
<a href="#">MAX9117/18/19/20</a>	1	1.5	14μs	1.6 to 5.5	Yes, 1.75% to 6% accurate	Open drain/push-pull	-40 to +85	SC70-5, SO-8
<a href="#">MAX9140/41/42/44</a>	1/2/4	250	0.4μs	2.7 to 5.5	No	Push-pull	-40 to +125	SC70-5, SOT23-5, SOT23-8, TSSOP-14
<a href="#">MAX9201/02/03</a>	4/2/1	2400	0.007μs	4.75 to 10.5	No	Push-pull	-40 to +85	SOT23-8, TSSOP-14, TSSOP-16
<a href="#">MAX999</a>	1	6500	0.0045μs	2.7 to 5.5	No	Push-pull	-40 to +125	SOT23-5
<a href="#">MAX9031</a>	1	55	228ns	2.5 to 5.5	No	Open drain	-40 to +125	SC70-5, SOT23-5
<a href="#">MAX40002/3/4/5</a>	1	1.1	9μs	1.7 to 5.5	Yes, 6% accurate	Open drain/push-pull	-40 to +125	WLP-5/ SOT23-5
<a href="#">MAX40000/1</a>	1	1.7	3.2μs	1.7 to 5.5	Yes, 1% accurate	Open drain/push-pull	-40 to +125	WLP-6/ SOT23-6
<a href="#">MAX40008/9</a>	1	25	0.22	1.7 to 5.5	No	Open drain/push-pull	-40 to +125	WLP-6/ SOT23-6
<a href="#">MAX49017*</a>	1	2.55	3.2μs	1.7 to 5.5	Yes, 1% accurate	Push-pull	-40 to +125	8-TDFN

\*Automotive-qualified.

For additional features and devices, please consult:

[Comparator Parametric Search Table](#)

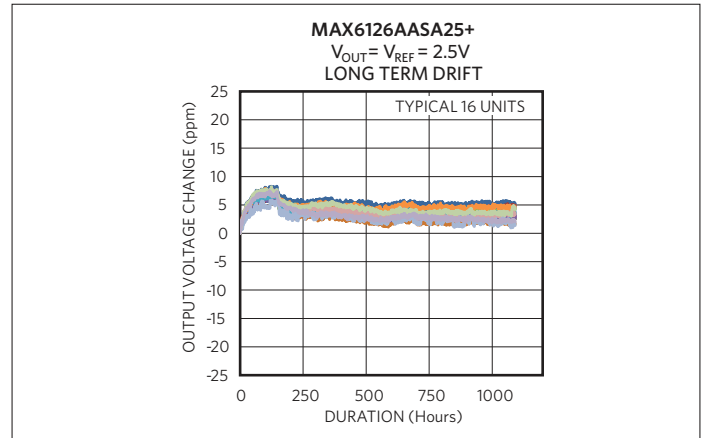
# VOLTAGE REFERENCES with LOWEST DRIFT OVER TIME AND TEMPERATURE

Our industry-leading portfolio of shunt and series voltage reference ICs offer low-noise operation, excellent initial accuracy, and the lowest drift over time and temperature.

## BENEFITS

- Broad portfolio of voltage references supports many different applications
- Tiny series and shunt references with very low input current are ideal for portable and hand-held devices
- Our low-temperature-coefficient, low-noise references drive the industry's highest performance 24-/20-/18-/16-bit ADCs

## TYPICAL LONG TERM DRIFT








## FOCUS PRODUCTS

Product	Temp. Coeff. (max)	$V_{OUT}$ (V)	Supply Current (max)	Supply Voltage (V)	Noise, 0.1Hz to 10Hz	Initial Accuracy (%)	Temp. Range (°C)	Package
<a href="#">MAX6078A</a>	10	1.25, 2.048, 2.5, 3.0, 3.3, 4.096, 5.0	15µA	2.3 to 5.5	12µVp-p	0.04	-55 to +125	6-WLP, 8-TDFN
<a href="#">MAX6126</a>	3	2.048, 2.5, 3, 3.3, 3.6, 4.096, 5	550µA	2.7 to 12.6	1.35µVp-p	0.06	-40 to +125	8-µMAX®, 8-SO
<a href="#">MAX6325/41/50</a>	1	2.5, 4.096, 5	3200µA	8 to 36	1.5µVp-p	0.02	-40 to +85	8-SO
<a href="#">MAX6070*/71*</a>	6	1.25, 1.8, 2.048, 2.5, 3, 3.3, 4.096, 5	200µA	2.8 to 5.5	3.6µVp-p	0.04	-40 to +125	6-SOT23
<a href="#">LM4040*</a>	100	2.048, 2.5, 3, 3.3, 4.096, 5	65µA	Shunt reference, n/a	—	0.1	-40 to +125	3-SC70, 3-SOT23
<a href="#">MAX6079</a>	6	2.5	160µA	2.8 to 5.5	4.8µVp-p	0.08	-40 to +125	8 LLC
<a href="#">MAX6226</a>	5	2.5	380µA	2.7 to 12.6	1.45µVp-p	0.02	-40 to +125	8 LLC
<a href="#">MAX6279</a>	25	1.225	40µA	N/A	20µVRMS	0.1	-40 to +85	8 LLC

\*Automotive-qualified.

## RELATED RESOURCES

-  [AN2879: Selecting the Optimum Voltage Reference](#)
-  [AN4003: Series or Shunt Voltage Reference](#)
-  [AN4300: Calculating the Error Budget in Precision Digital-to-Analog Converter \(DAC\) Applications](#)
-  [Tutorial 719: Understanding Voltage-Reference Topologies and Specifications](#)
-  [Associated Error Budget Calculator Tool with AN4300](#)



## FEATURE SELECTOR GUIDE

Product	Temp. Coeff. (max)	V <sub>OUT</sub> (V)	Supply Current (max)	Supply Voltage (V)	Noise, 0.1Hz to 10Hz	Initial Accuracy	Temp. Range (°C)	Package	Features
<a href="#">MAX6078A</a>	10	1.25, 2.048, 2.5, 3.0, 3.3, 4.096, 5.0	15μA	2.3 to 5.5	12μV <sub>p-p</sub>	±0.04	-55 to +125	6-WLP, 8-TDFN	Best LTD ceramic
<a href="#">MAX6325/41/50</a>	1	2.5, 4.096, 5	3200μA	8 to 36	1.5μV <sub>p-p</sub>	0.02	-40 to +85	8-SO	Lowest tempco
<a href="#">MAX6126</a>	3	2.048, 2.5, 3, 3.3, 3.6, 4.096, 5	550μA	2.7 to 12.6	1.35μV <sub>p-p</sub>	0.06	-40 to +125	8-μMAX, 8-SO	Lowest noise
<a href="#">MAX6133</a>	3 (A), 5 (B)	2.5, 3, 4.096, 5	85μA	2.7 to 12.6	16μV <sub>p-p</sub>	0.04 (A), 0.08 (B)	-40 to +125	8-SO	Low tempco, low power
<a href="#">MAX6173/74/75/76/77</a>	3 (A), 10 (B)	2.5, 3.3, 4.096, 5, 10	600μA	4.5 to 40	3.8μV <sub>p-p</sub>	0.06 (A), 0.1 (B)	-40 to +125	8-SO	Internal temp sensor
<a href="#">MAX6190/91/92/93/94/95/98</a>	5 (A), 10 (B), 25 (C)	1.25, 2.048, 2.5, 3, 4.096, 4.5, 5	35μA	2.5 to 12.6	25μV <sub>p-p</sub>	0.16 (A), 0.32 (B), 0.48 (C)	-40 to +85	8-SO	Low power, low tempco
<a href="#">MAX6070*/71*</a>	6 (A), 8 (B)	1.25, 1.8, 2.048, 2.5, 3, 3.3, 4.096, 5	200μA	2.8 to 5.5	3.6μV <sub>p-p</sub>	0.04 (A), 0.08 (B)	-40 to +125	6-SOT23	Best power/performance
<a href="#">MAX6072</a>	6 (A), 8 (B)	1.25 & 2.5, 2.048V and 4.096, 2.5 and 5	630μA	2.8 to 10.5	3.6μV <sub>p-p</sub>	0.05 (A), 0.08 (B)	-40 to +125	10-μMAX	Dual V <sub>REF</sub> and V <sub>REF/2</sub>
<a href="#">MAX6012/21/25/30/41/45/50</a>	20	1.247, 2.048, 2.5, 3, 4.096, 4.5, 5	35μA	2.7 to 12.6	50μV <sub>p-p</sub>	0.32 (A), 0.48 (B)	-40 to +85	3-SOT23	Very low power
<a href="#">LM4040*</a>	100	2.048, 2.5, 3, 3.3, 4.096, 5	65μA	Shunt reference, n/a	n/s	0.1 (A), 0.2 (B), 0.5 (C), 1 (D)	-40 to +125	3-SC70, 3-SOT23	Lowest cost, shunt ref
<a href="#">MAX6079</a>	6	2.5	160μA	2.8 to 5.5	4.8μV <sub>p-p</sub>	0.08	-40 to +125	8 LLC	Ceramic package
<a href="#">MAX6226</a>	5	2.5	380μA	2.7 to 12.6	1.45μV <sub>p-p</sub>	0.02	-40 to +125	8 LLC	Low noise, low drift
<a href="#">MAX6279</a>	25	1.225	70μA to 12mA	N/A	28μV <sub>RMS</sub>	0.1	-40 to +85	8 LLC	Ceramic package
<a href="#">MAX6006A</a>	30	1.25, 2.048, 2.5, 3.0	1μA		30μV <sub>p-p</sub>	0.2	-40 to +85	3-SOT23	
<a href="#">MAX6025</a>	15	2.5	35μA	2.5 to 12.6	35μV <sub>p-p</sub>	0.2	-40 to +85	3-SOT23	Low power, low dropout
<a href="#">MAX6033</a>	7	2.5	40μA	2.7 to 12.6	16μV <sub>p-p</sub>	0.04	-40 to +125	6-SOT23	Low dropout
<a href="#">MAX6043</a>	15	2.5, 3.3, 4.096, 5.0, 10.0	320μA	4.5 to 40	4μV <sub>p-p</sub>	0.05	-40 to +125	6-SOT23	High precision

\*Automotive-qualified.

# DIRECT RF SOLUTIONS FOR CABLE ACCESS AND DIGITAL VIDEO BROADCAST

## QAM MODULATOR FEATURES AND BENEFITS

- High-density, symbols-to-QAM RF solution
- Highly flexible and configurable on per-channel basis
- Scalable capacity from 8 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
- Digital pre-distortion compensation capable

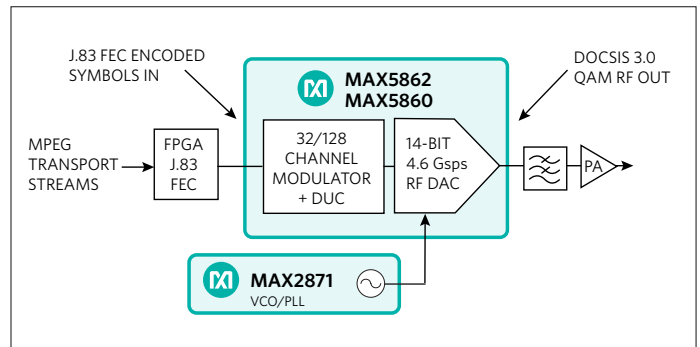
## QAM MODULATOR + OFDM FEATURES AND BENEFITS

- High-density, symbols-to-QAM RF solution
- Highly flexible and configurable on per-channel basis
- 160 QAM channels, 6 OFDM channel block capability
- NCO block/channel control for up-conversion
- Rich feature set eases RF design
- Complementary VCO/PLL clock solution
- Digital pre-distortion compensation capable

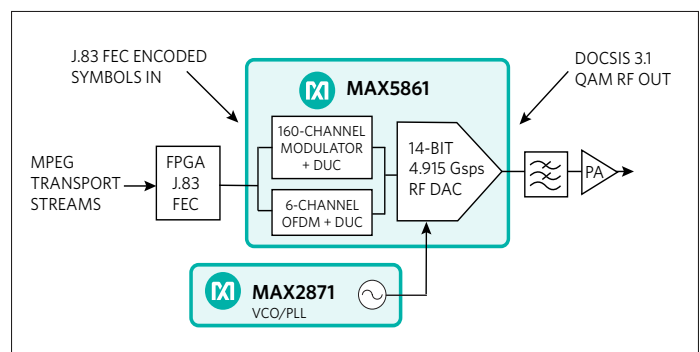
## RF DAC FEATURES AND BENEFITS

- Simplifies RF design and enables new communications architectures
  - Enables multi-band RF modulation
  - Enables software-defined radio transmitter
  - Eliminates I/Q imbalance and LO feedthrough
- Direct RF synthesis of 600MHz bandwidth up to 2.8GHz
- Integrated DUC and JESD204B interface reduces FPGA requirements and cost

