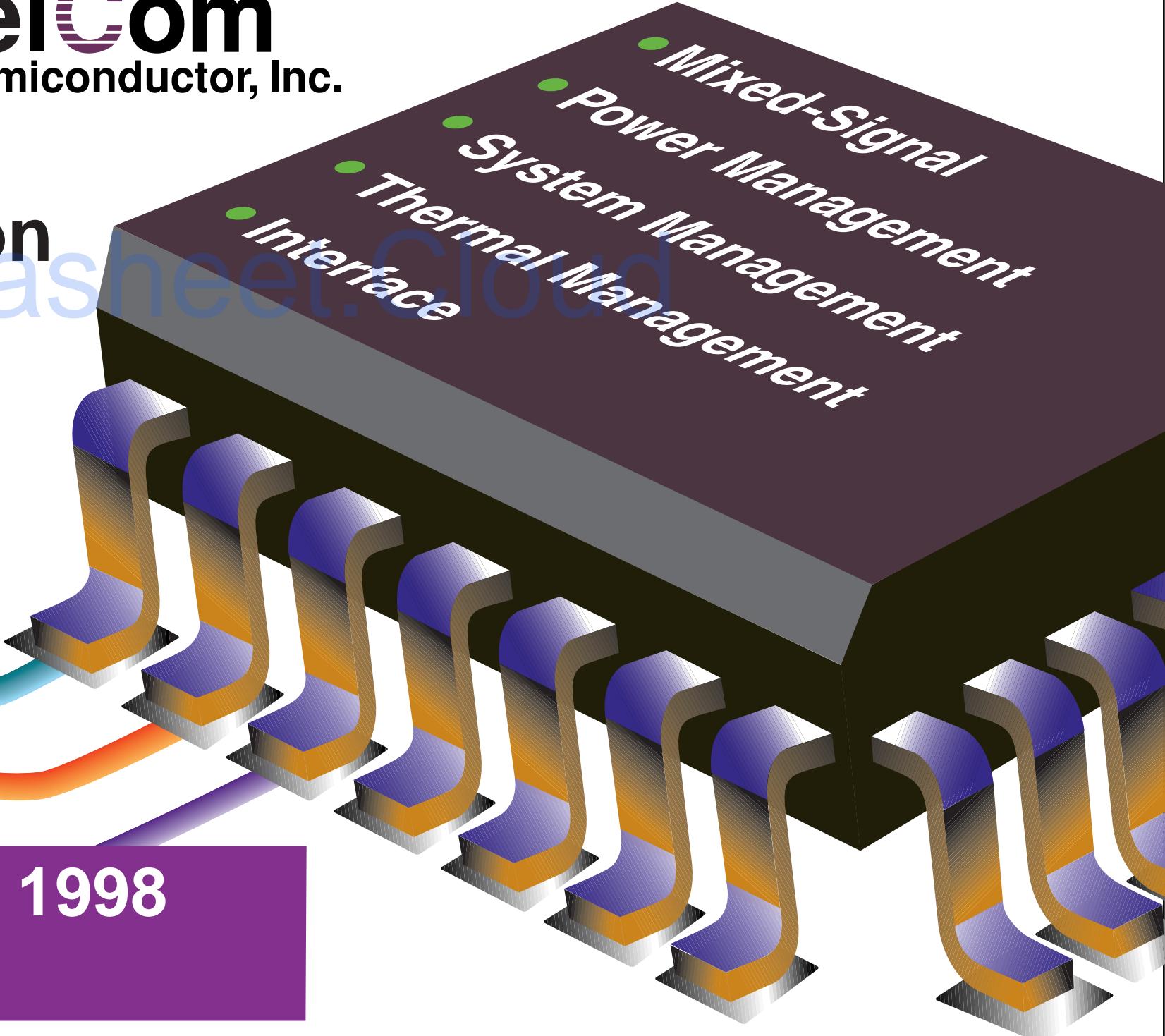




# Selection Guide

January 1998  
Update



- Mixed-Signal
- Power Management
- System Management
- Thermal Management
- Interface



## Plants and Offices

Established in December of 1993, TelCom Semiconductor, Inc. is a worldwide manufacturer of semiconductor devices, with a dedicated wafer manufacturing facility in Mountain View, California and a testing plant in Hong Kong.

## Sales and Distribution

TelCom's products and services are represented and distributed through our sales offices in the United States, Hong Kong, and Europe, and by electronics distributors and manufacturer representatives throughout the world.

## Products

TelCom Semiconductor, Inc. is a high performance analog company that develops, manufactures, and markets integrated circuits for a broad spectrum of customers with commercial, high-volume standard product applications. TelCom's product direction is focused on proprietary and commodity mixed-signal, power management, thermal management, system management, and interface devices.

TelCom's mixed-signal products consist of multiple precision analog signal processing products including: display and system A/D converters, V/F and F/V converters, voltage references, and precision op amps. Characteristics of this family are low power, cost effectiveness, precision, and high noise rejection/reduction.

TelCom's line of power management integrated circuit devices include low power linear regulators, voltage detectors and monitors, DC-DC converters, and power MOSFET drivers. These discrete replacement devices interface to a wide range of logic levels to directly drive motors, power MOSFETs, IGBTs, bipolar transistors, and inductive-loads.

TelCom's solid-state temperature sensors protect sensitive components such as microprocessors, power supplies, motor drives, and laser diodes from thermal runaway, and control temperature in process control applications.

