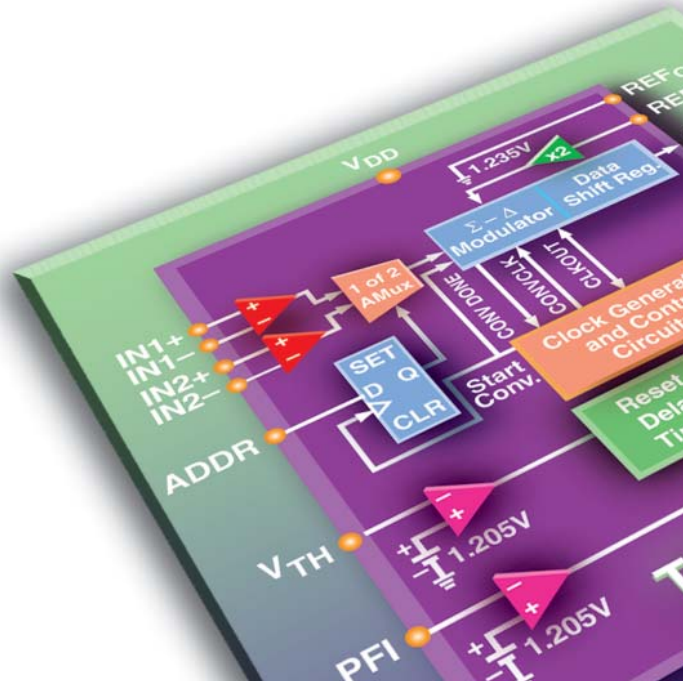
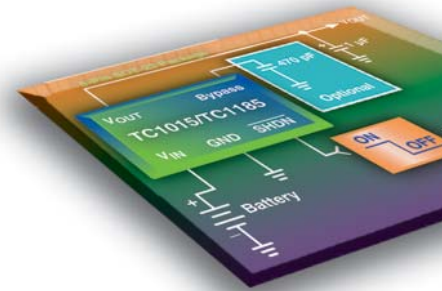
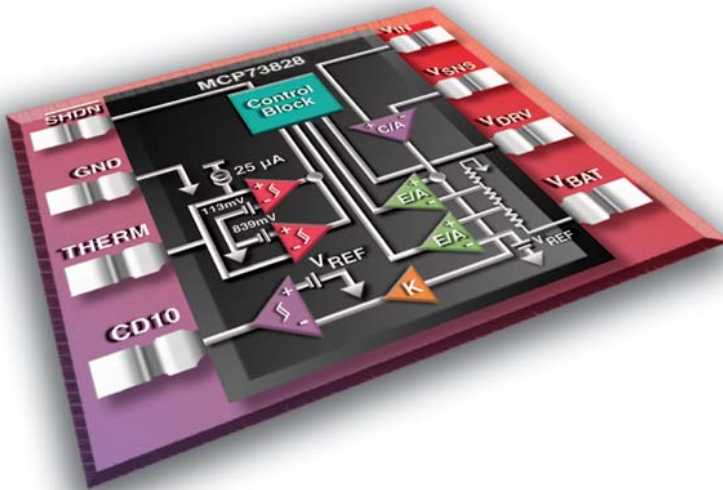




## Stand-Alone Analog and Interface Solutions

- Thermal Management
- Battery Management
- Interface Peripherals
- Power Management
- Linear & Mixed- Signal



# Are you looking for Complete Analog & Interface Design Solutions?

Microchip's integrated analog technology, peripherals and features are engineered to meet today's demanding design requirements. Our broad spectrum of analog products addresses thermal management, power management, battery management, mixed-signal, linear and interface solutions. Combined with "Intelligent Analog" microcontrollers, Microchip offers an extensive analog portfolio for thousands of high-performance design applications in the automotive, communications (wireless), consumer, computing and industrial control markets.

Our broad portfolio of stand-alone analog and interface devices offers highly integrated solutions that combine various analog functions in space-saving packages and support a variety of bus interfaces. Many of these devices support functionality that enhances the analog functionality currently available on PIC® microcontrollers.

## Microchip Technology's Stand-Alone Analog & Interface Portfolio

### Thermal Management

- Temperature Sensors
- Fan Speed Controllers/ Fan Fault Detectors

### Power Management

- LDO & Switching Regulators
- Charge Pump DC/DC Converters
- Power MOSFET Drivers
- PWM Controllers
- System Supervisors
- Voltage Detectors
- Voltage References

### Interface

- CAN Peripherals
- Infrared Peripherals
- LIN Transceiver
- Serial Peripherals

### Mixed-Signal

- A/D Converter Families
- Digital Potentiometers
- System D/A Converters
- V/F and F/V Converters

### Linear

- Op Amps
- Programmable Gain Amplifiers
- Comparators
- Linear Integrated Devices

### Battery Management

- Li-Ion/Li-Polymer Battery Chargers
- Smart Battery Managers

## Thermal Management Solutions

From temperature measurement to critical over-temperature protection, Microchip's thermal management solutions will help your design operate at an optimal temperature. Ease-of-use, no firmware, high-integration and the ability to work with simple 2-wire fans, are a few of the reasons engineers choose our Fan Speed Controllers and Fan Fault Detectors. Microchip also offers a wide variety of logic, voltage and serial output temperature sensors to thermally protect your system and ensure real-time temperature measurement and compensation.