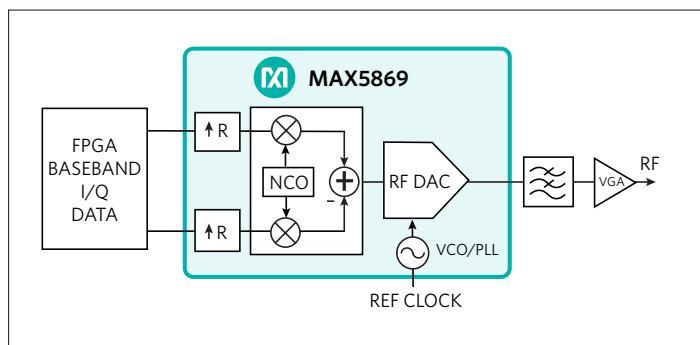
## SYMBOLS-TO-RF WIDEBAND TRANSMITTER



## SYMBOLS-TO-RF WIDEBAND TRANSMITTER



## BITS-TO-RF WIDEBAND TRANSMITTER











## FOCUS PRODUCTS

Product	Description	Industry Standard	Signal Bandwidth	Output Frequency
<b>MAX5862</b>	High-Density QAM Modulator 8/16/24/32-Channels	DOCSIS 3.0, DVB-C	Fully agile channels in 4 x 192MHz blocks. Each 192MHz block agile over 960MHz.	1.0GHz
<b>MAX5860</b>	Scalable High-Density QAM Modulator 32/48/64/96/128-Channels			
<b>MAX5861</b>	High-Density 160-Channel SCQAM Modulator and 6 OFDM Channels	DOCSIS 3.1, DVB-C	Fully agile channels, up to 6 active 192MHz blocks, SCQAM blocks and/or 6 x 192MHz OFDM blocks	1.2GHz
<b>MAX5868</b>	16-Bit 5Gsp/s Interpolating and Modulating RF DAC	DVB-S2X, DVB-T2, ATSC, DTMB, ISDB-T	500MHz	2.2GHz
<b>MAX5869</b>	16-Bit 5.9Gsp/s Interpolating and Modulating RF DAC with JESD204B Interface		600MHz	2.8GHz

## FEATURE SELECTOR GUIDE

Product	Input Interface	Digital Signal Processing	Additional Features	Power
<b>MAX5862</b>	10-Bit CMOS (1 port)	QAM Modulator & DUC Digital Pre-distortion	High-Output Power (9dBm)	4.2W @ 32 QAMs
<b>MAX5860</b>	10-Bit CMOS (4 ports)			5.7W @ 128 QAMs
<b>MAX5861</b>	10-Bit LVDS/SSTL (1 port) 9-Bit LVDS/SSTL (2 ports)	SCQAM Modulator OFDM & DUC, Digital Pre-distortion	High-Output Power (9dBm)	5.9W @ 128 QAMs +2 OFDMs
<b>MAX5868</b>	16-Bit 1240Mwps DDR Parallel LVDS	I/Q Interpolators, Digital Quadrature Modulator & NCO	Word, Byte, Nibble Modes	1.5W
<b>MAX5869</b>	1/2/4-Lane JESD204B Serial up to 10Gbps		Clock multiplying VCO/PLL	2.5W

## RELATED RESOURCES

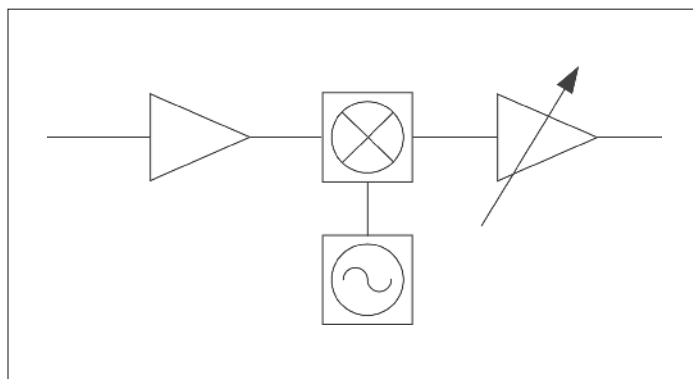
-  AN5394: Digital RF Modulators Provide the High Density, Agility, and Cost Benefits for a Converged Cable Access Platform
-  RF DAC Portfolio
-  MAX5860/MAX5862 Usage and Configuration Guide
-  Modulator and Digital Up-Converter Portfolio
-  MAX5860/MAX5862 Thermal Model Considerations
-  UG6174: MAX5861 Usage and Configuration Guide
-  RF Communications Product Selector Guide
-  AN6110: MAX5861 Thermal Model Considerations

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

## KEY FEATURES AND BENEFITS

- Exceptional linearity increases the receiver's immunity to strong blockers
- Low noise figure enhances receiver sensitivity
- Covers multiple frequency protocols (from 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

## TYPICAL BLOCK DIAGRAM



## FOCUS PRODUCTS

Product	Description	RF Frequency (MHz)	LO Frequency (MHz)	IF Frequency (MHz)	Gain (dB)	IIP3 (dBm)	Supply Voltage (V)	Supply Current (mA)	Package
<b>MAX2680</b>	Low-Noise, SiGe Downconverter Mixers	400 to 2500	400 to 2500	10 to 500	11.6	-6.9	2.7 to 5.5	5	6- SOT23
<b>MAX2681</b>	Low-Noise, SiGe Downconverter Mixers	400 to 2500	400 to 2500	10 to 500	14.2	1	2.7 to 5.5	8.7	6-SOT23
<b>MAX2682</b>	Low-Noise, SiGe Downconverter Mixers	400 to 2500	400 to 2500	10 to 500	14.7	3.2	2.7 to 5.5	15	6- SOT23

## APPLICATION REFERENCE

Product	Microwave Radios	WLAN	ISM	GPS
<b>MAX2680</b>	X	X	X	X
<b>MAX2681</b>	X	X	X	X
<b>MAX2682</b>	X	X	X	X

## RELATED RESOURCES



AN806: RF ICs for 3.5GHz WLL Transceivers



AN957: The MAX2681 SiGE Downconverter Mixer Tuned for GPS Front Ends



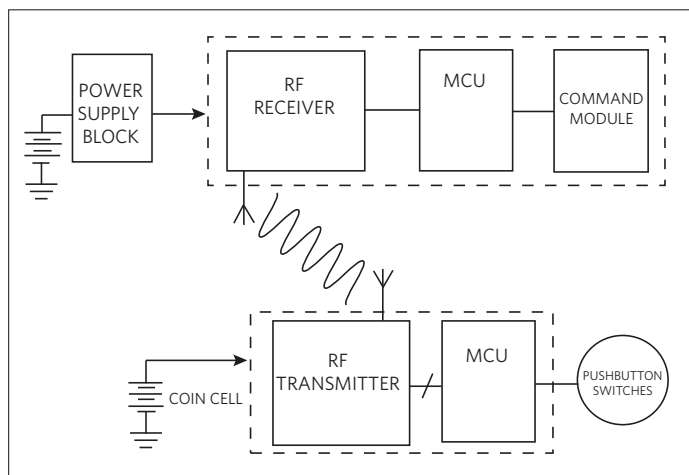
AN4647: Selecting High-Linearity Mixers for Wireless Base Stations

With the largest portfolio of sub-GHz ISM wireless products available, our RF transmitters and receivers achieve the best balance of high efficiency, high integration, high performance, low power consumption, and small package sizes.

## KEY FEATURES AND BENEFITS

- Highest sensitivity receivers (as low as -115dBm ASK, -110dBm FSK) and highest output power transmitters (up to +16dBm) provide improved RF performance
- Widest supply voltage ranges (2.1V to 5.5V) and full automotive temperature ranges (-40°C to +125°C) support many applications
- Lowest power consumption (~5.3mA Tx at +10dBm, ~5.2mA Rx) extends battery life
- Smallest packages (3mm x 3mm) and fully integrated functions reduce external components and total solution size

## BLOCK DIAGRAM











## HIGHLIGHTED PRODUCTS

Product	Description	Key Features
<a href="#">MAX7032</a>	Low-Cost, Crystal-Based, Programmable, ASK/FSK 300 to 450MHz Transceiver with Fractional-N PLL	Autopolling Low-Power Mode, Single Crystal Transceiver, Selectable IF Bandwidth, High DR RSSI, Integrated PLL and Tx/Rx Switch, Fast-On <250µs
<a href="#">MAX7034*</a>	300MHz to 450MHz ASK Superheterodyne Receiver	< 250µs Startup Time, Low Power, High Sensitivity, High Dynamic Range RSSI, Robust Crystal Oscillator
<a href="#">MAX7044</a>	300MHz to 450MHz High-Efficiency, Crystal-Based +13dBm ASK Transmitter	Low Supply Current, Auto-Shutdown with Data Activity Detector, Small 3mm x 3mm Package, Fast-On < 250µs, Single Pin Data Input and Clock Output
<a href="#">MAX41460/1/2/3/4</a>	300MHz to 960MHz ASK and (G)FSK Transmitter with SPI and I <sup>2</sup> C Interface	High-Efficiency ASK/FSK Transmitter Supports Wide Frequency Range and High +16dBm Transmit Power With a Very Low Supply Current

\*Automotive-qualified.

## RELATED RESOURCES

-  [AN5417: How to Optimize an ISM Radio Frequency \(RF\) System](#)
-  [AN5142: Radio Link-Budget Calculations for ISM-RF Products](#)
-  [AN2815: Calculating the Sensitivity of an ASK Receiver](#)
-  [AN5426: Baseband Calculations for ISM-RF Receiver](#)
-  [AN4636: Avoid PC-Layout "Gotchas" in ISM-RF Products](#)
-  [AN3395: Requirements of Remote Keyless Entry \(RKE\) Systems](#)
-  [AN3945: Path Loss in Remote Keyless Entry Systems](#)
-  [AN3671: Data Slicing Techniques for UHF ASK Receivers](#)

## REFERENCE DESIGNS

Reference Design	Description	Products
<a href="#">REFD5366</a>	Remote Keyless Entry (RKE) Reference Design	<a href="#">MAX1472</a> - ASK Transmitter, <a href="#">MAX1473</a> - ASK Receiver, <a href="#">MAXQ610</a> - 16-Bit Microcontroller
<a href="#">REFD5391</a> <a href="#">REFD5404</a>	Wireless Automatic Meter Reading (AMR) Water Meter Automatic Meter Reading	<a href="#">MAX7032</a> - ASK/FS Transceiver, <a href="#">MAXQ610</a> - 16-Bit Microcontroller
<a href="#">REFD5406</a>	2-Way Remote Control Reference Design	<a href="#">MAX7032</a> - ASK/FS Transceiver, <a href="#">MAXQ610</a> - 16-Bit Microcontroller
<a href="#">REFD5390</a>	Tube Motor Receiver Reference Design	<a href="#">MAX7034</a> - ASK Receiver

## PRODUCT SELECTOR GUIDE

Product	Function	Frequency (MHz)	Modulation	RX Sensitivity (dBm)	Max Output Power	Supply Voltage (V)	Supply Current (mA)	Footprint (mm x mm)	Package
<a href="#">MAX1471*</a>	Rx	300 to 450	ASK, FSK	-114 ASK -108 FSK	N/A	2.4 to 3.6, 4.5 to 5.5	7	5.0 x 5.0	32-TQFN
<a href="#">MAX1473</a>	Rx	300 to 450	ASK	-114	N/A	2.4 to 3.6, 4.5 to 5.5	5.2	5.0 x 5.0, 6.3 x 9.7	32-TQFN, 28-TSSOP
<a href="#">MAX7034*</a>	Rx	300 to 450	ASK	-114	N/A	4.5 to 5.5	6.7	6.3 x 9.7	28-TSSOP
<a href="#">MAX7036</a>	Rx	300 to 450	ASK, OOK	-109	N/A	3.0 to 3.6, 4.5 to 5.5	5.5	5.0 x 5.0	20-TQFN
<a href="#">MAX7042</a>	Rx	308/315/418/434	FSK	-110	N/A	2.4 to 3.6, 4.5 to 5.5	6.2	5.0 x 5.0	32-TQFN
<a href="#">MAX41460/1/2/3/4</a>	Tx	300 to 960	ASK, OOK, FSK	N/A	+16dBm	1.8 to 3.6	7 ASK 12 FSK	3.0 x 3.0	10-TSSOP
<a href="#">MAX7037</a>	TRx with MCU	315 to 930	ASK, OOK, FM	-100	+10dBm	2.1 to 5.5	22 Rx 16 Tx	6.0 x 6.0	40-TQFN
<a href="#">MAX7044</a>	Tx	300 to 450	ASK, OOK	N/A	+13dBm	2.1 to 3.6	7.7	3.0 x 3.0	8-SOT23
<a href="#">MAX7030</a>	TRx	315/345/433.92	ASK, OOK	-114	+13dBm	2.1 to 3.6, 4.5 to 5.5	< 6.7 Rx < 12.5 Tx	5.0 x 5.0	32-TQFN
<a href="#">MAX7031</a>	TRx	308/315/434	FSK	-110	+13dBm	2.1 to 3.6, 4.5 to 5.5	< 6.7 Rx < 12.5 Tx	5.0 x 5.0	32-TQFN
<a href="#">MAX7032</a>	TRx	300 to 450	ASK, FSK	-114 ASK -110 FSK	+13dBm	2.1 to 3.6, 4.5 to 5.5	< 6.7 Rx < 12.5 Tx	5.0 x 5.0	32-TQFN

\*Automotive-qualified.