TelCom's products have gained wide application acceptance. Examples include:

- Laptops, computers, workstations, and peripherals
- Battery charging and temperature control
- Thermal management
- Hand-held and bench top measurement tools
- Motor disk drives
- Telecommunications switches
- Cellular phones
- Consumer electronics

## Product Assurance

TelCom is committed to delivering products which meet or exceed our customer's quality and reliability expectations. TelCom Semiconductors' product assurance programs ensure compliance to customer driven quality requirements and provide for continuous improvement.

## Life Support Policy

TelCom's products are not authorized for use as critical components in life-support devices or systems without express written approval from the president of TelCom Semiconductor, Inc.

TelCom reserves the right to make changes in the circuitry and specifications of its devices and advises its customers to obtain the latest version of relevant information.

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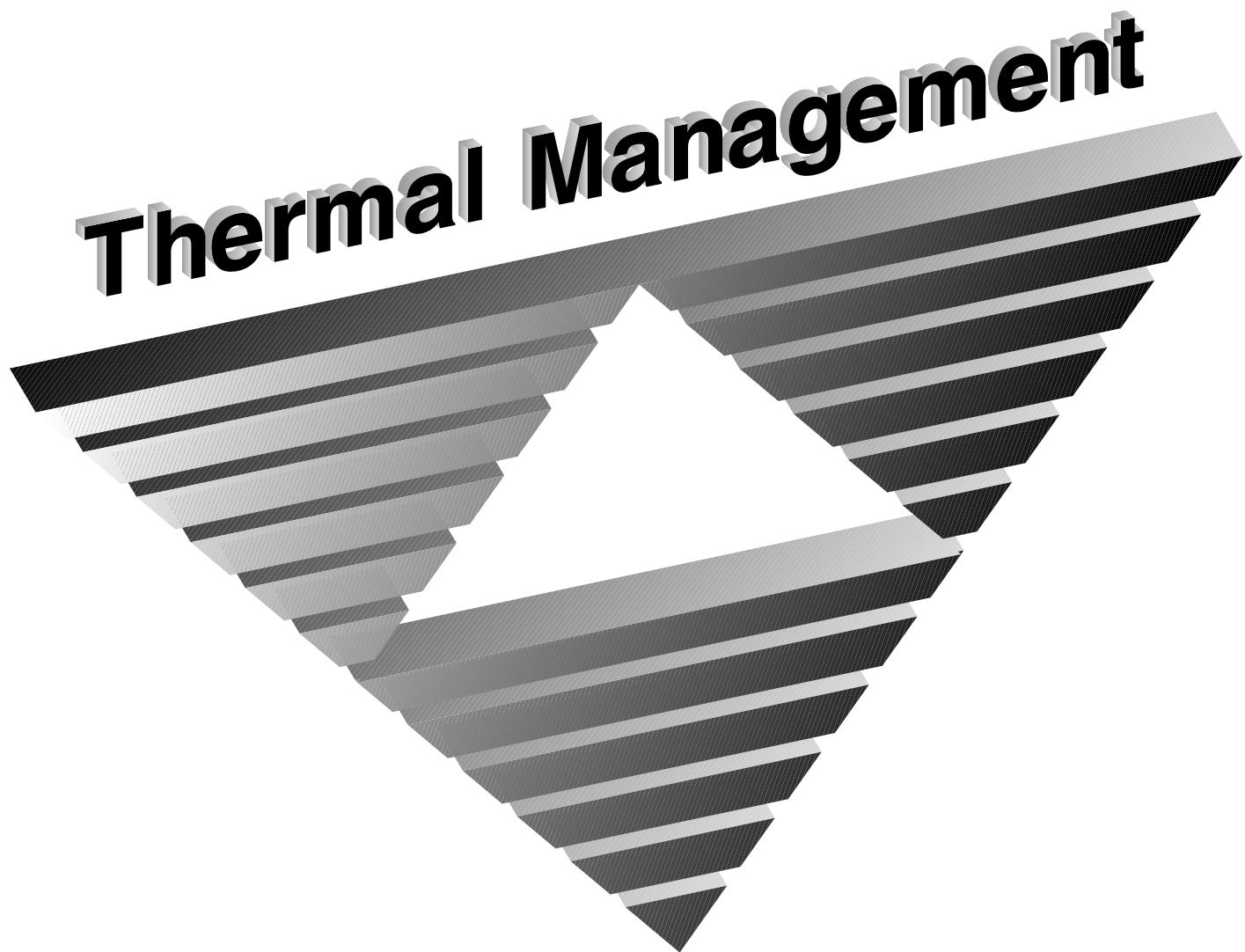
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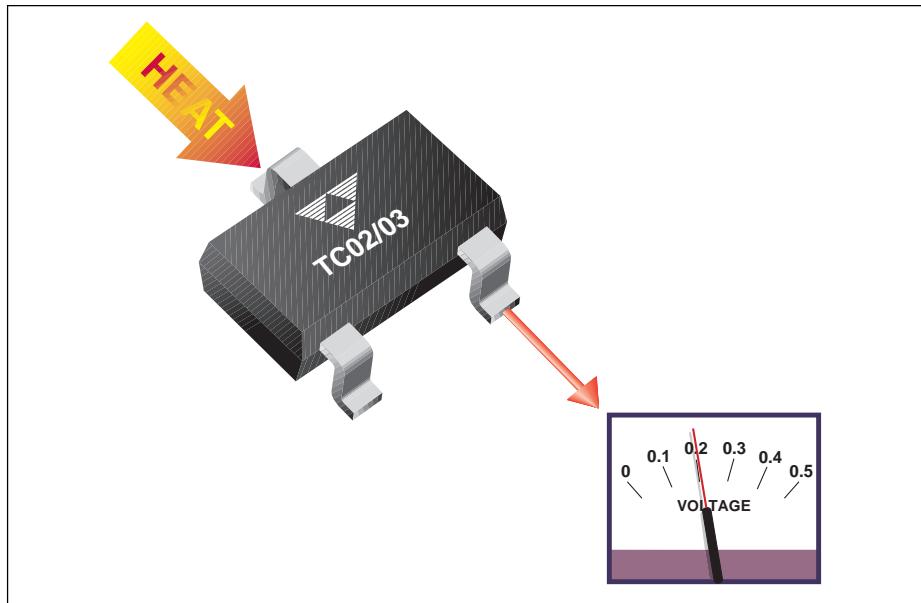
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\* Contact Factory for Information