Fan Speed Controllers and Fan Fault Detectors	
Part #	Description
TC642	PWM Fan Speed Controller with Fan Fault Detection
TC646	PWM Fan Speed Controller with Fan Fault Detection and Auto-Shutdown
TC647	PWM Fan Speed Controller with Fan Fault Detection
TC648	PWM Fan Speed Controller with Over-Temperature Detection and Auto-Shutdown
TC649	PWM Fan Speed Controller with Fan Fault Detection and Auto-Shutdown
TC642B	PWM Fan Speed Controller with Fan Fault Detection and Fan Restart
TC646B	PWM Fan Speed Controller with Fan Fault Detection, Auto-Shutdown and Fan Restart
TC647B	PWM Fan Speed Controller with Fan Fault Detection and Fan Restart
TC648B	PWM Fan Speed Controller with Over-Temperature Detection, Auto-Shutdown and Fan Restart
TC649B	PWM Fan Speed Controller with Fan Fault Detection, Auto-Shutdown and Fan Restart
TC650/651	Integrated Temperature Sensor and Brushless DC Fan Controller with Over-Temperature Alert
TC652/653	Integrated Temperature Sensor and Brushless DC Fan Controller with Fan Fault Detection & Over-Temp Alert
TC654/655	Dual SMBus Fan Speed Controller with Fan Fault and Over Temperature Detection
TC664/665	Single SMBus Fan Speed Controller with Fan Fault and Over Temperature Detection
TC670	SOT-23 Predictive Fan Fault Detector

Temperature Sensors	
Part #	Description
<b>Voltage Output</b>	
TC1046	High Precision Temperature-to-Voltage Converter (6.25 mV/°C)
TC1047/47A	High Precision Temperature-to-Voltage Converters (10 mV/°C)
MCP9700/01	Very Low-cost Linear Active Thermistors in SC-70 Package
<b>Logic Output</b>	
TC6501/2/3/4	Ultra-Small Temperature Switches with Pin-Selectable Hysteresis
TC620/21	5V Dual Trip-Point Temperature Switch
TC622/24	Low Cost, Single Trip-Point Temperature Switch
TC623	3V Dual Trip-Point Temperature Switch
<b>Serial Output</b>	
TC72	High-Accuracy, 10-bit Digital Thermal Sensor with 4-wire SPI™ Interface
TC74	SOT-23 SMBus Digital Temperature Sensor
TC77	High-Accuracy, 13-bit Digital Thermal Sensor with 3-wire SPI Interface
TCN75A	Serial Interface Digital Temperature Sensor and Thermal Monitor
MCP9800/1/2/3	High Accuracy, 12-bit Digital Thermal Sensor with 2-wire Interface

## Power Management Solutions

Power Management products from Microchip help drive today's most demanding power supply applications.

**Linear Regulators** – Microchip's portfolio of LDOs features ultra low drop-out voltages, 50 mA to 1.0A output currents and small SOT and SC-70 package options.

Part #	Description
<b>50 mA Output Current</b>	
TC1014	CMOS LDO with Shutdown Mode and VREF Bypass Input
TC1054	CMOS LDO with Shutdown Mode and ERROR Output
TC1070	Adjustable CMOS LDO with Shutdown Mode, 85 mV V <sub>DROPOUT</sub>
TC1072	CMOS LDO with Shutdown Mode, ERROR Output and VREF Bypass Input
TC1223	CMOS LDO with Shutdown Mode, 85 mV V <sub>DROPOUT</sub>
TC2014	CMOS LDO with Shutdown Mode and VREF Bypass Input, 45 mV V <sub>DROPOUT</sub>
TC2054	CMOS LDO with Shutdown Mode and ERROR Output, 45 mV V <sub>DROPOUT</sub>
<b>80 mA Output Current</b>	
TC1016	CMOS SC-70 LDO with Shutdown
<b>100 mA Output Current</b>	
TC1015	CMOS LDO with Shutdown Mode and VREF Bypass Input
TC1055	CMOS LDO with Shutdown Mode and ERROR Output
TC1071	Adjustable CMOS LDO with Shutdown Mode
TC1073	CMOS LDO with Shutdown Mode, ERROR Output and VREF Bypass Input
TC1224	CMOS LDO with Shutdown Mode
TC2015	CMOS LDO with Shutdown and VREF Bypass Input, 90 mV V <sub>DROPOUT</sub>
TC2055	CMOS LDO with Shutdown and ERROR Output, 90 mV V <sub>DROPOUT</sub>
<b>120 mA Output Current</b>	
TC1188	MAX8863 Replacement CMOS LDO with Shutdown Mode
TC1189	MAX8864 Replacement CMOS LDO with Shutdown Mode and Auto Discharge
<b>150 mA Output Current</b>	
TC1017	CMOS LDO with Shutdown Mode, 50 µA Active Current, SC-70 package
TC1185	CMOS LDO with Shutdown Mode and VREF Bypass Input, 50 µA Active Current
TC1186	CMOS LDO with Shutdown Mode and ERROR Output, 50 µA Active Current
TC1187	Adjustable V <sub>OUT</sub> CMOS LDO with Shutdown Mode
TC2185	CMOS LDO with Shutdown Mode and VREF Bypass
TC2186	CMOS LDO with Shutdown Mode and ERROR Output
<b>180 mA Output Current</b>	
TC56	CMOS LDO with Shutdown, 10V V <sub>IN</sub> Range
<b>250 mA Output Current</b>	
MCP1700	1.5 µA Supply Current CMOS LDO
<b>300 mA Output Current</b>	
TC1107	CMOS LDO with Shutdown Mode and VREF Bypass Input
TC1108	CMOS LDO in 3-pin SOT-223
TC1173	CMOS LDO with Shutdown Mode, ERROR Output and VREF Bypass Input
TC1174	Adjustable CMOS LDO with Shutdown Mode and VREF Bypass Input
TC1269	CMOS LDO with Shutdown Mode and VREF Bypass Input
<b>500 mA Output Current</b>	
TC1262	Fixed Output CMOS LDO
TC1263	CMOS LDO with Shutdown Mode, ERROR Output and VREF Bypass Input
TC1268	Fast Response CMOS LDO with Shutdown Mode, ERROR Output and VREF Bypass Input
<b>800 mA Output Current</b>	
TC1264	Fixed Output CMOS LDO
TC1265	CMOS LDO with Shutdown Mode, ERROR Output and VREF Bypass Input
TC2117	Fixed Low Dropout CMOS Regulator
<b>1.0A Output Current</b>	
MCP1726	CMOS LDO with Shutdown Mode and Power Good Output with Programmable Delay, Ceramic Output Capacitor Stable
<b>Specialty LDOs</b> – Specialty LDOs are available for unique design requirements.	
TC57	Positive LDO Controller with Shutdown
TC59	-10 V <sub>IN</sub> Max, 100 µA CMOS LDO
TC1266	200 mA PCI-compliant LDO
TC1267	400 mA PCI-compliant LDO