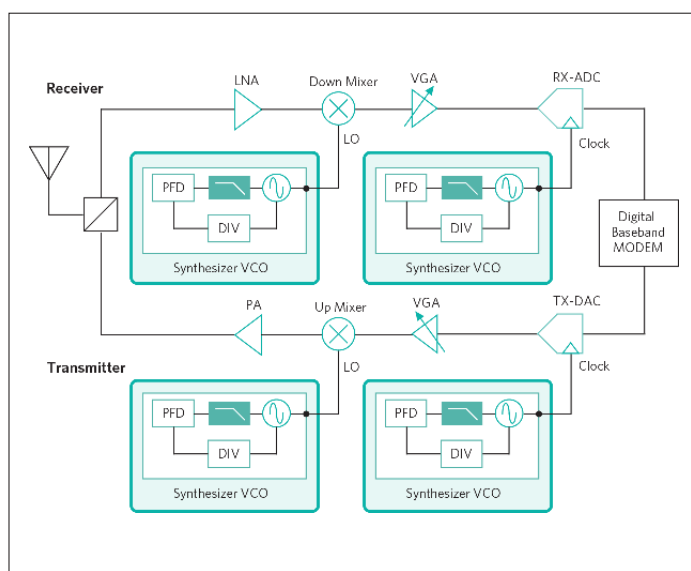


Our broadband RF synthesizers with integrated VCOs feature a combination of high performance, power consumption, and ease of integration, enabling a flexible solution across many applications.

## KEY FEATURES AND BENEFITS

- 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

## TYPICAL FUNCTIONAL DIAGRAM



## FOCUS PRODUCTS

Product	Description	Mode	V <sub>SUPPLY</sub> (V)	Frequency (MHz)	Inband Noise (dBc/Hz)	RMS Jitter (ps <sub>RMS</sub> )	P <sub>OUT</sub> (dBm)	Package
<b>MAX2870</b>	23MHz to 6000MHz Frac-N VCO/PLL	Fractional Integer	3.0 to 3.6	23.5 to 6000	-226.4	0.25	-4 to +5	32-TQFN
<b>MAX2871</b>	23MHz to 6000MHz Frac-N VCO/PLL	Fractional Integer	3.0 to 3.6	23.5 to 6000	-229	0.2	-4 to +5	33-TQFN

## RELATED RESOURCES


[MAX2870/MAX2871 Evaluation Kits](#)

[AN5498: Design Porting Considerations for the MAX2870](#)

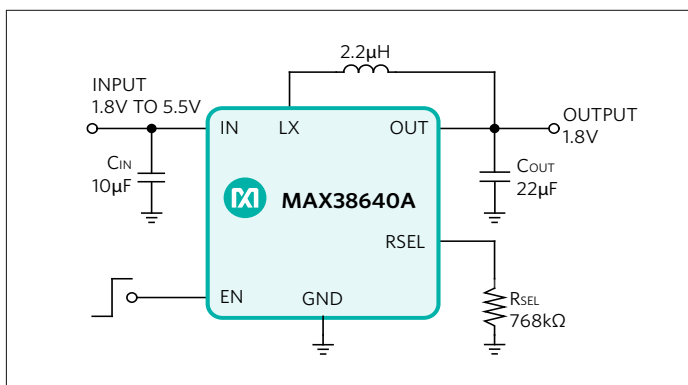
[EE-Sim® VCO/PLL Design Simulator](#)

Our high-efficiency step-down switching regulators offer the best balance of high performance, wide temperature range operation, and tiny packages.

## FEATURES AND BENEFITS

- Low nanoamp quiescent current and True Shutdown™ feature increase battery life
- No-Schottky synchronous operation delivers superior conversion efficiency
- High switching frequency shrinks component size and enables fast transient response
- Multi-mode operation ensures high light-load efficiency

## FUNCTIONAL DIAGRAM





## FOCUS PRODUCTS



Product	V <sub>IN</sub> (V)	V <sub>OUT</sub> (V)	I <sub>OUT</sub> (A)	f <sub>SW</sub> (MHz)	I <sub>Q</sub>	No. of Outputs	Peak Efficiency (%)	Package
<a href="#">MAX38640/1/2/3</a>	1.8 to 5.5	0.5 to 5.0	0.175/ 0.35/ 0.35/ 0.7	2.1	330nA	1	96	6-µDFN, 6-WLP
<a href="#">MAX17620</a>	2.7 to 5.5	1.5 to 3.4	0.6	4	40µA	1	91	8-TDFN
<a href="#">MAX1684/85</a>	2.7 to 14	1.25 to V <sub>IN</sub>	1.0	0.3/0.6	150µA	1	96	16-QSOP
<a href="#">MAX1836/37</a>	4.5 to 24	3.3/5.5 1.25 to V <sub>IN</sub>	0.125/0.25	0.2	12µA	1	94	6-TDFN, 6-SOT23
<a href="#">MAX1927/28</a>	2.6 to 5.5	0.75 to 5.0	0.8	1	140µA	1	97	10-µMAX®
<a href="#">MAX15026</a>	4.5 to 28	0.6 to 0.85 × V <sub>IN</sub>	25	0.2 to 2	1.75mA	1	90	14-TDFN
<a href="#">MAX15048/49</a>	4.7 to 23	0.6 to V <sub>IN</sub>	6	0.2 to 1.2	6mA	3	95	32-TDFN

## FEATURE SELECTOR GUIDE

Product	nanoPower™	Synchronous	Integrated FET	Internal Compensation	Power-Good
<a href="#">MAX38640/1/2/3</a>	x	x	x	x	
<a href="#">MAX17620</a>		x	x	x	x
<a href="#">MAX1684/85</a>			x	x	x
<a href="#">MAX1836/37</a>			x	x	
<a href="#">MAX1927/28</a>		x	x		x
<a href="#">MAX15026</a>		x			x
<a href="#">MAX15048/49</a>		x			x

## RELATED RESOURCES

-  [AN2031: DC To DC Buck Converter Tutorial](#)
-  [AN737: Choosing the Right Power-Supply IC for Your Application](#)

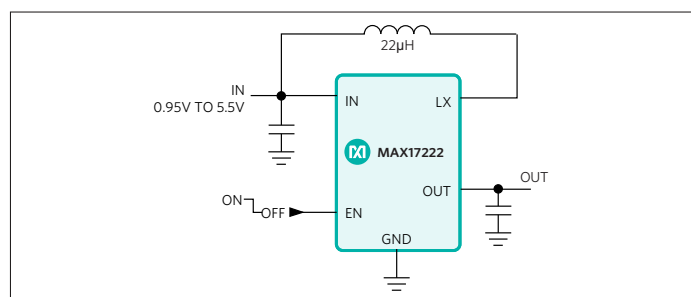
-  [AN5936: Power Supplies Begin the Circuit Foundation, Taming Switching Power-Supply Layout](#)
-  [Palo Verde \(MAXREFDES33#\): Step-Down Converter](#)

Our low-power step-up switching regulators offer high efficiency operation and tiny packages.

## FEATURES AND BENEFITS

- Low nanoamp quiescent current and True Shutdown™ features increase battery life
- Single-/multi-cell battery operation offers design flexibility
- High switching frequency shrinks component size and enables fast transient response

## TYPICAL FUNCTIONAL DIAGRAM



## FOCUS PRODUCTS

Product	V <sub>IN</sub> (V)	V <sub>OUT</sub> (V)	I <sub>IN</sub> Limit*	f <sub>SW</sub> (MHz)	I <sub>Q</sub> (µA)	Peak Efficiency (%)	Package
<a href="#">MAX17220/21/22/23/24/25</a>	0.4 to 5.5	1.8 to 5.5	225mA/225mA/ 500mA/ 500mA/ 1A/ 1A	1.5	0.3	95	6-µDFN, 6-WLP
<a href="#">MAX17250</a>	2.7 to 18	3 to 18	3.5A	1	60	93	14-TDFN, 12-WLP
<a href="#">MAX38888**</a>	0.8 to 4.5	2.5 to 5	3A	2	2.5	95	14-TDFN-CU
<a href="#">MAX668/9</a>	1.8/3 to 28	28	Adjustable	0.1 to 0.5	220	92	10-µMAX®, 10-TDFN
<a href="#">MAX8815A</a>	1.2 to 5.5	3.3 to 5	2.5A	2	16	95	10-TDFN
<a href="#">MAX1674/5/6</a>	0.7 to 5.5	2 to 5.5	0.5A/1A	0.5	16	94	8-µMAX
<a href="#">MAX1795/6/7</a>	0.7 to 5.5	2 to 5.5	0.25A/0.5A/1A	PFM	25	95	8-µMAX

\*I<sub>OUT</sub> = I<sub>IN</sub> × (V<sub>O</sub>/V<sub>IN</sub>) × Efficiency


## FEATURE SELECTOR GUIDE

Product	nanoPower	True Shutdown	Synchronous	Low-Battery Detection	Fixed-Frequency PWM Mode	Preset Output
<a href="#">MAX17220/21/22/23/24/25</a>	x	x	x			x
<a href="#">MAX17250</a>		x	x			
<a href="#">MAX38888**</a>						
<a href="#">MAX668/9</a>					x	
<a href="#">MAX8815A</a>		x	x		x	
<a href="#">MAX1674/5/6</a>			x	x		x
<a href="#">MAX1795/6/7</a>		x	x	x		x

\*\*MAX38888 is a reversible, buck-boost regulator for backup power applications.


## RELATED RESOURCES


 [AN5509: Oceanside \(MAXREFDES9#\): 3.3V to 15V Input, ±15V \(±12V\) Output, Isolated Power Supply](#)

 [AN4834: Negative-to-Negative Switch-Mode Converter Offers High Current and High Efficiency](#)

 [AN3943: ±15V or ±12V Output Switch-Mode Power Supply Has Wide Input-Voltage Range](#)

 [AN4445: Boost Converter Switches Between Battery and USB Power](#)

 [AN3209: Protecting Against Momentary Power Loss Due to Battery-Bounce](#)

 [AN4691: Introduction to Hearing Aids and Important Design Considerations](#)

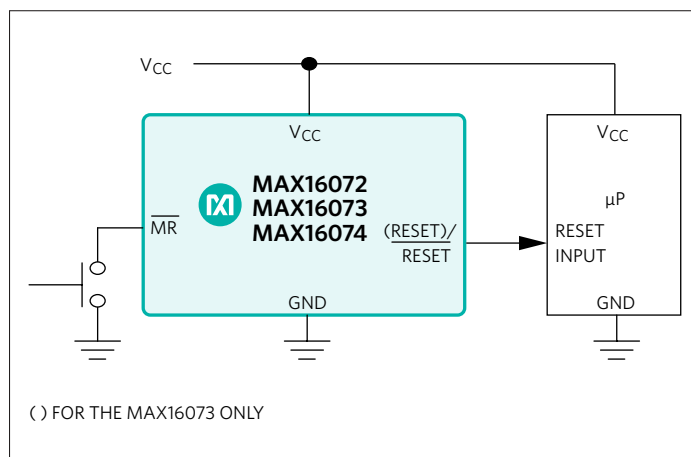
 [AN4690: Important Design Considerations for Digital Thermometers](#)

Our wide selection of microprocessor-reset circuits offer industry-leading precision. Flexible features include multiple reset-output types, precision reset thresholds, threshold hysteresis, and highly accurate reset timeouts.