## TC02/03 Precision Temperature-to-Voltage Converters



The TC02/03 temperature sensors furnish a linearized output voltage directly proportional to measured temperature. The TC03 has a temperature measurement range of  $-20^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ . Its output voltage is directly calibrated in degrees Centigrade (i.e.,  $V_{\text{OUT}} = 10\text{mV}/^{\circ}\text{C} \times \text{Temperature } ^{\circ}\text{C}$ ). An external pull-down resistor to a negative voltage source is required for temperature measurement below  $0^{\circ}\text{C}$ .

The TC02 has a temperature measurement range of  $-20^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ , and operates with a single supply. It has the same output voltage slope with temperature as the TC03 ( $10\text{mV}/^{\circ}\text{C}$ ). The output voltage range is 100mV at  $-20^{\circ}\text{C}$  to 1.75V at  $+125^{\circ}\text{C}$ .

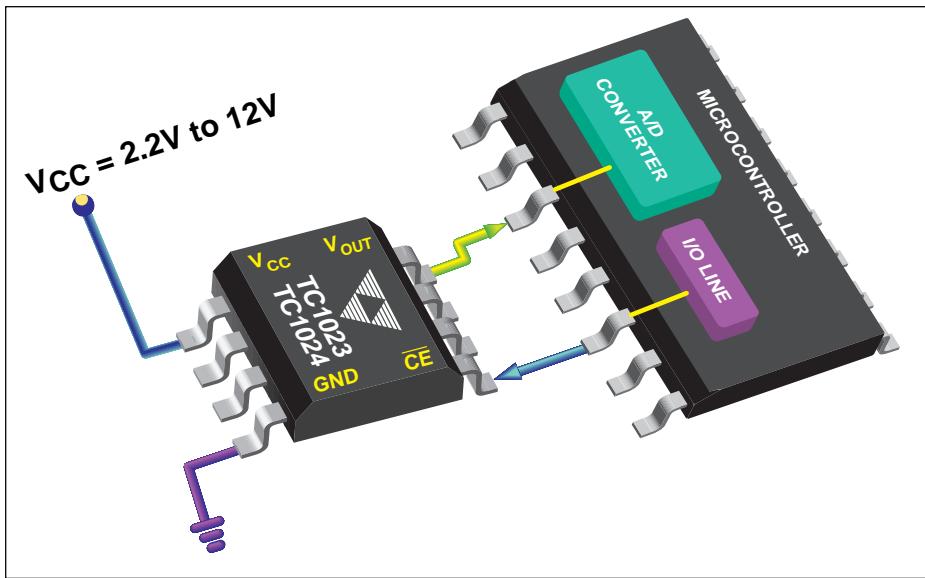
### FEATURES

- Linearized Temperature-to-Voltage Converters
- Direct Centigrade Output Voltage Scaling (TC03)
- Wide Temperature Measurement Range (TC02) .....  $-20^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Excellent Temperature Converter Linearity Over Temperature .....  $0.8^{\circ}\text{C}$
- High Temperature Converter Accuracy at  $25^{\circ}\text{C}$  Guaranteed .....  $\pm 2^{\circ}\text{C}$
- Small Packages ..... TO-92-3 and SOT-23B-3

Small size, low cost, and low power operation make the TC02/03 suitable for a wide range of general purpose temperature measurement applications.

# TC1023/1024

## Precision Temperature-to-Voltage Converters with Shutdown Mode



The TC1023/1024 temperature sensors furnish a linearized output voltage directly proportional to measured temperature. The TC1023 has a temperature measurement range of – 20°C to +100°C. Its output voltage is directly calibrated in degrees Centigrade (i.e.,  $V_{OUT} = 10\text{mV}/^\circ\text{C} \times \text{Temperature } ^\circ\text{C}$ ). An external pull-down resistor to a negative voltage source is required for temperature measurement below 0°C.