**Power MOSFET Drivers** – Microchip's Power MOSFET Drivers feature wide range input supply voltages and output currents and offer outstanding latch-up immunity. The portfolio has recently been expanded with the addition of smaller, surface mount power-enhanced packages.

Part #	Description
<b>0.5A Peak Output Current, Low Side Driver</b>	
TC1410/N	Single, Inverting/Non-Inverting
<b>1.0A Peak Output Current, Low Side Driver</b>	
TC1411/N	Single, Inverting/Non-Inverting
<b>1.2A Peak Output Current, Low Side Driver</b>	
TC1426/7/8	Dual, Inverting/Non-Inverting/Combo
TC4467/8/9	Quad, 2-input Logic Gate Inputs
<b>1.5A Peak Output Current, Low Side Driver</b>	
TC426/7/8	Dual, Inverting/Non-Inverting/Combo
TC4403	Single, Non-Inverting, Floating Load Driver
TC4404/05	Dual, Inverting/Non-Inverting
TC4426/7/8	Dual, Inverting/Non-Inverting/Combo, Also Available in High-Performance "A" Version
<b>2.0A Peak Output Current, Low Side Driver</b>	
TC1412/N	Single, Inverting/Non-Inverting
<b>3.0A Peak Output Current, Low Side Driver</b>	
TC1413/N	Single, Inverting/Non-Inverting
TC4423/4/5	Dual, Inverting/Non-Inverting/Combo
<b>6.0A Peak Output Current, Low Side Driver</b>	
TC429	Single, Inverting
TC4420/29	Single, Inverting/Non-Inverting
<b>9.0A Peak Output Current, Low Side Driver</b>	
TC4421/22	Single, Inverting/Non-Inverting, Also Available in High-Performance "A" Version
<b>1.5A Peak Output Current, High Side/Low Side Drivers</b>	
TC4626/27	Single, Inverting/Non-Inverting
TC4431/32	Single, Inverting/Non-Inverting
<b>Voltage Detectors</b> – Voltage Detectors with low quiescent current.	
MCP111	1 µA Voltage Detector with Open-Drain Output
MCP112	1 µA Voltage Detector with Push-Pull Output
TC51	1 µA Voltage Detector with Output Delay
TC52	Dual Channel Voltage Detector
TC53	1 µA Voltage Detector with Output Delay
TC54	1 µA Operating Current CMOS Voltage Detector
<b>PWM Controllers</b> – Our high-speed Pulse Width Modulator circuits were developed for advanced power supply applications particularly when used in conjunction with a PIC® microcontroller.	
MCP1630	PIC® microcontroller "attach" High-Speed Pulse Width Modulator
<b>Power Management Combo ICs</b> – Our space and cost-saving Combo ICs combine supervisor and regulator functions in one IC.	
TC1300	CMOS LDO with Shutdown Mode, Bypass and Independent Delay Reset Output
TC1301	Dual CMOS LDO (300 mA, 150 mA), with Shutdown Pin, Bypass and Independent Reset Output
TC1302	Dual CMOS LDO (300 mA, 150 mA), with Shutdown Pin, Bypass
TC1305	Dual, 150 mA CMOS LDO with Select Mode™ Shutdown and Independent Reset Output
TC1306	Dual, 150 mA CMOS LDO with Select Mode Shutdown and Reset Output
TC1307	Quad, 150 mA CMOS LDO with Select Mode Shutdown and Reset Output
<b>Switching Regulators</b> – Choose from a variety of switching frequencies with low supply currents in our Switching Regulator families.	
<b>PFM/PWM Buck Regulators/Controllers</b>	
MCP1601	PFM/PWM Step-Down (Buck), 500 mA Synchronous Regulator
TC105	PFM/PWM Step-Down (Buck) DC/DC Controller
TC120	PFM/PWM Step-Down (Buck) Combination DC/DC Regulator/Controller
<b>PWM Buck Regulators/Controllers</b>	
MCP1612	Constant Frequency PWM Step-Down (Buck), 1.0A Synchronous Regulator
<b>PFM/PWM Boost Regulators/Controllers</b>	
TC110	PFM/PWM Step-Up (Boost) DC/DC Controller
TC115	PFM/PWM Step-Up (Boost) DC/DC Regulator
TC125/126	PFM Step-Up (Boost) DC/DC Regulator
<b>Boost Controllers</b>	
MCP1650	Step-up (Boost) Controller
MCP1651	Boost Controller with Low Battery Indicator
MCP1652	Boost Controller with Power Good Indicator
MCP1653	Boost Controller with Low Battery and Power Good Indicator