## BENEFITS

- Integrated functions eliminate external components and adjustments to improve reliability
- High-accuracy threshold voltages ( $\pm 1\%$ ) over the full temperature range provides superior protection from stray voltages
- Versatile thresholds and timeout options provide design flexibility
- Low power operation extends battery life and small packages save board space
- Operating temperature up to  $+125^{\circ}\text{C}$  provides robust operation in harsh environments

## TYPICAL APPLICATION DIAGRAM



## FOCUS PRODUCTS

Product	Description	Key Benefits
<a href="#">MAX16057/59</a>	125nA Supervisors with Capacitor-Adjustable Reset and Watchdog Timeouts in TDFN	Tiny, ultra-low power and flexible
<a href="#">MAX16072-MAX16074</a>	700nA Supervisors in 1mm x 1mm WLP	Smallest, ultra-low power, with factory fixed thresholds
<a href="#">MAX16132*/33*/34*/35*</a>	Low-Voltage, Precision, Single/Dual/Triple Quad-Voltage $\mu\text{P}$ Supervisors	1% accuracy, programmable OV/UV
<a href="#">MAX16160</a>	High-Accuracy, Quad-Channel, Any-Input Supervisor	1% accuracy, tiny, and valid reset for any input

\*Automotive-qualified.

## RELATED RESOURCES




-  [Reset IC/Power-On Reset](#)
-  [The Why, What, How, and When of Using Microprocessor Supervisors](#)
-  [Tutorial 589: CPU Supervisors: Frequently Asked Questions \(FAQs\)](#)



## FEATURE SELECTOR GUIDE

Features	Product	Reset Threshold	Reset Timeout	Supply Current	Temp. Range (°C)	Package
Lowest Power	<a href="#">MAX16057/MAX16059</a>	1.58V to 4.63V	Capacitor-Adjustable	125nA	-40 to +125	3mm × 3mm TDFN
Versatile Threshold and Timeout Options	<a href="#">MAX6381*-MAX6390</a>	1.58V to 4.63V	1ms, 20ms, 140ms, 280ms, 560ms, 1120ms, 1200ms	3µA	-40 to +125	1.5mm × 1.0mm µDFN SC70
Smallest	<a href="#">MAX16072-MAX16074</a>	1.58V to 3.08V	20µs, 8ms, 34ms, 140ms	0.7µA	-40 to +85	1mm × 1mm 4-USCP
Ultra-Low Power	<a href="#">MAX6854-MAX6869</a>	1.58V to 4.63V	10ms, 40ms, 150ms, 300ms, 60ms, 1200ms WDI Timeout: 1.5s, 95s]	170nA	-40 to +85	SOT23
Small, Flexible	<a href="#">MAX6895*/96*/97*/98/99</a>	Adjustable down to 0.5V	Capacitor-Adjustable	10µA	-40 to +125	1.5mm × 1.0mm µDFN, Thin SOT23
Highest Accuracy (1% Over Full Temp Range)	<a href="#">MAX6394*</a>	2.4V to 4.8V	0.7ms, 14ms, 105ms, 826ms	4µA	-40 to +125	SOT143
Capacitor-Adjustable Timeout	<a href="#">MAX6412-MAX6420</a>	1.6V to 5V	Capacitor-Adjustable	1.7µA	-40 to +125	SOT23
Capacitor-Adjustable Timeout in SC70	<a href="#">MAX6421-MAX6426</a>	1.6V to 5V	Capacitor-Adjustable	1.6µA	-40 to +125	SC70, SOT23
Highest Accuracy (1% Over Full Temp Range)	<a href="#">MAX16132*/33*/34*/35*</a>	Programmable 0.5V to 5.0V	Factory-trimmed	15µA	-40 to +125	SOT23
High Accuracy, Low Power	<a href="#">MAX16160</a>	1.8V to 2.5V, 2.5V to 3.3V, 3.3V to 5.5V	Factory-trimmed	17µA	-40 to +125	SOT23, WLP

\*Automotive-qualified.

## RESET ICs PARAMETRIC SEARCH

-  Supervisors (Monitor One Voltage)
-  Supervisors (Monitor Two Voltages)
-  Supervisors (Monitor Three Voltages)

-  Supervisors (Monitor Four Voltages)
-  Supervisors (Monitor Five Voltages)

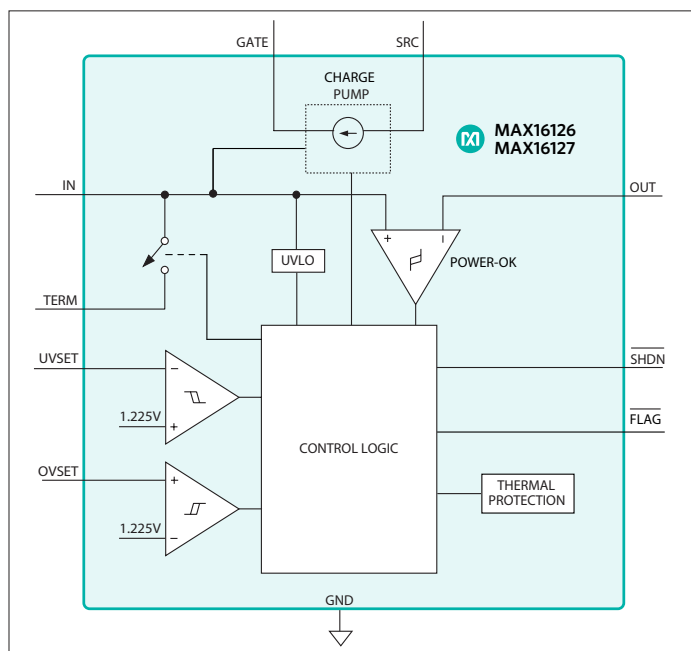
# OVERVOLTAGE PROTECTORS AND HIGH-VOLTAGE REGULATORS

Our overvoltage protection ICs guard against transient voltages, overvoltages, and reverse-battery voltages ideal for automotive and industrial applications. Our high-voltage regulators provide a clean, well-regulated output voltage in harsh, high-temperature, transient-ridden environments.

## BENEFITS

- Flexible protection features prevent damage from incorrect AC adapter or charger connection
- Wide input-voltage range, cold crank operation and automotive temp range provide protection in harsh environments
- Regulated output with integrated supervisory functions saves cost and space

## TYPICAL APPLICATION DIAGRAM



## FOCUS PRODUCTS

Product	Description	Key Benefits
<b>MAX16126*/27*/28/29</b>	90V, Load-Dump/Reverse-Voltage Protection Circuits	No need for external resistors and diodes enables small, lower cost solutions
<b>MAX6495*/96*/97/98/99*</b>	72V, Overvoltage Protection Switches/Limiter Controllers with Latch/Autoretry and POK	Small, highly integrated devices minimize solution size
<b>MAX6397</b>	72V, Overvoltage Protection Switch/Limiter Controller	Highly integrated solution increases system reliability

\*Automotive-qualified.

## RELATED RESOURCES



AN4081: Alternate Circuits for Overvoltage Protection: Tips and Tricks



Overvoltage Protection Controllers Parametric Search



## FEATURE SELECTOR GUIDE

### OVERVOLTAGE PROTECTORS

Product	Function	Reverse-Voltage Protection	Undervoltage Threshold	Channel Driver	Latch/Autoretry	POK	LDO
<b>MAX16126*</b>	Switch	X	X	N-Channel	Autoretry Latch		
<b>MAX16127*</b>	Limiter	X	X	N-Channel			
<b>MAX6397</b>	Switch/Limiter			N-Channel			X
<b>MAX6495*</b>	Switch/Limiter			N-Channel			
<b>MAX6496*</b>	Switch/Limiter			N-Channel	Latch with clear		
<b>MAX6497</b>	Switch	X		N-Channel	Latch	X	
<b>MAX6498</b>	Switch			N-Channel	Autoretry	X	
<b>MAX6499*</b>	Switch/Limiter		X	N-Channel	Latch with clear		
<b>MAX16013</b>	Switch/Limiter	X		P-Channel	Autoretry		
<b>MAX16014</b>	Switch	X		P-Channel	Latch		

\*Automotive-qualified.

### HIGH-VOLTAGE REGULATORS WITH INTEGRATED RESET

Product	Output (s)	Watchdog	Enable Input (s)	Hold Input (s)	Input Voltage Range	Output Voltage Range	Additional Comparator	GATE P	
<b>MAX6765</b> <b>MAX6766</b>	100mA	—	1	X	4V to 72V	Fixed (5V, 3.3V, 2.5V, 1.8V)	—		
<b>MAX6767*</b> <b>MAX6768</b>	100mA	—	1						
<b>MAX6769</b> <b>MAX6770</b>	100mA	—	1				RESETIN		
<b>MAX6771</b> <b>MAX6772</b>	100mA	—	1				Adjustable (11V down to 1.8V)		
<b>MAX6773</b> <b>MAX6774</b>	100mA	Fixed	1						
<b>MAX6791</b> <b>MAX6792</b>	2 × 150mA	Adjustable Windowed	2	X	5V to 72V	Fixed (5V, 3.3V, 2.5V, 1.8V)	PFI/PFO	X	
<b>MAX6793</b> <b>MAX6794</b>	2 × 150mA	Adjustable	2	X				PFI/PFO	X
<b>MAX6795*</b> <b>MAX6796</b>	300mA	Adjustable	1	X			Adjustable (11V down to 1.8V)	PFI/PFO	X

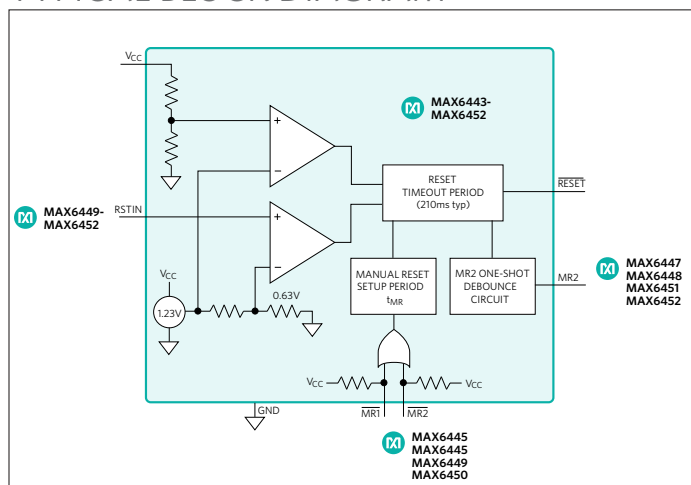
\*Automotive-qualified.

Our pushbutton controllers and switch debouncers are the simplest and most cost-effective solutions for microprocessor supervision and manual reset. Features such as ESD protection, low-power operation, and small packages make them ideal for harsh environments and portable applications.

## BENEFITS

- ESD protection (up to 15kV HBM) provides reliable operation in harsh environments
- No software or firmware required, which simplifies design
- Eliminates need for separate hard reset pushbutton, saving cost and space
- Debounce circuitry offers increased reliability over traditional solutions

## TYPICAL BLOCK DIAGRAM



## FOCUS PRODUCTS

Product	Description	Key Benefits
<b>MAX6816-MAX6818</b>	Single/Dual/Octal CMOS Switch Debounces with ±15kV ESD Protection	+27V to +5.5V operating range with no external components required simplifies system interface to mechanical switches
<b>MAX16054</b>	Pushbutton On/Off Controller with Debounce and ±15kV ESD Protection	±25V switch inputs with ±5kV ESD protection over -40°C to +125°C provides reliable operation in harsh environments
<b>MAX16122-MAX16125</b>	Dual Pushbutton Controllers in Tiny 6-Bump WLP Package	Low supply current, fixed/pin-programmable or resistor-adjustable, precise dual pushbuttons in WLP
<b>MAX16150</b>	nanoPower Pushbutton On/Off Controller and Battery Freshness Seal	20nA (max) standby current with robust input, includes short and long debounce options in tiny WLP or small SOT package