The TC1024 has a temperature measurement range of – 20°C to +125°C, and operates with a single supply. It has the same output voltage slope with temperature as the TC1023 (10mV/°C). The output voltage range is 100mV at – 20°C to 1.75V at +125°C. Both devices have a chip

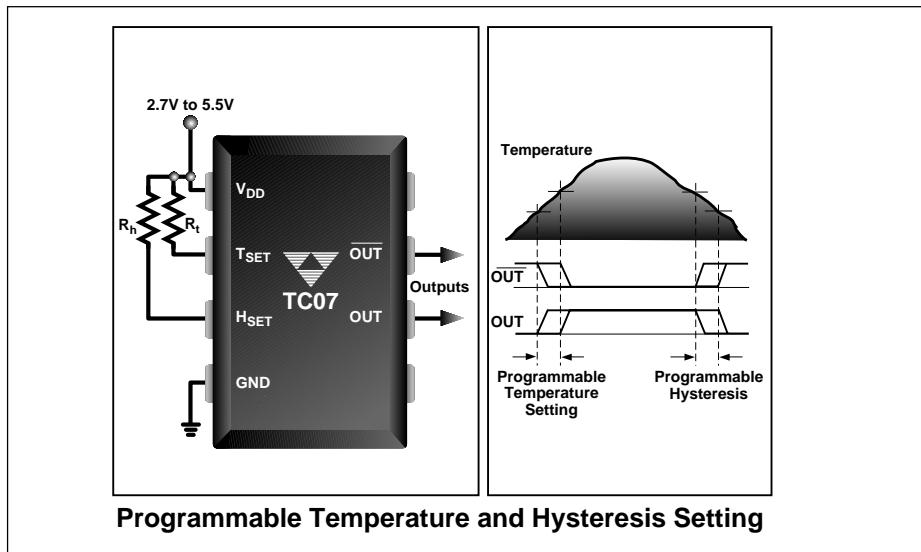
### FEATURES

- Linearized Temperature-to-Voltage Converters
- Direct Centigrade Output Voltage Scaling (TC1023)
- Shutdown/Calibrate Mode
- Multi-Zone Temperature Sensing Capability
- Wide Temperature Measurement Range (TC1024) ..... – 20°C to +125°C
- Excellent Temperature Converter Linearity ..... 0.8°C Over Temperature
- High Temperature Converter Accuracy ..... ±2°C at 25°C Guaranteed
- Small Packages ..... 8-Pin SOIC and 8-Pin MSOP

enable input that reduces supply current to 1 $\mu\text{A}$  (typical) when pulled high. In this state, the output defaults to a high resistance, allowing an external voltage output device (such as a second TC1023/24 for multizone sensing) to be multiplexed on a common analog line.

Small size, low cost, flexibility, and low power operation make the TC1023/1024 suitable for a wide range of general purpose temperature measurement applications.

## TC07 3V Temperature Controller with Programmable Hysteresis



The TC07 is a programmable temperature sensor that operates from power supply levels as low as 2.7V. It consists of an on-board temperature sensor and user-programmable threshold detector. It operates over a maximum temperature range of – 40°C to +125°C (commercial and industrial operating temperature versions are also available). It can be operated in an “open-loop” mode as an over-temperature or under-temperature monitor. It also can be operated as a “closed-loop” controller when its outputs are connected to a fan or heating system. Both high-true and low-true outputs are provided for easy system interface. Typical cooling applications include thermal overload sensing and fan control in power supplies and computing systems. Typical heating applications include en-

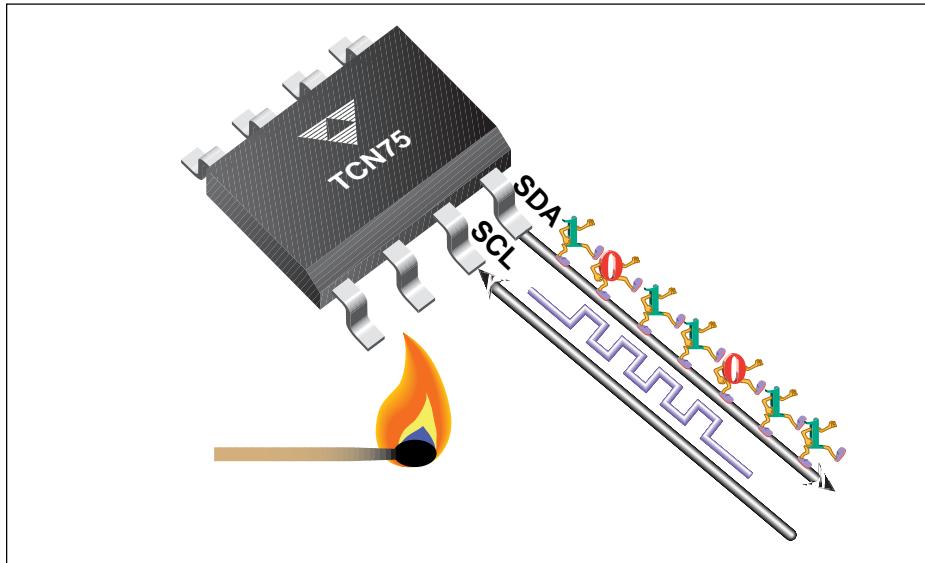
### FEATURES

- User Programmable Hysteresis and Temperature Set Point
- Easily Programs with Two External Resistors
- Wide Temperature Detection Range
  - TC07CxA ..... 0°C to +70°C
  - TC07ExA ..... – 40°C to +85°C
  - TC07VxA ..... – 40°C to +125°C
- Small Packages ..... 8-Pin MSOP and 8-Pin SOIC
- Cost Effective

vironmental heating controls, LCD display heaters, and process control.

The user programs the temperature and hysteresis trip points with a single resistor each. The outputs are driven active when ambient temperature exceeds the user’s programmed temperature trip point setting. These outputs remain active until ambient temperature falls below the user’s programmed hysteresis trip point setting. The ability to program both the setpoint temperature and hysteresis allows the user to “tailor” the on/off control characteristics of the TC07 to match the system requirements.