## Power Management Solutions

**System Supervisors** – Microchip's System Supervisors offer excellent low supply current and small packages.

Part #	Description
<b>Power Supply Monitors with Reset Generator for 3.3V and 5V Systems</b>	
MCP102	1 $\mu$ A Voltage Supervisor with Push-Pull Output (SOT-23 & SC-70)
MCP103	1 $\mu$ A Voltage Supervisor with Push-Pull Output (SOT-23 & SC-70)
MCP121	1 $\mu$ A Voltage Supervisor with Open-Drain Output (SOT-23 & SC-70)
MCP131	1 $\mu$ A Voltage Supervisor with Open-Drain Output and Internal Pull-up Resistor (SOT-23 & SC-70)
TCM809/10	Precision CPU Supervisor (SOT-23 & SC-70)
MCP809/10	Microcontroller Supervisory Circuit with Push-Pull Output
TCM811/12	4-pin $\mu$ P Reset Monitors
TC1270/71	4-pin $\mu$ P Reset Monitors
TC1272/3/4	3-pin Reset Monitors for 5V Systems
MCP100	Microcontroller Supervisory Circuit with Push-Pull Output
MCP101	Microcontroller Supervisory Circuit with Push-Pull Output
MCP120	3-pin Reset with Open Drain Output
MCP130	3-pin Reset with Open Drain Output and Internal Pull-up
<b>Power Supply Monitors with Reset Generator, Watch Dog and Manual Reset</b>	
TC32M	3-pin ECONOMONITOR™ Supervisor
TC1232	Microprocessor Monitor

## Interface Solutions

In addition to microcontrollers with integrated CAN ports, Microchip offers peripherals designed to provide flexible, cost-effective options for implementing complete CAN nodes. Products include stand-alone CAN controllers, CAN input/output expanders and high-speed CAN transceivers.

Microchip offers products to enable customers to add infrared connectivity to their embedded applications. Products include infrared encoder/decoders and IrDA® protocol stack controllers.

Continuing its leadership in LIN (Local Interconnect Network) solutions, the recently introduced MCP201 device, a single-chip LIN bus interface transceiver with an integrated voltage regulator, joins the portfolio of LIN microcontrollers and development tools.

### CAN Peripherals

Part #	Description
MCP2515	Stand-Alone CAN Controller with SPI Interface
MCP2551	High-Speed CAN Transceiver
MCP25020/25	CAN Input/Output Expander with Digital I/O and 2 PWM Outputs
MCP25050/25	CAN Input/Output Expander with Digital I/O, PWM Outputs and A/D Inputs

### Infrared Peripherals

MCP2120	IR Encoder/Decoder, Hardware/Software Baud Rate Selection
MCP2122	8-pin IR Encoder/Decoder, 16x Clock Input
MCP2140	Fixed-speed, Low-power IrDA Protocol Handler Plus Bit Encoder/Decoder
MCP2150/55	IrDA® Protocol Handler plus Bit Encoder/Decoder

### LIN Transceiver

MCP201	Single-Chip LIN Bus Interface Transceiver with an Integrated Voltage Regulator
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### Serial Peripherals

MCP23008/23S08	8-bit Input/Output Expanders. Support for both I <sup>2</sup> C and SPI Protocols
MCP23016	16-bit Input/Output Expander
MCP23017/23S17	16-bit Input/Output Expanders, Support for both I <sup>2</sup> C and SPI Protocols

**Charge Pump DC/DC Converters** – Our Charge Pump DC/DC Converters feature inverting and non-inverting voltage doublers and SMT packaging.

Part #	Description
<b>Inverters and Doublers 20-45 mA Output/V<sub>OUT</sub> = -V<sub>IN</sub> or +2V<sub>IN</sub></b>	
TC1044S	1.5V to 12V Input, Boost Frequency Mode Selection (10 kHz/45 kHz)
TC7660	1.5V to 10V Input, (10 kHz)
TC7660H	1.5V to 10V Input, High Frequency (120 kHz)
TC7662B	1.5V to 15V Input, Boost Frequency Mode Selection (10 kHz/35 kHz)
TC7660S	1.5V to 12V Input, Boost Frequency Mode Selection (10 kHz/45 kHz)
TCM828/29	1.5V to 5.5V Input, (12 kHz/35 kHz)
TC1219/20	1.5V to 5.5V Input with Shutdown (12 kHz/35 kHz)
TC1221/22	1.8V to 5.5V Input with Shutdown (125 kHz/750 kHz)
TC1240	2.5V to 4.0V, Positive Doubling CMOS Charge-Pump Voltage Converter with Shutdown (160 kHz)
TC1240A	2.5V to 5.5V, Positive Doubling CMOS Charge-Pump Voltage Converter with Shutdown (160 kHz)
TC7662A	3V to 18V Input (12 kHz), V <sub>OUT</sub> = -V <sub>IN</sub> or +2 V <sub>IN</sub>
<b>80-100 mA Output Positive Output, V<sub>OUT</sub> = -V<sub>IN</sub> or +2V<sub>IN</sub></b>	
TC962	3V to 18V Input (12 kHz/24 kHz), 80 mA I <sub>OUT</sub>
TC1121	2.4V to 5.5V Input with Shutdown and Frequency Control Selection (10 kHz/200 kHz), 100 mA output
<b>Multi Function</b>	
TC682	2.4V to 5.5V Input/up to 10 mA output current (12 kHz) Converter, V <sub>OUT</sub> = -2V <sub>IN</sub>
<b>Regulated Positive Converters</b>	
MCP1252/53	2.0V to 5.5V Input, 120 mA I <sub>OUT</sub> , Fixed (3.3V or 5.0V), or Adjustable (1.5V to 5.5V) V <sub>OUT</sub> (650 kHz/1.0 MHz)

## Battery Management

Get high accuracy and longer battery operation for your portable designs with Microchip's battery management products offering low reverse leakage current and a wide range of features in small footprint packages. In addition to Microchip's Battery Chargers, the company also offers a portfolio of high-accuracy field-programmable smart battery managers. These PowerSmart® devices offer advanced features to maximize battery operating life and reduce PCB footprint, while minimizing overall system cost and improving time-to-market.