## RELATED RESOURCES



Pushbutton Debouncers and Devices



Switch Debouncers Parametric Search



AN4444: Single-Pushbutton ON/OFF Power Control



Pushbutton Devices Parametric Search

## FEATURE SELECTOR GUIDE

Product	Description	Monitored Voltages	Manual Reset Feature	MR1 Setup Time	MR2 Setup Time	Reset Out
<b>MAX6453</b>	μP Supervisors with Separate V <sub>CC</sub> Reset and Manual Reset Outputs for Software/Hardware Resets	2	Independent Soft and Hard Reset Outputs	1μs	-	Active Low, Push-Pull
<b>MAX6454</b>	μP Supervisors with Separate V <sub>CC</sub> Reset and Manual Reset Outputs for Software/Hardware Resets	2	Independent Soft and Hard Reset Outputs	1μs	-	Active Low, Open Drain
<b>MAX6455</b>	μP Supervisors with Separate V <sub>CC</sub> Reset and Manual Reset Outputs for Software/Hardware Resets	2	Independent Soft and Hard Reset Outputs	1μs (Soft), 3.36s (Hard)	-	Active Low, Push-Pull
<b>MAX6456*</b>	μP Supervisors with Separate V <sub>CC</sub> Reset and Manual Reset Outputs for Software/Hardware Resets	2	Independent Soft and Hard Reset Outputs	1μs (Soft), 3.36s (Hard)	-	Active Low, Open Drain
<b>MAX6443</b>	μP Reset Circuit with Single Long Manual Reset Setup Period Input	1	Extended Setup Period	6.72s	-	Active Low, Push-Pull
<b>MAX6444</b>	μP Reset Circuit with Single Long Manual Reset Setup Period Input	1	Extended Setup Period	6.72s	-	Active Low, Open Drain
<b>MAX6445</b>	μP Reset Circuit with Two Long Manual Reset Setup Period Inputs	1	Extended Setup Period	6.72s	6.72s	Active Low, Push-Pull
<b>MAX6446</b>	μP Reset Circuit with Two Long Manual Reset Setup Period Inputs	1	Extended Setup Period	6.72s	6.72s	Active Low, Open Drain
<b>MAX6447</b>	μP Reset Circuit with 1 Long and 1 Normal Manual Reset Setup Period Inputs	1	Extended Setup Period	6.72s	1μs	Active Low, Push-Pull
<b>MAX6448</b>	μP Reset Circuit with 1 Long and 1 Normal Manual Reset Setup Period Inputs	1	Extended Setup Period	6.72s	1μs	Active Low, Open Drain
<b>MAX6449</b>	μP Reset Circuit with Two Long Manual Reset Setup Period Inputs	2	Extended Setup Period	6.72s	6.72s	Active Low, Push-Pull
<b>MAX6450</b>	μP Reset Circuit with Two Long Manual Reset Setup Period Inputs	2	Extended Setup Period	6.72s	6.72s	Active Low, Open Drain
<b>MAX6451</b>	μP Reset Circuit with 1 Long and 1 Normal Manual Reset Setup Period Inputs	2	Extended Setup Period	6.72s	1μs	Active Low, Push-Pull
<b>MAX6452</b>	μP Reset Circuit with 1 Long and 1 Normal Manual Reset Setup Period Inputs	2	Extended Setup Period	6.72s	1μs	Active Low, Open Drain
<b>MAX6467</b>	μP Supervisor with Edge-Triggered, One-Shot Manual Reset	1	One-Shot	1μs	-	Active Low, Open Drain
<b>MAX6468</b>	μP Supervisor with Edge-Triggered, One-Shot Manual Reset	1	One-Shot	1μs	-	Active Low, Push-Pull
<b>MAX16125</b>	Pushbutton Controller with Single-Supply Monitors	2		8μs	10μs	Active-Low, Push-Pull, Open-Drain
<b>MAX16150</b>	μP Pushbutton Controller On/Off Controller and Battery Freshness Seal	1	One-Shot	1μs	-	Active Low, PB_IN

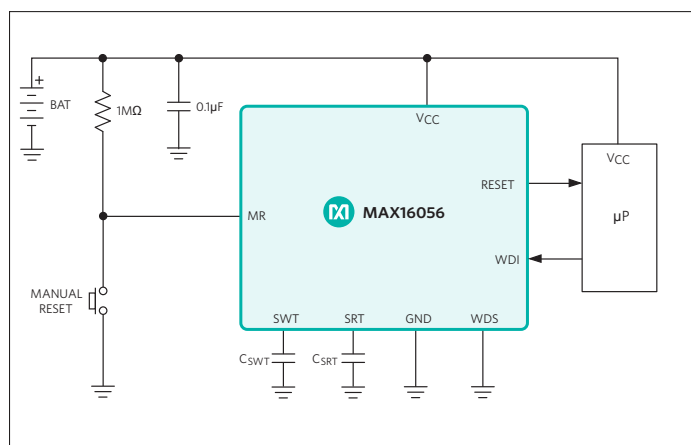
\*Automotive-qualified.

Our watchdog timers provide the most innovative solutions for monitoring and minimizing code execution errors. Our complete portfolio of watchdog timers includes both factory-preset and user-selectable reset voltages, low-power operation, multiple timeout options, automotive temperature range, and a variety of output configurations.

## BENEFITS

- Precision timers increase system reliability through notification of code execution errors
- Flexible configuration options support a wide range of system timing applications
- Stand-alone timers cannot be bypassed or disabled by runaway code
- Low-power operation extends battery life and small packages save board space
- Operating temperature up to +125°C provides robust operation in harsh environments

## TYPICAL APPLICATION DIAGRAM



## FOCUS PRODUCTS

Product	Description	Key Benefits
<a href="#">MAX16152-MAX16155</a>	nanoPower Supervisors and Watchdog Timers	400nA supply current in tiny WLP and SOT packages with dynamic watchdog enable/disable function or manual reset
<a href="#">MAX16056/MAX16058</a>	125nA Supervisors with Capacitor-Adjustable Reset and Watchdog Timeouts in TDFN	Tiny, ultra-low power and flexible
<a href="#">MAX6369*/70/71/72/73/74*</a>	Pin-Selectable Watchdog Timers	Versatile, with integrated features and long start-up delay
<a href="#">MAX6746*/47*/48/49/50*/51*/52*/53*</a>	Low-Power Supervisors with Min/Max Windowed Watchdog in SOT23	Unique features in tiny, space saving package

\*Automotive-qualified.

## RELATED RESOURCES

 [Watchdog Timers](#)

 [Tutorial 1926: Watchdogs Improve System Reliability—How To Choose The Right Part](#)

## WATCHDOG TIMERS PARAMETRIC SEARCH

 [Standalone](#)

 [Supervisors \(Monitor Three Voltages\)](#)

 [Supervisors \(Monitor One Voltage\)](#)

 [Supervisors \(Monitor Four Voltages\)](#)

 [Supervisors \(Monitor Two Voltages\)](#)

 [Supervisors \(Monitor Five Voltages\)](#)

## FEATURE SELECTOR GUIDE

Features	Watchdog Features	Product	Watchdog Timeout	Supply Current	Temperature Range (°C)	Package
Windowed Watchdog Window Voltage Monitor with Separate Overvoltage Indicator	No external components needed to set the Fast/ Slow timeout, several options from 1ms/10ms to 4096ms/40.96s	<b>MAX16136*</b>	Factory trimmed, from 1ms/10ms to 4096ms/40.96s	15µA	-40 to +125	TDFN
Lowest Power	Watchdog Disable	<b>MAX16056/16058</b>	Capacitor- Adjustable	125nA	-40 to +125	TDFN
Pin-Selectable Watchdog Timing	Long Startup Delay	<b>MAX6369*/70/71/72 /73/74*</b>	Pin-Selectable	8µA	-40 to +125	SOT23
Capacitor Adjustable Tim- eouts	Min/Max Windowed Watchdog Option	<b>MAX6746*/47*/48/49/ 50*/51*/52*/53*</b>	Capacitor- Adjustable	3.7µA	-40 to +125	SOT23
Versatile Threshold and Time- out Options	Offer 3,224 Unique Options	<b>MAX6316*-MAX6322</b>	4 options from 6.3ms to 25.6s	3µA	-40 to +125	SOT23
Min/Max Windowed Watch- dog	Min/Max Windowed Watchdog Option	<b>MAX6323/MAX6324</b>	8 options from 1.5ms to 1.3s	23µA	-40 to +125	SOT23
Ultra-Low Power	Long Watchdog Timeout Option (209s)	<b>MAX6864-MAX6869</b>	3.3s, 209s	170µA	-40 to +85	SOT23
Independent Watchdog Output	Long Startup Delay, Single/Dual/Triple Voltage	<b>MAX6730-MAX6735</b>	1.6s, 54s Startup Delay	3µA	-40 to +125	SOT23
Smallest nanoPower	Dynamic Watchdog Disable	<b>MAX16152-MAX16155</b>	4 options	400nA	-40 to +125	WLP, SOT23

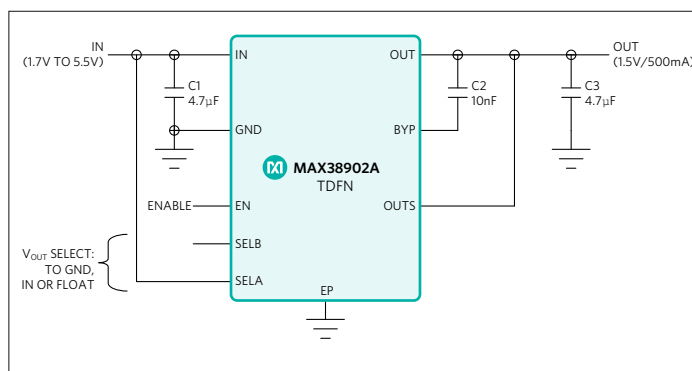
\*Automotive-qualified.

Our low-dropout linear regulators offer high accuracy and low-noise operation with very small dropout voltage.

## FEATURES AND BENEFITS

- Very low dropout voltages reduce heat dissipation
- High output accuracy provides closely regulated voltages
- Ultra-low noise ensures precise system measurements
- Low quiescent current increases battery life

## TYPICAL OPERATING CIRCUIT



## FOCUS PRODUCTS


Product	V <sub>IN</sub> (V)	V <sub>OUT</sub> (V)	I <sub>OUT</sub> (A)	I <sub>Q</sub> (µA)	V <sub>DROPOUT</sub> @ I <sub>OUT</sub> (mV)	Accuracy (%)	PSRR-10kHz (dB)	Output Noise (µV <sub>RMS</sub> )	Package
<a href="#">MAX38902</a>	1.7 to 5.5	0.6 to 5.3	0.5	365	50	1	70	10.7	8-TDFN, 6-WLP
<a href="#">MAX38903</a>	1.7 to 5.5	0.6 to 5.0	1	1200	100	1	70	5.5	10-TDFN, 9-WLP
<a href="#">MAX38904</a>	1.7 to 5.5	0.6 to 5.0	0.5	1300	100	1	70	4	14-TDFN, 15-WLP
<a href="#">MAX38908</a>	0.9 to 5.5	0.6 to 5.0	4	365	82	1	78	25	14-TDFN, 15-WLP
<a href="#">MAX8902</a>	1.7 to 5.5	0.6 to 5.3	0.5	80	50	1.5	92	16	8-TDFN
<a href="#">MAX8510/1/2</a>	2 to 6	1.5 to 4.5	0.12	40	120	3	72/78	11	8-TDFN 5-SC70
<a href="#">MAX8840/1/2</a>	2 to 6	1.5 to 4.5	0.15	40	120	3	72/78	11	6-µDFN
<a href="#">MAX1806</a>	2.25 to 5.5	0.8 to 4.5	0.5	210	175	1	45	300	8-µDFN
<a href="#">MAX8880/1</a>	2.5 to 12	1.25 to 5; 1.8/2.5/3.3	0.2	3.5	100	3	40	300	6-TDFN 6-SOT23
<a href="#">MAX667</a>	3.5 to 16	1.3 to 16	0.25	20	350	4	40		8 SO; 8 PDIP
<a href="#">MAX1510</a>	1.1 to 3.6	0.5 to 1.5	3	700	350	1	80		10-TDFN
<a href="#">MAX8556</a>	1.425 to 3.6	0.5 to 3.4	4	0.2	100	1	38		25-TQFN

## RELATED RESOURCES

 [AN4404: Using a Linear Regulator to Produce a Constant Current Source](#)

 [MAX38902 Evaluation Kit](#)

 [Tutorial 6617: LDO Application Tutorial](#)