# TCN75 Serial Thermometer and Thermal Watchdog



The TCN75 is a serially programmable temperature sensor that notifies the host controller when ambient temperature exceeds a user-programmed setpoint. Hysteresis also is programmable. The INT/COMP output is programmable as either a simple comparator for thermostat operation or as a temperature event interrupt. Communication with the TCN75 is accomplished via a 2-wire bus that is compatible with industry standard protocols. This permits reading the current temperature, programming the setpoint and hysteresis, and configuring the device.

The TCN75 powers up in Comparator Mode with a default setpoint of 80°C with 5°C hysteresis. Defaults allow independent operation as a stand-alone thermostat. A shutdown command may be sent via the 2-wire bus to

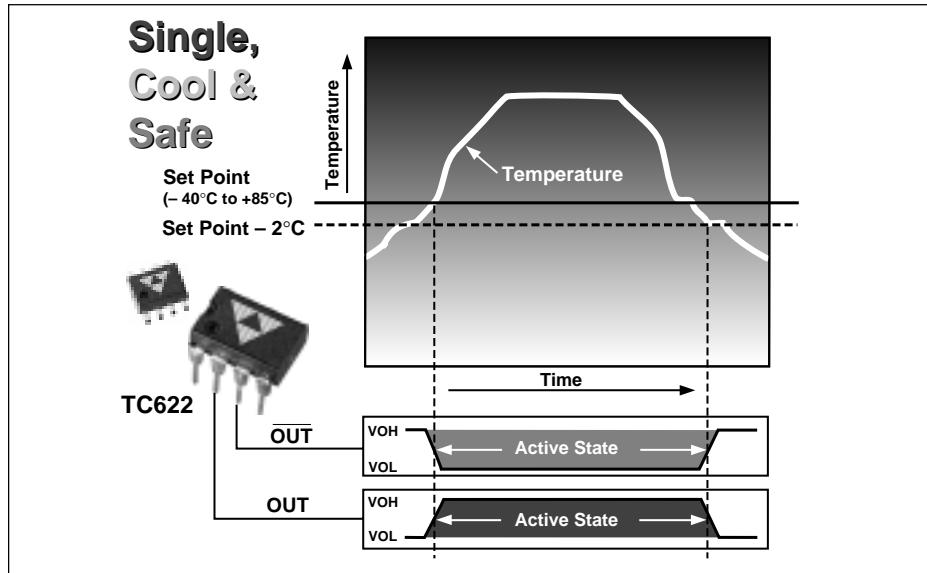
## FEATURES

- Solid-State Temperature Sensing; 2°C Accuracy from -25°C to 100°C; 2.7V - 5.5V Operating Range
- Programmable Trip Point and Hysteresis with Power-up Defaults
- Industry Standard 2-Wire Serial Interface
- Thermal Event Alarm Output Functions as Interrupt or Comparator / Thermostat Output
- Up to 8 TCN75's May Share the Same Bus
- Shutdown Mode for Low Standby Power Consumption
- Low Power ..... 250µA (Typ.) Operating  
1µA (Typ.) Shutdown Mode
- 8-Pin Plastic DIP, SOIC, and MSOP Packaging

activate the low-power standby mode. Address selection inputs allow up to eight TCN75's to share the same 2-wire bus for multi-zone monitoring.

All registers can be read by the host and the INT/COMP output's polarity is user programmable. Both polled and interrupt driven systems are easily accommodated. Small physical size, low installed cost, and ease of use make the TCN75 an ideal choice for implementing sophisticated system management schemes.

## TC622 Low Cost, 5-Volt Programmable Single Trip-Point Temperature Sensor



The TC622 integrates a temperature sensor, voltage reference, and all required circuitry to form a stand-alone, single trip-point temperature sensor.

Key features of the TC622 include a user-programmable temperature set point, 4.5V to 18.0V power supply range, a temperature measurement range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ , and space-saving 8-pin PDIP and SOIC packaging.

The TC622 and its lower operating voltage companion, TC624 ( $\text{V}_{\text{DD}} = 2.7\text{V}$  to  $4.5\text{V}$ ) are ideally suited as cost-effective thermal control integrated circuits. Applications include thermal management for all high

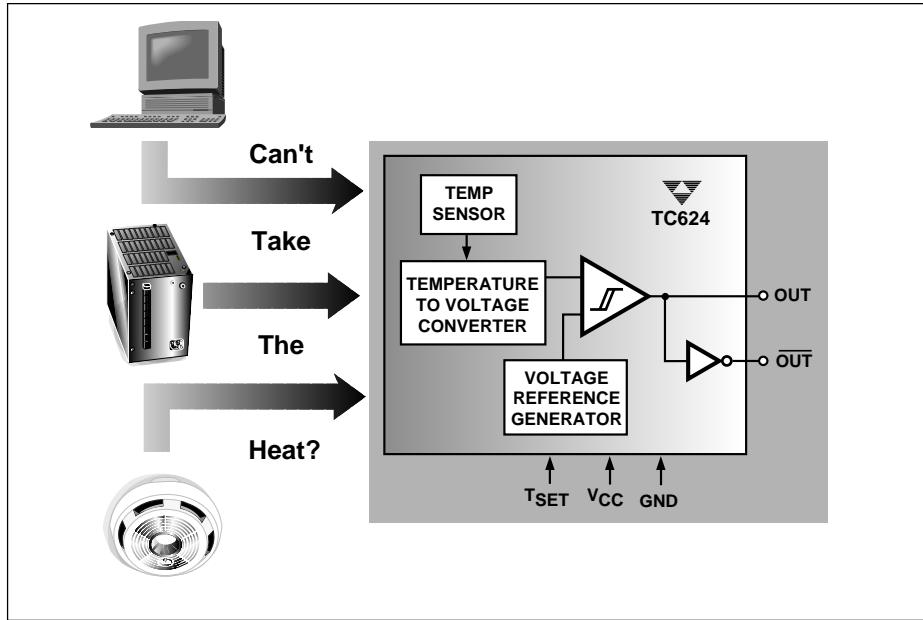
### FEATURES

- Temperature Set Point Easily Programs with a Single External Resistor
- TO-220 Package for Direct Mounting to Heatsink (TC622xAT) or Standard 8-Pin PDIP, SOIC
- Cost Effective