### Battery Chargers

Part #	Description
MCP73826	Single Cell Li-Ion/Li-Polymer Charge Management Controller in SOT-23 Package
MCP73827	Single Cell Li-Ion/Li-Polymer Charge Management Controller with Mode Indicator and Charge Current Monitor
MCP73828	Single Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Complete Indicator and Temperature Monitor
MCP73841	Single Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator, Safety Timers and Temperature Monitor
MCP73842	Dual Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator, Safety Timers and Temperature Monitor
MCP73843	Single Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator and Safety Timers
MCP73844	Dual Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator and Safety Timers
MCP73853	Dual Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator and Safety Timers
MCP73855	Dual Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator and Safety Timers
MCP73861	Fully Integrated Single Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator, Safety Timers and Temperature Monitor
MCP73862	Fully Integrated Dual Cell Li-Ion/Li-Polymer Charge Management Controller with Charge Status Indicator, Safety Timers and Temperature Monitor

## Mixed-Signal Solutions

High performance combined with low cost and low power consumption make our Analog-to-Digital Converters (A/D Converters) ideal for portable instrumentation, embedded control and data acquisition applications. Microchip's portfolio includes Delta-Sigma A/D Converters with up to 22-bit resolution and sampling speeds up to 60 samples per second. Successive Approximation Register (SAR) A/D Converters have 10-, 12- and 13-bit resolutions with sampling rates up to 200 ksps. Also included are Dual Slope A/D Converters with high resolution of up to 17 bits with fully differential inputs, plus BCD and Binary A/D Converters which feature over-range and under-range detection.

Select from low-cost serial D/A Converters, Voltage-to-Frequency Converters (V/F), Frequency-to-Voltage Converters (F/V) and low dropout precision Voltage References that feature low power and high precision. Rounding out Microchip's Mixed-Signal Family are the Single- and Dual-Channel Digital Potentiometers.

System Analog-to-Digital Converters	
Part #	Description
<b>Delta-Sigma A/D Converters</b>	
MCP3551	22-bit, 15 sps, SPI Interface, Single Channel
MCP3553	22-bit, 60 sps, SPI Interface, Single Channel
<b>SAR A/D Converters</b>	
MCP3001/2/4/8	10-bit, SPI Interface, Single/Dual/4/8 Input Channel
MCP3201/2/4/8	12-bit, SPI Interface, Single/Dual/4/8 Input Channel
MCP3021	10-bit, I <sup>2</sup> C Interface, Low Power, SOT-23 Package, Single Channel
MCP3221	12-bit, I <sup>2</sup> C Interface, Low Power, SOT-23 Package, Single Channel
MCP3301/2/4	13-bit, SPI Interface, Single/Dual/4, Differential Input Channel
<b>Dual Slope A/D Converters</b>	
TC500/A	16-bit/17-bit Front End
TC510	17-bit Front End
TC514	17-bit Front End with 4 Channel Input MUX
TC520A	Serial Interface Adapter for TC500 A/D Converters
TC530	17-bit, Single Input Channel
TC534	17-bit, 4 Input Channel
TC7109/A	12-bit Plus Sign, CMOS Low-Power A/D Converter
<b>BCD and Binary A/D Converters</b>	
TC835	4-1/2 Digit, PC. Data Acquisition A/D Converter
TC850	15-bit, Fast Integrating, CMOS A/D Converter
TC7135	4-1/2 Digit, A/D Converter
TC14433/A	3-1/2 Digit, A/D Converter
<b>Display Analog-to-Digital Converters</b>	
<b>LCD Display - 4-1/2 Digit</b>	
TC7129	Basic 1-Chip DMM with Hold, Low Battery, Over-Range/Under-Range
<b>LCD Display - 3-1/2 Digit</b>	
TC7106/A	Basic 1-Chip DMM with Internal Reference
TC7116/A	Plus Hold Function
TC7126/A	Low Power Basic 1-Chip DMM
<b>LED Display - 3-1/2 Digit</b>	
TC7107/A	Basic 1-Chip DMM with Internal Reference
TC7117/A	Plus Hold Function
<b>LED Display - 3-3/4 Digit</b>	
TC820	DMM plus Frequency Counter and Logic Probe
<b>Digital Potentiometers</b>	
MCP4021	6-bit Non-volatile Potentiometer with U/D Interface in 8-lead SOIC, MSOP and 2x3 DFN (2, 5, 10, 50 ohm)
MCP4022	6-bit Non-volatile Rheostat with U/D Interface in 6-lead SOT-23 (2, 5, 10, 50 ohm)
MCP4023	6-bit Non-volatile Potentiometer in 6-lead SOT-23 (2, 5, 10, 50 ohm)
MCP4024	6-bit Non-volatile Rheostat in 5-lead SOT-23 (2, 5, 10, 50 ohm)
MCP41010	10 Kohm, Single with SPI Interface
MCP42010	10 Kohm, Dual with SPI Interface
MCP41050	50 Kohm, Single with SPI Interface
MCP42050	50 Kohm, Dual with SPI Interface
MCP41100	100 Kohm, Single with SPI Interface
MCP42100	100 Kohm, Dual with SPI Interface
<b>Voltage References</b>	
MCP1525	2.5V Precision Voltage Reference
MCP1541	4.096V Precision Voltage Reference

## System D/A Converters

MCP4921	12-bit Digital-to-Analog Converter with SPI Interface
MCP4922	Dual-channel 12-bit Digital-to-Analog Converter with SPI Interface
MCP4821	12-bit Digital-to-Analog Converter with Internal Voltage Reference and SPI Interface
MCP4822	Dual-channel 12-bit Digital-to-Analog Converter with Internal Voltage Reference and SPI Interface
TC1320/1	8/10-bit Digital-to-Analog Converter with Two-Wire Interface

## V/F and F/V Converters

TC9400/1/2	Precision V/F and F/V Converters
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## Linear Solutions

Microchip's Operational Amplifier family offers one of the lowest I<sub>q</sub> for a given GBWP in the industry. All op amps offer rail-to-rail output with many also offering rail-to-rail input. Microchip's family of low power Comparators offers single, dual or quad amplifiers in space-saving packages.