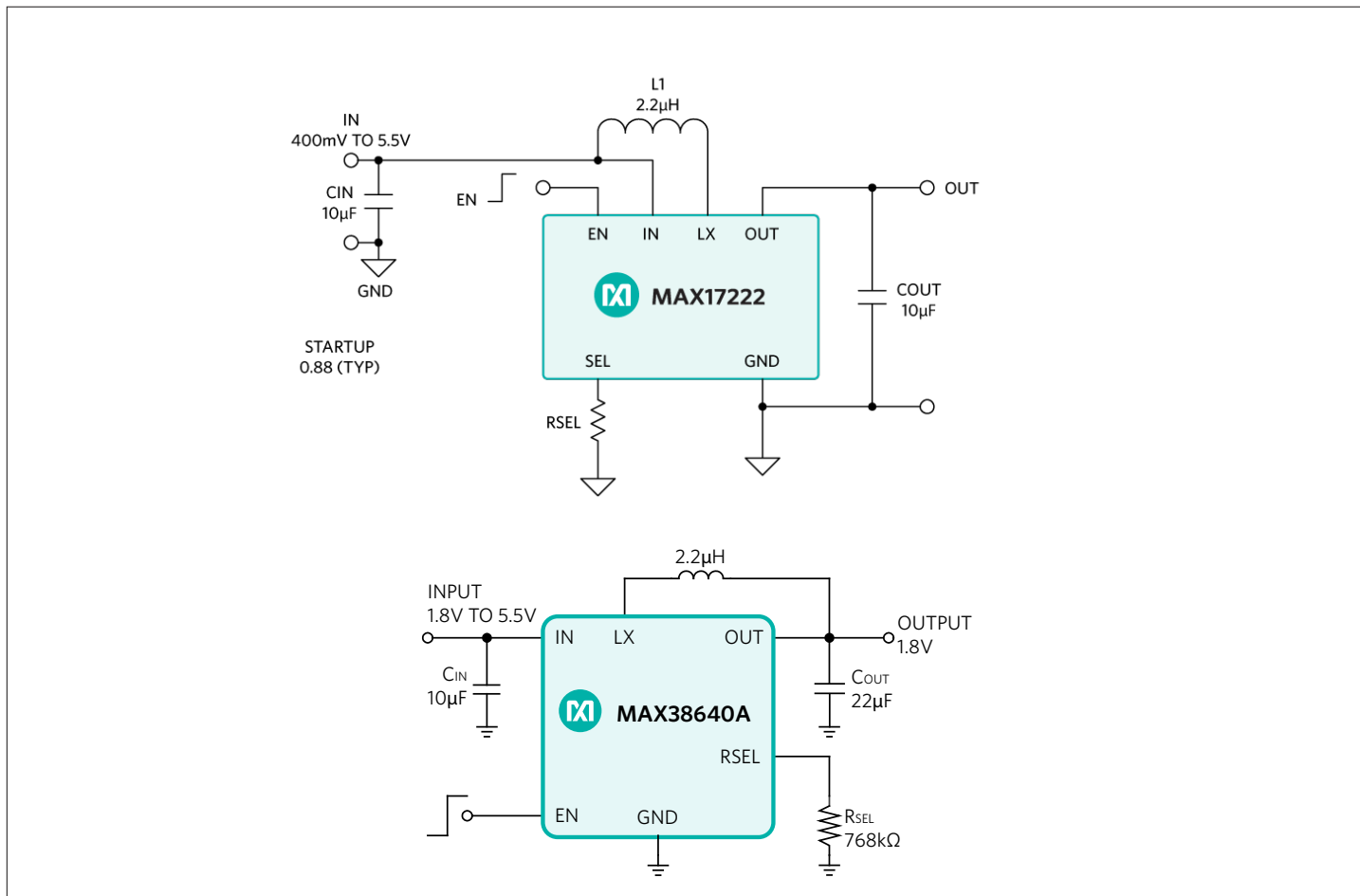
 [AN6650: How to Measure Power Supply Rejection Ratio for the MAX38902A/MAX38902B](#)

 [AN883: Improved Power-Supply Rejection for Linear Regulators](#)



Highly integrated, nanoPower™ DC-DC switching regulators with ultra-low quiescent current enable even longer run times for compact wearable and battery-powered applications.











## BLOCK DIAGRAMS



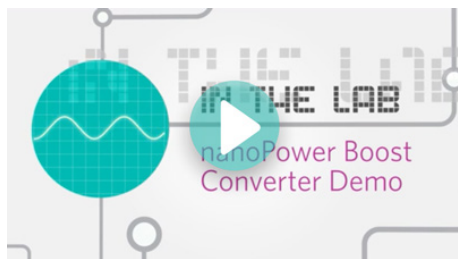
## FEATURES AND BENEFITS

- Ultra-low quiescent current (less than 1µA) with greater than 95% peak efficiency significantly reduce battery drain
- True Shutdown™ mode draws only 0.5nA current to provide the longest battery life and eliminate the need for external disconnect switches

## FOCUS PRODUCTS

Product	$I_Q$ (nA) (typ)	Output Current (A)	$V_{IN}$ (V)	$V_{OUT}$ (V)	Peak Efficiency	Features	Package	BUY	EVKIT
<a href="#">MAX38640</a>	330	0.175	1.8 to 5.5	0.5 to 5	96%	Buck	6- $\mu$ DFN 6-WLP		<a href="#">EV KIT</a>
<a href="#">MAX38641</a>		0.35							
<a href="#">MAX38642</a>		0.35							
<a href="#">MAX38643</a>		0.7							
<a href="#">MAX17220</a>	300	0.085	0.4 to 5.5	1.8 to 5	95%	Boost	6- $\mu$ DFN 6-WLP		<a href="#">EV KIT</a>
<a href="#">MAX17221</a>		0.085							
<a href="#">MAX17222</a>		0.2							
<a href="#">MAX17223</a>		0.2							
<a href="#">MAX17224</a>		0.8							
<a href="#">MAX17225</a>		0.8							

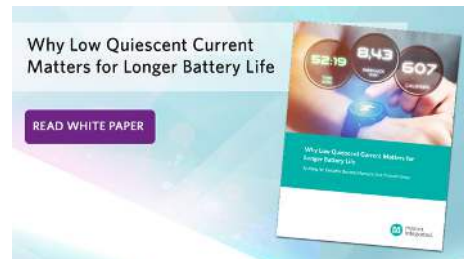
## RELATED RESOURCES




[nanoPower Boost Converter Demo](#)





[Sometimes It's Smart to Have a Low  \$I\_Q\$](#)




[Why Low Quiescent Current Matters for Longer Battery Life](#)

 [MAX17222 Evaluation Kit for the MAX17220/  
MAX17221/MAX17222/MAX17223/MAX17224 and  
MAX17225](#)

 [Design Solution: Make your IoT Device Last Longer  
with a nanoPower Boost Converter](#)

 [Design Solution: How to Maximize Your  
Wireless Sensor's Runtime](#)

 [Design Solution: Make Your Small Asset Tracker  
Last Longer](#)

 [Blog: Operate Your Design from a Single Battery  
with the Right Converter](#)

## SEQUENCERS/TRACKERS ADDRESS POWER-UP/POWER-DOWN NEEDS

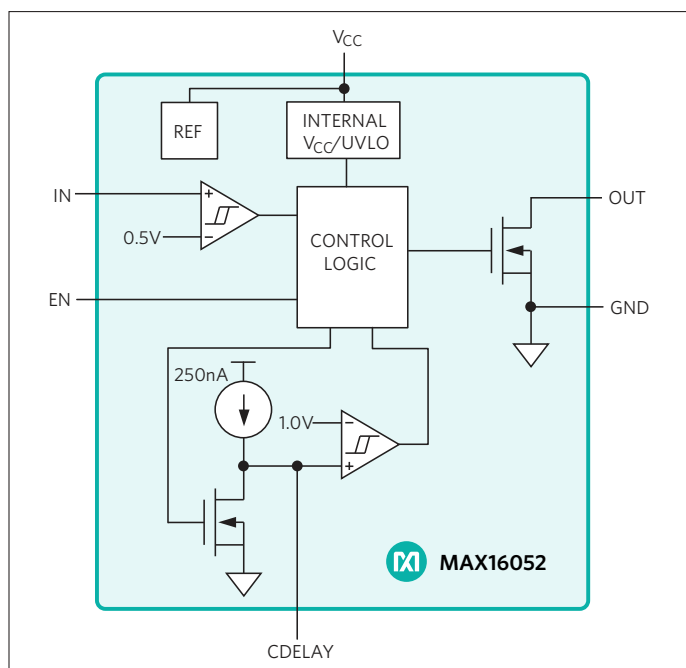
Maxim's power-supply sequencing and voltage tracking ICs simplify your design by solving your power-up and power-down problems. Our products range from simple, small, dual-voltage sequencers/trackers to highly flexible, I<sup>2</sup>C-programmable, hex sequencers.

### BENEFITS








- Easy solutions for designs requiring power-up sequencing or specific timing and undervoltage specifications

### APPLICATIONS


- Server/Storage and Networking/Telecom Equipment
- Automotive, Industrial, Medical and Military Equipment
- Set-Top Boxes



### FOCUS PRODUCTS

Product	Package	Features	Order
<b>MAX16050</b>	4mm x 4mm TQFN 0.7mA Supply Current	Reverse sequencing, 4-voltage sequence	
<b>MAX16051</b>	4mm x 4mm TQFN 0.7mA Supply Current	Reverse sequencing, 6-voltage sequence	
<b>MAX16025</b>	4mm x 4mm 16-TQFN 40µA Supply Current with Open-Drain	1.5% accurate dual-voltage sequencer with open-drain	
<b>MAX16026</b>	4mm x 4mm 16-TQFN 40µA Supply Current	1.5% accurate dual-voltage sequencer with push-pull	
<b>MAX16027</b>	4mm x 4mm 20-TQFN 40µA Supply Current	1.5% accurate triple-voltage sequencer with open-drain	
<b>MAX16028</b>	4mm x 4mm 20-TQFN 40µA Supply Current	1.5% accurate triple-voltage sequencer with push-pull	
<b>MAX16029</b>	4mm x 4mm 24-TQFN 40µA Supply Current	1.5% accurate 4-voltage sequencer with open-drain	

## FOCUS PRODUCTS (CONTINUED)

Product	Package	Features	Order
<b>MAX16030</b>	4mm x 4mm 24-TQFN 40µA Supply Current	1.5% accurate 4-voltage sequencer with push-pull	
<b>MAX16041</b>	4mm x 4mm 16-TQFN 40µA Supply Current	1.5% accurate, 2-voltage sequencer	
<b>MAX16042</b>	4mm x 4mm 20-TQFN 40µA Supply Current	1.5% accurate 3-voltage sequencer	
<b>MAX16043</b>	4mm x 4mm 24-TQFN 40µA Supply Current	1.5% accurate 4-voltage sequencer	
<b>MAX16052</b>	SOT23 28V V <sub>IN</sub>	Wide input range in small package, active-high open-drain	
<b>MAX16053</b>	SOT23, 28V V <sub>IN</sub>	Wide input range in small package, active-high push-pull	

## FEATURE SELECTOR GUIDE

Product	Features	Number of Voltages	Enable/ Charge Pump	Reset Threshold	Supply Voltage	Supply Current	Temp. Range (°C)	Package
<b>MAX6895*</b> <b>MAX6896*</b> <b>MAX6897*</b> <b>MAX6898</b> <b>MAX6899</b>	Ultra Small, Low Voltage	1	Enable	Capacitor Adjustable	1.5V to 5.5V	10µA	-40 to +125	1.5mm x 1.0mm µDFN, Thin SOT23
<b>MAX16052</b> <b>MAX16053</b>	High-Voltage Range	1	Enable	Capacitor Adjustable	2.5V to 28V	18µA	-40 to +125	SOT23
<b>MAX6819</b> <b>MAX6820</b>	Simple Charge-Pump Sequencer	1	Charge Pump	Fixed/ Capacitor Adjustable	0.9V to 5.5V	20µA	-40 to +125	SOT23

\*Automotive-qualified.

## FEATURE SELECTOR GUIDE (CONTINUED)

Product	Features	Number of Voltages	Enable/ Charge Pump	Reset Threshold	Reset Timeout (V)	Supply Current	Temp. Range	Package
<a href="#">MAX6877</a> <a href="#">MAX6878</a> <a href="#">MAX6879</a> <a href="#">MAX6880</a> <a href="#">MAX6881</a> <a href="#">MAX6882</a> <a href="#">MAX6883</a>	Multivoltage Charge-Pump Sequencers/ Trackers	2/3	Charge Pump	Pin-Selectable	2.7 to 5.5	1.1mA	-40°C to +85°C	4mm x 4mm TQFN
<a href="#">MAX16025</a> <a href="#">MAX16026</a> <a href="#">MAX16027</a> <a href="#">MAX16028</a> <a href="#">MAX16029</a> <a href="#">MAX16030</a> <a href="#">MAX16041</a> <a href="#">MAX16042</a> <a href="#">MAX16043</a>	1.5% Accurate Multivoltage Sequencer	2/3/4	Enable	Fixed/ Capacitor Adjustable	2.2 to 28	40µA	-40°C to +125°C	4mm x 4mm TQFN
<a href="#">MAX16050</a> <a href="#">MAX16051</a>	Reverse Sequencing	4/5	Enable	Fixed/ Pin-Selectable	2.7 to 13.2	0.7mA	-40°C to +85°C	4mm x 4mm TQFN

## RELATED RESOURCES



Sequencers and Voltage Trackers



AN4109: Low-Cost Power-Supply Sequencer



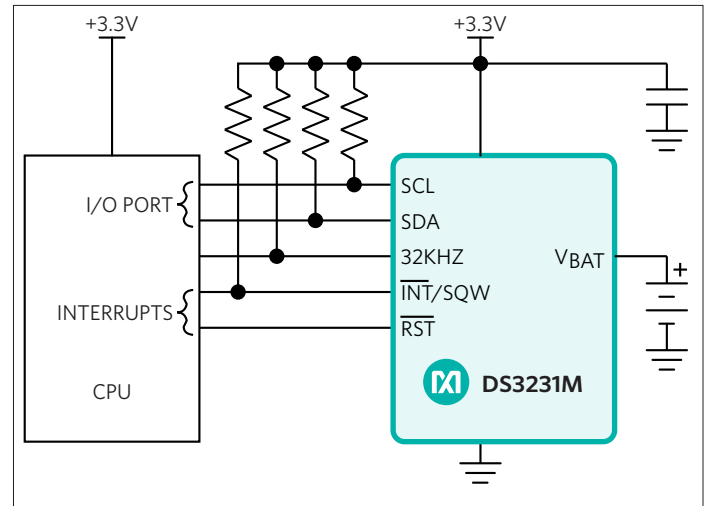
AN3567: Monitoring and Sequencing Supply Voltages in High-Reliability Systems

As the market leader in real-time clocks, we provide the widest selection of interfaces, packages, and features available to support all of your design needs.