performance microcontrollers and microcomputers, power supplies, consumer appliances, automotive and industrial temperature control, and battery overheat detectors in portable equipment. Both devices feature very low supply current, making them suitable for many portable applications.

# TC624

## Low Cost, 3-Volt Single Trip-Point Temperature Sensor



### FEATURES

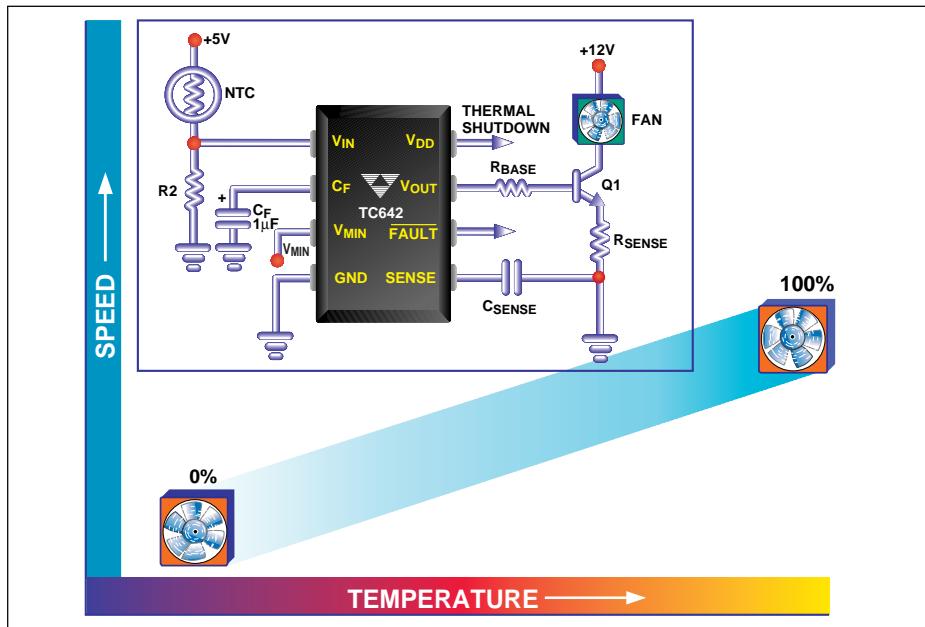
- Temperature Set Point Easily Programs with a Single External Resistor
- Operates with 2.7V Power Supply
- Standard 8-Pin PDIP, SOIC
- Cost Effective

The 3-volt electronics market is heating up; therefore, cost-effective thermal management techniques must be incorporated into every modern system design. The TC624 integrates a temperature sensor, voltage reference, and all required circuitry to form a stand-alone single trip-point temperature sensor.

Key features of the TC624 include a 2.7V to 4.5V supply voltage range, a user-programmable temperature set point, a temperature measurement range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ , and space-saving 8-pin PDIP and SOIC packaging.

The TC624's low voltage operation, low installed cost, and ease of programming make it the clear choice for designers of highly cost-sensitive consumer and industrial thermal management applications. Among these applications are computer systems, smoke detectors, heat detectors, home entertainment electronics, power supplies, board mounted power systems, and battery overheat detectors in portable equipment.

## TC642 PWM Fan Speed Controller with Fault Detection



The TC642 is a switch mode fan speed controller for use with brushless DC motors. Temperature proportional speed control is accomplished using pulse width modulation. A thermistor (or other voltage output temperature sensor) connected to the V<sub>IN</sub> input furnishes the required control voltage of 1.25V to 2.65V (typical) for 0% to 100% PWM duty cycle. Minimum fan speed is set by a simple resistor divider on the V<sub>MIN</sub> input. An integrated Start-Up Timer ensures reliable motor start-up at turn-on, coming out of Shutdown Mode, or following a transient fault.

A logic low applied to V<sub>MIN</sub>, pin 3, causes fan shutdown. In normal fan operation, a pulse train is present at SENSE, pin 5, indicating normal