## Operational Amplifiers

Part #	Description
TC1029	Dual, Low Power Rail-to-Rail Input/Output
TC1030	Quad, Low Power with Shutdown Modes, Rail-to-Rail Input/Output
TC1034/(35)	Single, (Single with Shutdown) Low Power (SOT-23 Package), Rail-to-Rail Input/Output
MCP601/2/(3)/4	Single/Dual/(Single with Chip Select)/Quad, Rail-to-Rail Output
MCP606/7/(8)/9	Single/Dual/(Single with Chip select)/Quad, Low-Power, Rail-to-Rail Output, Vos<250 µV
MCP616/17/(18)/19	2.3V Single/Dual/(Single with Chip select)/Quad, Rail-to-Rail Output, Vos<150 µV
MCP6001/2/4	Single/Dual/Quad, 1 MHz 1.8V Dual, Rail-to-Rail Input/Output
MCP6021/22/(23)/24	10 MHz Single/Dual/(Single with Chip Select)/Quad, Rail-to-Rail Input/Output
MCP6041/42/(43)/44	600 nA, 1.4V, 10 kHz, Single/Dual/(Single with Chip Select)/Quad, Rail-to-Rail Input/Output
MCP6141/42/(43)/44	600 nA, 1.4V, 120 kHz G>10, Single/Dual/(Single with Chip Select)/Quad, Rail-to-Rail Input/Output
MCP6231/32/34	300 kHz, Single/Dual/Quad, Low Power, Rail-to-Rail Input/Output, Extended Temperature
MCP6241/42/44	650 kHz, Single/Dual/Quad, Low Power, Rail-to-Rail Input/Output, Extended Temperature
MCP6271/72/(73)/74/(75)	2 MHz, Single/Dual/(MCP6273 -Single with Chip Select Shutdown)/Quad/(MCP6275 - Dual Connected with Chip Select), Rail-to-Rail Input/Output, Extended Temperature
MCP6281/82/(83)/84/(85)	5 MHz, Single/Dual/(MCP6283 -Single with Chip Select Shutdown)/Quad/(MCP6285 - Dual Connected with Chip Select), Rail-to-Rail Input/Output, Extended Temperature
MCP6291/92/(93)/94/(95)	10 MHz, Single/Dual/(MCP6293 -Single with Chip Select Shutdown)/Quad/(MCP6295 - Dual Connected with Chip Select), Rail-to-Rail Input/Output, Extended Temperature

## Programmable Gain Amplifiers – SPI™ Bus programmable amplifiers with built-in Analog Multiplexer.

MCP6S21/2/6/8	Single/Dual/Hex/Octal, Precision Rail-to-Rail Input/Output, Gain and Channel Control over SPI
MCP6S91/2/3	Single/Dual/Dual, Low-Cost, Rail-to-Rail Input/Output, Gain and Channel Control over SPI

## Comparators

Several comparators are offered with low supply voltage (1.8) and low supply current (1 µA). Examples include the **MCP6541**, **TC1039**, **TC1038** and the **MCP6546** family of push-pull and open-drain comparators, which are designed for very low power single-supply applications.

The **MCP6541**, **TC1039** and **TC1038** families of comparators have a push-pull output that interfaces with CMOS/TTL logic. The output limits supply current surges and dynamic power consumption while switching.

The **MCP6546** family of comparators has an open-drain output that can be pulled up to 10V supply.

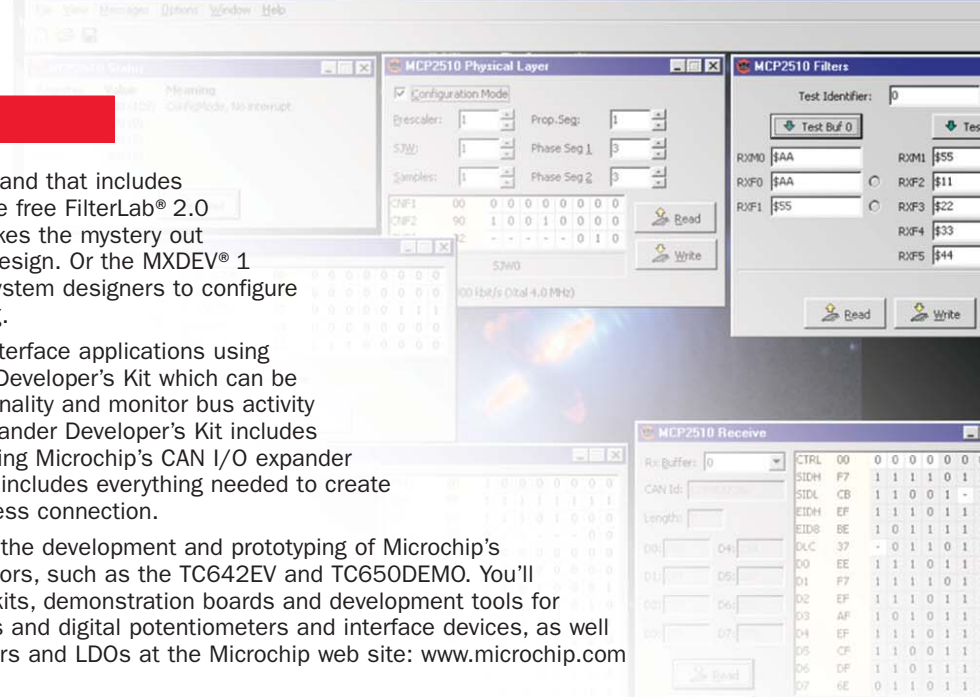
The linear building blocks such as **TC1027**, **TC1039** and **TC1041**, have integrated reference voltage and shutdown which makes them ideal for low power portable applications.