## BENEFITS

- Precision timers increase system reliability through notification of code execution errors
- Flexible configuration options support a wide range of system timing applications
- Stand-alone timers cannot be bypassed or disabled by runaway code
- Low power operation extends battery life and small packages save board space
- Operating temperature up to +125°C provides robust operation in harsh environments

## TYPICAL BLOCK DIAGRAM



## FOCUS PRODUCTS

Product	Description	Interface	V <sub>SUPPLY</sub> (V)	Timekeeping Current (typ) (nA)	Memory Type	Memory Size (bytes)	Time of Day Alarms	Integrated Resonator
DS1302	Trickle-Charge Timekeeping Chip	3-Wire	2, 3, 3.3, 5	200	NV SRAM	31	0	
DS1338	I <sup>2</sup> C-Compatible RTC with 56-Byte NV RAM	I <sup>2</sup> C	1.8, 3, 3.3, 5	800	NV SRAM	56	0	
DS1341	Low-Current I <sup>2</sup> C RTC for High-ESR Crystals	I <sup>2</sup> C	1.8, 5.5	220	None		2	
DS1683	Total-Elapsed-Time and Event Recorder with Alarm	I <sup>2</sup> C	3, 3.3, 5		EEPROM	10	1	RC Osc
DS3231M	±5ppm, I <sup>2</sup> C Real-Time Clock with Internal MEMS Resonator	I <sup>2</sup> C	2.3 to 5.5	2000	None		2	MEMS
DS3232M	±5ppm, I <sup>2</sup> C Real-Time Clock with Internal MEMS Resonator and User SRAM	I <sup>2</sup> C	2.3 to 4.5	1800	NV SRAM	236	2	MEMS
DS3232	Extremely Accurate I <sup>2</sup> C RTC with Integrated Crystal and SRAM	I <sup>2</sup> C	2, 3.3, 5.5	1500	SRAM	236	2	Quartz Crystal

## FEATURE SELECTOR GUIDE

Core Die	Internal Oscillator	MEMS	TCXO	Memory	High ESR XTal Compatible	Trickle Charger	Integrated Battery	3x3 TDFN	Interface
<a href="#">DS1302</a>				X		X			3-Wire
<a href="#">DS1305</a>				X		X			SPI
<a href="#">DS1337C</a>	X								I <sup>2</sup> C
<a href="#">DS1338</a>				X					I <sup>2</sup> C
<a href="#">DS1341</a>					X			X	I <sup>2</sup> C
<a href="#">DS1390</a>						X			SPI
<a href="#">DS1683</a>	RC			X					I <sup>2</sup> C
<a href="#">DS1687</a>	X			X			X		Parallel
<a href="#">DS3231</a>	X								I <sup>2</sup> C
<a href="#">DS3231M</a>	X	X	X						I <sup>2</sup> C
<a href="#">DS3232M</a>	X	X	X	X					I <sup>2</sup> C
<a href="#">DS3232</a>	X		X	X					I <sup>2</sup> C
<a href="#">DS3234</a>	X			X					SPI

For additional features and devices, please consult:


[RTC Parametric Table](#)

## RELATED RESOURCES

 [DS3231MPMB1 Peripheral Module](#)




 [AN5545: MEMS Technology Provides Tangible Benefits for Real-Time Clocks](#)

 [Tutorial 5791: Tips for Writing Bulletproof Real-Time Clock Control Code](#)

 [AN5589: Industry Turns to MEMS for Accurate Real-Time Clocks](#)

 [AN504: Design Considerations for Maxim Real-Time Clocks](#)

 [AN3816: Selecting a Backup Source for Real-Time Clocks](#)

 [AN5329: Implementing Flawless Designs with Accurate I<sup>2</sup>C Real-Time Clocks](#)

 [AN5143: Feature Comparison of the DS323X Real-Time Clocks](#)

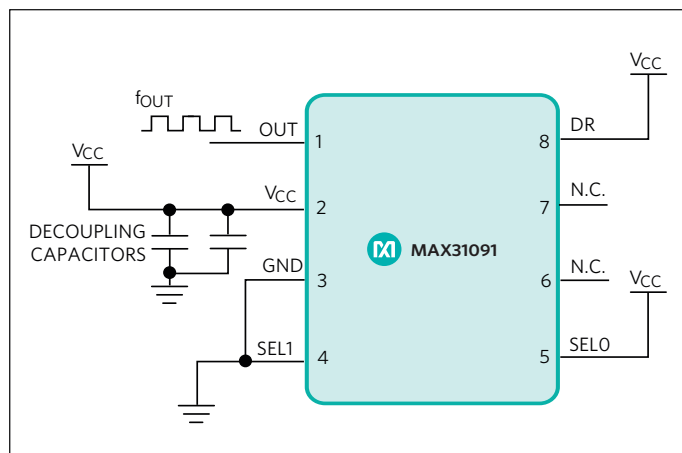
# SOLVE YOUR EMI PROBLEMS WITH SPREAD-SPECTRUM CLOCKS

Our silicon oscillators and clock multipliers offer a reliable, precise and economical timing solution for reducing EMI radiation, and to ensure EMI standards compliance.

## BENEFITS

- Programmable silicon oscillators with wide output frequency range (31kHz to 133MHz) are not susceptible to environmental factors such as shock, vibration, and humidity
- Pin-programmable clock multipliers generate a wide range of clock frequencies (8MHz to 134MHz) from a single external crystal
- Dithered spread-spectrum output significantly reduces EMI emissions compared to crystal oscillators
- Pin-selectable dither magnitude and rate allows real-time adjustment of dither settings

## TYPICAL APPLICATION CIRCUIT




## FOCUS PRODUCTS

Spread-Spectrum EconOscillator™							
Product	Description	$f_{OUT}$ (min-max) (MHz)	$\Delta f_{OUT}$ (max) (%)	User/Factory Programmable	$V_{SUPPLY}$ (min-max) (V)	Operating Temp. Range (°C)	AEC-Q100 Qualified
DS1090	Low-Frequency, Spread-Spectrum EconOscillator	0.125 to 8	+3	User	3.0 to 5.5	-40 to +85	No
MAX31091*	Automotive-Grade Spread-Spectrum EconOscillator	0.2 to 66.6	±1.75	Factory	3.0 to 3.6	-40 to +125	Yes
Spread-Spectrum Clock Multiplier							
Product	Description	$f_{OUT}$ (min-max) (MHz)	Output Jitter (RMS) (ps)	Programmability	$V_{SUPPLY}$ (min-max) (V)	Operating Temp. Range (°C)	AEC-Q100 Qualified
MAX31180*	Automotive Grade Spread-Spectrum Crystal Multiplier	16 to 134	75	Pin	3.0 to 3.6	-40 to +125	Yes

\*Automotive-qualified.

## RELATED RESOURCES

 DS1086LPMB# Peripheral Module

 AN3512: Automotive Applications for Silicon Spread-Spectrum Oscillators

 AN1995: Using Spread Spectrum Oscillators to Reduce Radiated Emissions in Consumer Products

 AN3503: Clock Generation with Spread Spectrum



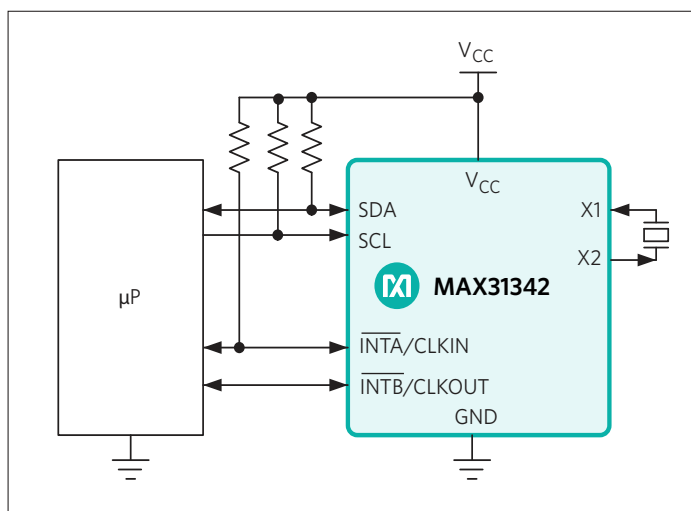
## FEATURE SELECTOR GUIDE

Product	$f_{OUT}$ (min - max) (MHz)	$\Delta f_{OUT}$ (max) (%)	Programmable Frequency	Temp. Range (°C)	Supply Voltage (V)	AEC-Q100 Qualified
EconOscillators						
<b>MAX31091*</b>	0.2 to 66.6	±1.75	Factory	-40 to +125	3.0 to 3.6	Yes
<b>DS1091L</b>	0.13 to 66.6	±1.75	Factory	-40 to +125	3.0 to 3.6	No
<b>DS1090</b>	0.125 to 8	±3.0	Resistor	-40 to +85	3.0 to 5.5	No
<b>DS1086</b>	0.26 to 133	±1.75	I <sup>2</sup> C	0 to +70	4.75 to 5.25	No
<b>DS1086L</b>	0.13 to 66.6	±1.78	I <sup>2</sup> C	-40 to +85	2.7 to 3.6	No
Crystal Multipliers						
<b>MAX31180*</b>	16 to 134		Pin	-40 to +125	3.0 to 3.6	Yes
<b>DS1080L</b>	16 to 134		Pin	-40 to +125	3.0 to 3.6	No
<b>DS1080CL</b>	8 to 64		Pin	-40 to +125	3.0 to 3.6	No
For additional features and devices, please consult: <a href="#">Silicon Oscillators</a> <a href="#">Clock Generators</a>						

\*Automotive-qualified.

The **MAX31341B/MAX31342** are the industry's smallest, fully featured, discrete RTCs ever designed. Both RTCs operate with a +1.6V to +3.6 voltage range and with a wide range of low-cost external crystals. To minimize size and increase accuracy, a 6pF capacitive load is integrated. This eliminates mismatched capacitive loads, a common cause of inaccurate timekeeping with crystals. Both have a timer with a dual alarm system that is recorded through flags and in the register. The MAX31341B includes a backup battery, trickle charger, and RAM backup. The trickle charger allows the main battery to be small, which makes it ideal for space-constrained applications. While both have small size and power, the MAX31342 has a smaller package size and lower power consumption, maximizing battery life and making it one of the smallest RTCs in its field.



## TYPICAL OPERATING CIRCUIT



## FEATURES AND KEY BENEFITS

- **Low Operating Current:** Increases battery life of the device
- **Ultra-Small WLP Package:** Ideal for space-constrained applications such as wearables, consumer, portable, etc.
- **Crystal Oscillator (External Crystal):** Allows designers the flexibility to use multiple vendors with cheaper external crystals




## FOCUS PRODUCTS

Product	Timekeeping Current (nA)	Package Dimension (mm x mm)	Pin Package	Battery Backup	Data Storage	Buy	EV KIT
<a href="#">MAX31341B</a>	180	1.5 x 2.0	12 -WLP	Yes	64-Byte RAM		<a href="#">MAX31341EVKIT</a>
<a href="#">MAX31342</a>	150	1.0 x 2.0	8-WLP	No	No		<a href="#">MAX31342SHLD</a>

## RELATED RESOURCES



Video: How to Use the MAX31342SHLD Evaluation Kit

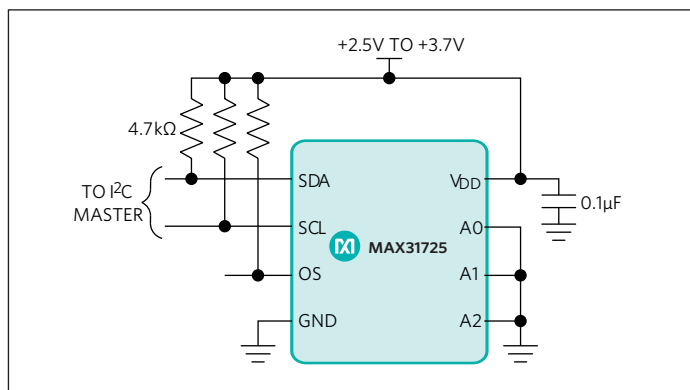
-  [MAX31341EVKIT](#): Evaluation Kit for the MAX31341B
-  [MAX31342SHLD#](#) Software
-  [MAX31342SHLD](#): Evaluation Kit for the MAX31342

With the largest selection of precision temperature sensors available, our broad portfolio of temperature sensors, temperature switches, fan controllers, RTD- and thermocouple-to-digital converters can support all of your design needs.