### FEATURES

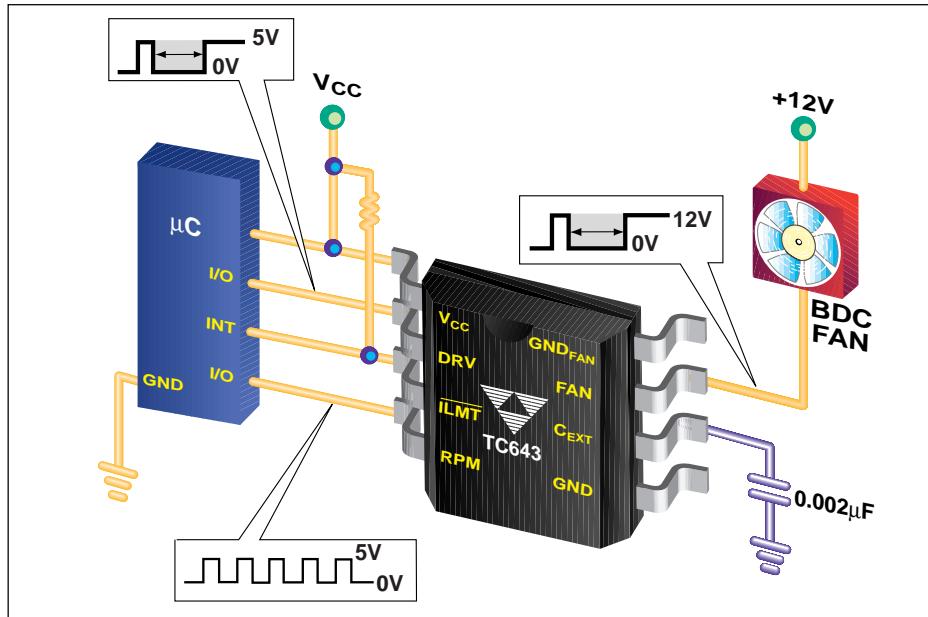
- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range; Fan Voltage Independent of TC642 Supply Voltage - Supports Any Fan Voltage!
- Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Shutdown Mode for "Green" Systems
- Supports Low Cost NTC/PTC Thermistors
- Space-Saving 8-Pin PDIP and SOIC Packages

operation. A missing-pulse detector monitors this pin during normal fan operation. A stalled, open, or unconnected fan causes the TC642 to trigger its start-up timer once. If the fault persists, the FAULT output goes low, and the device is latched in its Shutdown Mode. FAULT is also asserted if the PWM reaches 100% duty cycle, indicating a possible thermal runaway situation, although the fan continues to run. See the *Applications* section for more information and system design guidelines.

The TC642 is available in a standard 8-pin plastic DIP and SOIC packages. Commercial and industrial temperature ranges are available in both package options. The TC642's low voltage operation, low installed cost, and ease of programming make it the clear choice for designers of highly cost-sensitive consumer and industrial thermal management applications. Among these applications are computer systems, smoke detectors, heat detectors, home entertainment electronics, power supplies, board mounted power systems, and battery overheat detectors in portable equipment.

# TC643

## Integrated Fan / Motor Driver



The TC643 is a switchmode brushless DC fan/motor speed driver with diagnostic circuits. External components are kept to a minimum by integrating the power transistor on chip. Any logic-level signal can be used to drive the on-chip Power Driver. The output is current limited and a logic-level indication, ILMT, is provided to indicate an over-current condition.

The RPM output gives an indication of motor RPM. Each time the motor current is interrupted by commutation, a logic pulse occurs on RPM. The fundamental frequency of the resulting square wave is (4 x rpm). See the *Applications* section for more information and system design guidelines.

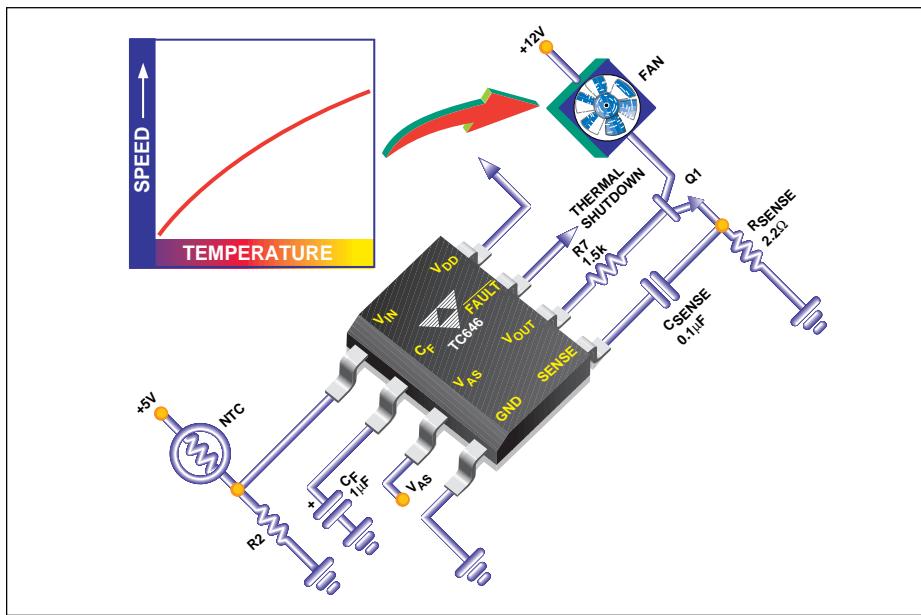
### FEATURES

- Integrates Current Limited Power Driver and Diagnostic/Monitoring Circuits in a Single IC
- Works with Standard DC Brushless Fans/Motors
- Supports Efficient PWM Drive with Logic-Level Input
- Supply Range ..... 2.7V to 5.5V
- Motor Voltage Independent of TC643 Supply Voltage; Supports 3V-15V Fans!
- Logic-Level Output Provides RPM Data
- Optimized For Use as a Microcontroller Peripheral
- Eliminates Discrete Components and Analog Circuit Design Effort
- Internal Thermal Shutdown For Fail-safe Operation
- Available in 8-Pin PDIP, SOIC, and MSOP Packaging

The TC643 mates easily with microcontrollers or other digital logic to form a complete motor or fan control and monitoring system, featuring: Variable Speed PWM Drive; RPM Indication; and Motor Open / Motor Shorted/ Motor Locked Fault Detection.