## Analog Design Development Tools

Microchip strives to offer complete design solutions and that includes innovative and easy-to-use development tools like the free FilterLab® 2.0 Active Filter Software (www.microchip.com), which takes the mystery out of analog and eases the difficult job of active filter design. Or the MXDEV® 1 Analog Evaluation System that makes it easier for system designers to configure the output stage and input signal source and scaling.

Engineers can evaluate, demonstrate and develop interface applications using one of Microchip's kits, such as the MCP2510 CAN Developer's Kit which can be used to demonstrate basic CAN input/output functionality and monitor bus activity on the user's CAN bus. The MCP250XX CAN I/O Expander Developer's Kit includes everything needed to create a CAN-based system using Microchip's CAN I/O expander family. The MCP2120/2150 Infrared Developer's Kit includes everything needed to create a system that communicates using an infrared wireless connection.

Several evaluation kits are also available to support the development and prototyping of Microchip's Brushless DC Fan Controllers and Temperature Sensors, such as the TC642EV and TC650DEMO. You'll find the most current information on our evaluation kits, demonstration boards and development tools for A/D converters, fan controllers, temperature sensors and digital potentiometers and interface devices, as well as electronic selection tools for power MOSFET drivers and LDOs at the Microchip web site: www.microchip.com



### Evaluation, Demonstration and Development Kits

Order #	Description	Devices Supported
<b>Thermal Management Demonstration and Evaluation Tools</b>		
MCP9800DM-PCTL	MCP9800 Temperature Sensor PICtail™ Demonstration Board	MCP9800
TC642DEMO	TC64X/64XB Fan Speed Controller Demonstration Board	TC642, TC646, TC647, TC648, TC649
TC642EV	TC64X/64XB Fan Speed Controller Evaluation Board	TC642, TC646, TC647, TC648, TC649
TC650DEMO	TC650 Fan Controller Demonstration Board	TC650
TC72DM-PICTL	TC72 Digital Temperature Sensor PICtail Demonstration Board	TC72
TC77DM-PICTL	TC77 Thermal Sensor PICtail Demonstration Board	TC77
TC1047ADM-PICTL	TC1047A Temperature-to-Voltage Converter PICtail Demonstration Board	TC1047A
TC74DEMP	TC74 Serial Digital Thermal Sensor Demonstration Board	TC74
TC652DEMO	TC652 Fan Controller Demonstration Board	TC652
<b>Linear Demonstration and Evaluation Tools</b>		
MCP6SX2DM-PCTLTH	MCP6SX2 PGA Thermistor PICtail Demonstration Board	MCP6S22/92
MCP6S22DM-PICTL	MCP6S22 PGA PICtail Demonstration Board	MCP6S22
MCP6SX2DM-PCTLPD	MCP6SX2 PGA Photodiode PICtail Demonstration Board	MCP6S22/92
MCP6S2XEVL	MCP6S2X PGA Evaluation Board	MCP6S2X
<b>Mixed Signal Demonstration and Evaluation Tools</b>		
DVMCPA	MXDEV Analog Evaluation System (Driver Board)	MCP300X, MCP320X, MCP42XXX
DV3201A	MCP3XXX Single/Dual ADC MXDEV Daughter Board	MCP3001, MCP3002, MCP3201, MCP3202
DV3204A	MCP3204/08 MXDEV Daughter Board	MCP3004, MCP3008, MCP3204, MCP3208
DV42XXX	Digital POT Evaluation Kit	MCP42010, MCP42050, MCP42100
MCP402XEVL	MCP402X Evaluation Kit with the PIC10F	MCP4021
MXSIGDM	Mixed Signal PICtail Evaluation Board	TC132X, MCP330X, MCP320X, MCP482X, MCP492X, MCP3221, MCP3021, MCP1525
TC3400EV	Sigma-Delta Evaluation Kit	TC340X
<b>Power Management Demonstration and Evaluation Tools</b>		
MCP7382XEVL	MCP7382X Li-Ion Battery Charger Evaluation Board	MCP7382X
MCP7384XEVL	MCP7384X Li-Ion Battery Charger Evaluation Board	MCP7384X
MCP7386XEVL	MCP7386X Li-Ion Battery Charger Evaluation Board	MCP7386X
MCP1601EV	MCP1601 Buck Regulator Evaluation Board	MCP1601
MCP1612EV	MCP1612 Synchronous Buck Regulator Evaluation Board	MCP1612
MCP1650EV	MCP1650 Boost Controller Evaluation Board	MCP1650
MCP1650DM-LED1	MCP165X 3W White LED Demonstration Board	MCP1650/51
MCP1630RD-DDBK-1	MCP1630 +12V in Dual Output Buck Converter Reference Design	MCP1630
MCP1630DM-NMC1	MCP1630 NiMH Battery Charger Demonstration Board	MCP1630
MCP1630RD-LIC1	MCP1630 Li-Ion Multi-Bay Battery Charger	MCP1630