## BENEFITS

- Wide selection of interfaces (I<sup>2</sup>C, SMBus, SPI, 1-Wire®, PWM) provides compatibility with many system configurations
- Sensor-to-digital products support RTD, thermocouple and thermistor designs
- Very high accuracy, high resolution sensors enable high precision designs
- Rich feature set supports many applications

## TYPICAL BLOCK DIAGRAM



## FOCUS PRODUCTS

Product	Description	Interface	Resolution	Accuracy	Supply Voltage (V)	Supply Current	Package
<b>DS1631</b>	Local Sensor	I <sup>2</sup> C	Selectable: 0.5 to 0.0625°C (9 to 12 bits)	±0.5°C (0 to +70°C) ±2°C (-55 to +125°C)	2.7 to 5.5	1mA converting 800nA standby	8-µMAX, 8-SO
<b>DS18B20</b>	Local Sensor	1-Wire	Selectable: 0.5 to 0.0625°C (9 to 12 bits)	±0.5°C (-10 to +85°C) ±2°C (-55 to +125°C)	3 to 5.5	1.5mA converting 1µA standby	TO-92, 8-µMAX, 8-SO
<b>DS75</b>	Local Sensor	I <sup>2</sup> C	Selectable: 0.5 to 0.0625°C (9 to 12 bits)	±2°C (-25 to +100°C) ±3°C (-55 to +125°C)	2.7 to 5.5	1mA converting 1µA standby	8-µMAX, 8-SO
<b>MAX31725</b>	Local Sensor	I <sup>2</sup> C	0.0039°C (16 bits)	±0.5°C (-40 to +105°C) ±0.7°C (-55 to +150°C)	2.5 to 3.7	925µA converting 3.5µA standby	8-TDFN
<b>MAX31730</b>	Triple Remote Sensor	I <sup>2</sup> C/ SMBus	0.0625°C (12 bits)	±1°C (0 to +100°C, remote)	3 to 3.6	1.2mA converting 7µA standby	12-TDFN
<b>MAX31825</b>	Local Sensor	1-Wire	Selectable: 1 to 0.0625°C (8 to 12 bits)	±1°C (0°C to +70°C) ±1.75°C (-45°C to +145°C)	1.6 to 3.6	80µA converting 2.5µA standby	6-WLP
<b>MAX31855</b>	Thermocouple-Digital	SPI	0.25°C (14 bits)	±2.8°C (at +700°C)	3 to 3.6	1.5mA	8-SO
<b>MAX31856</b>	Thermocouple-Digital with Linearization	SPI	0.0078°C (19 bits)	±1.7°C (at +1000°C)	3 to 3.6	2mA converting 10µA standby	14-TSSOP
<b>MAX31865</b>	RTD-Digital	SPI	0.03125°C (15 bits)	< ±0.5°C	3 to 3.6	3.5mA converting	20-TQFN
<b>MAX31875</b>	Local Sensor	I <sup>2</sup> C	Selectable: 1 to 0.0625°C (8 to 12 bits)	±1.75°C (-40°C to +145°C) ±1°C (0°C to +70°C)	1.6 to 3.6	80µA converting 0.5µA standby	4-WLP
<b>MAX31889</b>	Local Sensor	I <sup>2</sup> C	0.005°C (16 bits)	±0.25°C (-20°C to +105°C) ±0.65°C (-40°C to +125°C)	1.7 to 3.6	71µA converting 3.7µA standby	6-µDFN

## FEATURE SELECTOR GUIDE

Product	Alarm or Overtemperature Output	Local Sensor	Remote Diode Sensor	RTD Input	Thermocouple Input	Thermocouple Linearization	Selectable Addresses	Interface
<a href="#">DS1631</a>	X	X					8	I <sup>2</sup> C
<a href="#">DS18B20</a>		X						1-Wire
<a href="#">DS75</a>	X	X					8	I <sup>2</sup> C
<a href="#">MAX31725</a>	X	X					32	I <sup>2</sup> C
<a href="#">DS600</a>	X	X						Analog
<a href="#">MAX31730</a>	X	X	X				8	I <sup>2</sup> C/SMBus
<a href="#">MAX31825</a>		X						1-Wire
<a href="#">MAX31855</a>		X			X			SPI
<a href="#">MAX31856</a>	X	X			X	X		SPI
<a href="#">MAX31865</a>				X				SPI
<a href="#">MAX31875</a>		X						I <sup>2</sup> C
<a href="#">MAX31889</a>	X	X					4	I <sup>2</sup> C

For additional features and devices, please consult:

[Local Temperature Sensors Parametric Table](#)

[Remote Temperature Sensors Parametric Table](#)

[Temperature Switch ICs Parametric Table](#)

[RTD and Thermocouple Interface ICs Parametric Table](#)

[Fan Controller ICs Parametric Table](#)

## RELATED RESOURCES



[MAXREFDES42# IO-Link RTD Temp Sensor](#)



[Thermal Management Handbook](#)

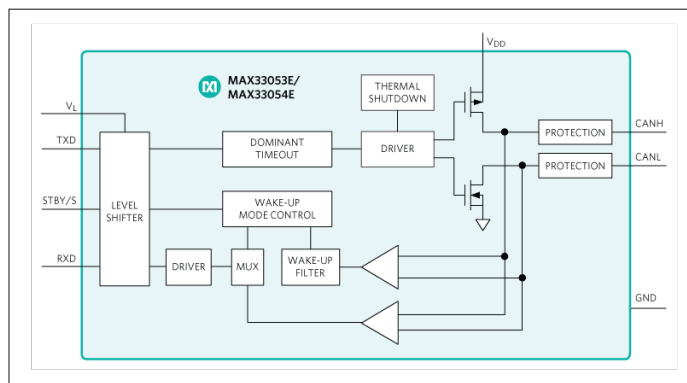
*Document includes temperature sensing and fan control concepts, circuits and application guidelines.*

As the technology leader in serial interface transceivers, Maxim offers one of the largest portfolios available. Our transceivers include value-add features to increase reliability and simplify design while providing the highest levels of protection in the market.

## BENEFITS

- Highest HBM ESD protection available reduces equipment downtime
- Highest levels of fault protection and fault detection enable maximum reliability
- Large portfolio supports any application
- The fastest RS-232 transceiver at 3Mbps with logic-level translation as low as 1.62V



## TYPICAL BLOCK DIAGRAM






## FOCUS PRODUCTS

Product	Serial Interface	Duplex	Supply Voltage (V)	Data Rate (Mbps)	Tx, Rx	Protection	Temp. Range (°C)
<a href="#">MAX33011E/12E/14E/15E</a>	CAN bus	Half	5	5	1, 1	±65V Fault Protection, ±45kV ESD, ±25V CMR, Fault Detection/Reporting	-40 to +125
<a href="#">MAX13053A/MAX13054A</a>	CAN bus	Half	5	2	1, 1	±65V Fault Protection, ±25kV ESD, ±25V CMR	-40 to +125
<a href="#">MAX33053E/MAX33054E</a>	CAN bus	Half	3.3	2	1, 1	±65V Fault Protection, ±25kV ESD, ±25V CMR	-40 to +125
<a href="#">MAX14780E</a>	RS-485	Half	5	0.5	1, 1	±30kV ESD	-40 to +85
<a href="#">MAX13442E/43E/44E</a>	RS-485	Half	5	10	1, 1	±80V Fault Protection, ±15kV ESD	-40 to +125
<a href="#">MAX3440E/41E</a>	RS-485	Half	5	10	1, 1	±60V Fault Protection, ±15kV ESD, Fault Detection	-40 to +125
<a href="#">MAX13089E</a>	RS-485	H/F	5	16	2, 2	±15kV ESD	-40 to +125
<a href="#">MAX3483AE/85AE/88AE/MAX3490AE/91AE</a>	RS-485	H, F	3.3	0.25, 20	1, 1, 2, 2	±20kV ESD	-40 to +125
<a href="#">MAX13234E/35E/36E/37E</a>	RS-232	Full	3.3 to 5	3	2, 2	±15kV ESD	-40 to +125

## RELATED RESOURCES


-  Tutorial 723: Guide to Selecting and Using RS-232, RS-422, and RS-485 Serial Data Standards
-  AN4643: Achieve ISO 11898-2-Compliant 5V HS-CAN Communication from a 3.3V Supply

-  AN639: Maxim Leads the Way in ESD Protection
-  AN3884: Full Guide to Serial Communication Protocol and Our RS-485
-  RS-485: Still The Most Robust Communication

## FEATURE SELECTOR GUIDE

Product	Serial Interface	Duplex	Isolation	Data Rate (Mbps)	Tx, Rx	Protection	Package
<a href="#">MAX13234E-MAX13237E</a>	RS-232	Full	No	3	2, 2	±15kV ESD	20-TSSOP, 20-TQFN-EP
<a href="#">MAX3380E</a>	RS-232	Full	No	0.46	2, 2	±15kV ESD and Low Logic Interface	20-TSSOP
<a href="#">MAX3218</a>	RS-232	Full	No	0.12	2, 2		20-SSOP
<a href="#">MAX3483AE/85AE/88AE/ 90AE/91AE</a>	RS-485	H, F	No	0.25, 20	1, 1	±15kV ESD	8-SOIC
<a href="#">MAX14782E/MAX14783E</a>	RS-485	Half	No	42	1, 1	±35kV ESD	8-SOIC, 8-μMAX 8-TDFN-EP
<a href="#">MAX14784E/MAX14786E MAX14787E/MAX14789E</a>	RS-485	Full	No	25	2, 2	±35kV ESD	14-SOIC, 14-TSSOP
<a href="#">MAX14780E</a>	RS-485	Half	No	0.5	1, 1	±30kV ESD	8-SOIC
<a href="#">MAX13442E-MAX13444E</a>	RS-485	Half	No	10	1, 1	±80V Fault Protection, ±15kV ESD	8-SOIC
<a href="#">MAX3440E/MAX3441E</a>	RS-485	Half	No	10	1, 1	±60V FP, Fault Detection	8-SOIC
<a href="#">MAX13089E</a>	RS-485	H/F	No	16	2, 2	±15kV ESD	8-SOIC
<a href="#">MAX14949</a>	RS-485	Half	Yes	0.5	1, 1	5kV <sub>RMS</sub> Isolation, ±35kV ESD	16-SOIC-16
<a href="#">MAX14857/MAX14859</a>	RS-485	Full	Yes	25	2, 2	5kV <sub>RMS</sub> Isolation, ±35kV ESD	16-SOIC-16
<a href="#">MAX13053A/MAX13054A MAX33053E/MAX33054E</a>	CAN bus	Half	No	2	1, 1	±65V Fault Protection, ±25kV ESD, ±25V CMR	8-SOIC
<a href="#">MAX13054</a>	CAN bus	Half	No	1	1, 1	±80V Fault Protection, ±15kV ESD	8-SOIC
<a href="#">MAX14878</a>	CAN bus	Half	Yes	2	1, 1	5kV <sub>RMS</sub> Isolation, ±15kV ESD, ±25V CMR	16-Wide SOIC
<a href="#">MAX14879/80/82</a>	CAN bus	Half	Yes	2	1, 1	5kV <sub>RMS</sub> and 2.75kV <sub>RMS</sub> Isolation, ±54V Fault Protection, ±15kV ESD, ±25V CMR	16-Wide SOIC

## EVALUATION KITS

 [MAX13053AESHL D](#)
 [MAX33053ESHLD](#)
 [MAX13054AESHL D](#)
 [MAX148X2EVKIT](#)



## RELATED RESOURCES

### Essential Analog ICs

Efficient Power

Reliable Connectivity

Precision Measurement

Robust Protection

### MAXESSENTIAL01: Essential Analog Toolkit

## TRADEMARKS

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## Learn more

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[www.maximintegrated.com/essentialanalog](http://www.maximintegrated.com/essentialanalog)

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