## Analog Design Development Tools (Continued)

Evaluation, Demonstration and Development Kits		
Order #	Description	Devices Supported
<b>CAN Demonstration and Evaluation Tools</b>		
DV251001	MCP2515/2510 CAN Developer's Kit	MCP2515, MCP2510
DV250501	MCP250XX CAN I/O Expanders Development Kit	MCP25020, MCP25025, MCP25050, MCP25055
<b>Infrared Demonstration and Evaluation Tools</b>		
DM163008	MCP2120/2150 Infrared Developer's Kit	MCP2120, MCP2150
MCP215XDM	MCP215X Data Logger Demonstration Board	MCP2150/55
MCP2140DM-TMPSNS	MCP2140 IrDA Wireless Temp Demo	MCP2140
<b>Serial Demonstration and Evaluation Tools</b>		
MCP23X08EV	MCP23X08 Evaluation Board	MCP23008, MCP23S08
<b>General Purpose Evaluation Tools</b>		
VSUPEV	General Purpose Board for easy evaluation of various 3-pin SOT-23 devices	Devices in 3-pin SOT-23 packages
VSUPEV2	General Purpose Board for easy evaluation of various 5- and 6-pin SOT-23 devices	Devices in 5- and 6-pin SOT-23 packages
<b>Software Tool</b>		
FilterLab® 2.0	Active Filter Design Filter Software (Download Free from <a href="http://www.microchip.com">www.microchip.com</a> )	Op Amps, ADCs

## Analog Demonstration and Evaluation Kit Examples

### Thermal Management Products

#### MCP9800 Thermal Sensor PICtail™ Demo Board

Part Number MCP9800DM-PCTL

The MCP9800 demonstration board illustrates how to interface the MCP9800 to a PICmicro® microcontroller. The board can also be used as a stand-alone module to quickly add thermal sensing capability to any existing application. This basic sensor functionality is implemented on a small Printed Circuit Board (PCB) and an interface via a standard 100 mil header.

### Power Management Products



#### MCP1650 Boost Controller Evaluation Board

Part Number MCP1650EV

Demonstrates the MCP165X Boost Controller product family in two high-power, boost-converter applications.

#### MCP7386X Li-Ion Evaluation Board

Part Number MCP7386XEV

The MCP7386X Evaluation Board is set up to evaluate simple, stand-alone, linear charging of single/dual cell Lithium-Ion/Lithium-Polymer battery packs with Microchip's MCP73861/2 fully integrated Li-Ion/Li-polymer Charge Management Controllers.

### Interface Products

#### MCP2140 IrDA® Wireless Temp Demo Board

Part Number MCP2140DM-TMPSNS

Demonstrates the MCP2140 device in a real-world application. Shows how to integrate an IrDA® standard port.



### Mixed-Signal Products

#### MXDEV® Analog Evaluation System

Part Number DVMCPA



Versatile, easy-to-use system helps evaluate mixed-signal products. Includes the DVMCPA MCP Driver Board, which provides data acquisition and analysis/display in a Windows® environment.

### Linear Products

#### MCP6SX2 PGA Photodiode PICtail™ Demo Board

Part Number MCP6SX2DM-PCTLPD

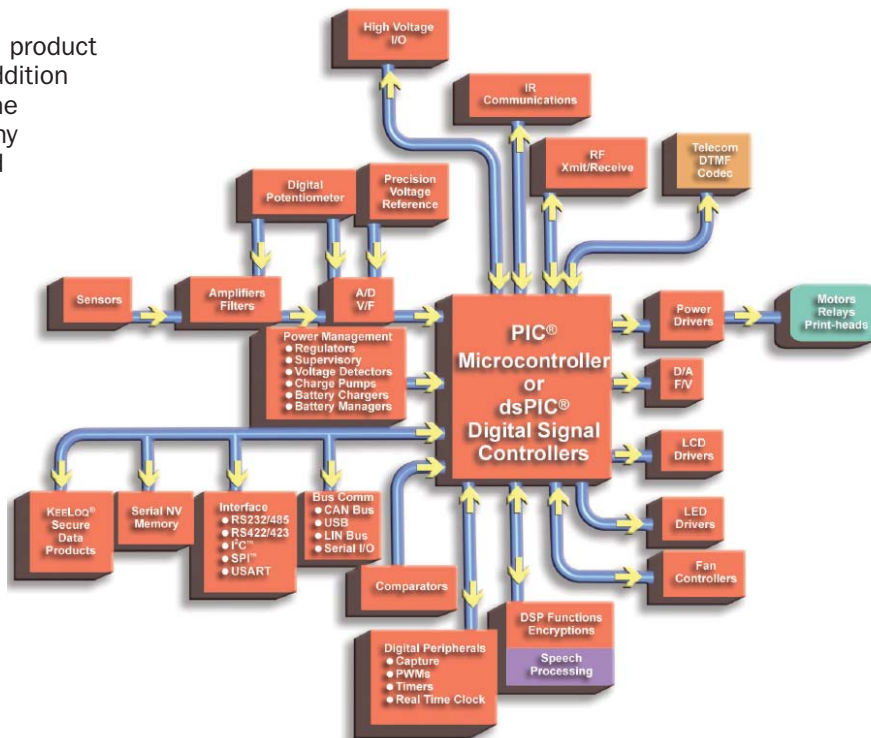
Opens possibilities to process other sensor signals. Increases the number of PIC microcontroller I/O pins available for other purposes. Features a PNZ334 photo-diode, MCP6001U op amp and MCP6S22 and MCP6S92 Programmable Gain Amplifiers (PGA).



## Worldwide Sales & Service

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