The TC643 is available in a standard 8-pin plastic DIP, SOIC, and MSOP package.

## TC646 Fan Speed Controller with Auto-Shutdown



The TC646 is a switch mode fan speed controller for use with brushless DC motors. Temperature proportional speed control is accomplished using pulse width modulation (PWM). A thermistor (or other voltage output temperature sensor) connected to the  $V_{IN}$  input furnishes the required control voltage of 1.25V to 2.65V (typical) for 0% to 100% PWM duty cycle. The TC646 automatically suspends fan operation when measured temperature ( $V_{IN}$ ) is below a user-programmed minimum setting ( $V_{AS}$ ). An integrated Start-Up Timer ensures reliable motor start-up at turn-on, coming out of Shutdown mode, or following a transient fault.

In normal fan operation, a pulse train is present at SENSE, pin 5. A

### FEATURES

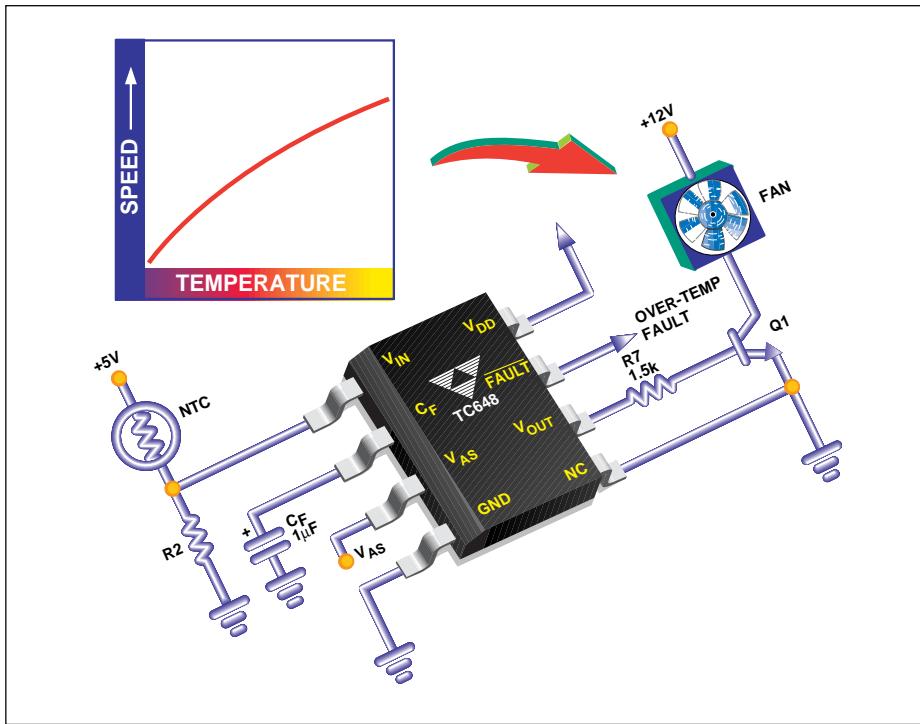
- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range; Fan Voltage Independent of TC646 Supply Voltage - Supports Any Fan Voltage!
- Fault Detection Circuits Protect Against Fan Failure and Aid System Testing
- Automatic Shutdown Mode for "Green" Systems
- Supports Low Cost NTC/PTC Thermistors
- Space-Saving 8-Pin PDIP and SOIC Packages

missing-pulse detector monitors this pin during fan operation. A stalled, open, or unconnected fan causes the TC646 to trigger its startup timer once. If the fault persists, the FAULT output goes low, and the device is latched in its Shutdown Mode. FAULT is also asserted if the PWM reaches 100% duty cycle, indicating a possible thermal runaway situation, although the fan continues to run. See the *Applications* section for more information and system design guidelines.

The TC646 is packaged in a space-saving 8-pin plastic DIP or SOIC package and is available in both industrial and commercial temperature ranges.

# TC648

## Fan Speed Controller with Auto-Shutdown



The TC648 is a switch mode fan speed controller for use with brushless DC motors. Temperature proportional speed control is accomplished using pulse width modulation (PWM). A thermistor (or other voltage output temperature sensor) connected to the  $V_{IN}$  input furnishes the required control voltage of 1.25V to 2.65V (typical) for 0% to 100% PWM duty cycle. The TC648 automatically suspends fan operation when measured temperature ( $V_{IN}$ ) is below a user-programmed minimum setting

### FEATURES

- Temperature Proportional Fan Speed for Acoustic Control and Longer Fan Life
- Efficient PWM Fan Drive
- 3.0V to 5.5V Supply Range; Fan Voltage Independent of TC648 Supply Voltage - Supports Any Fan Voltage!
- Automatic Shutdown Mode for "Green" Systems
- Supports Low Cost NTC/PTC Thermistors
- Space-Saving 8-Pin PDIP and SOIC Packages
- Low Cost

( $V_{AS}$ ). An integrated Start-Up Timer ensures reliable motor start-up at turn-on, coming out of Shutdown mode, or following a transient fault. Over-Temperature Fault ( $\overline{OTF}$ ) is asserted if the PWM reaches 100% duty cycle, indicating a possible thermal runaway situation.

The TC648 is packaged in a space-saving 8-pin plastic DIP or SOIC package and is available in extended temperature ranges.

## TC1132/1133 Consumer Grade Temperature-to-Voltage Converters



### FEATURES

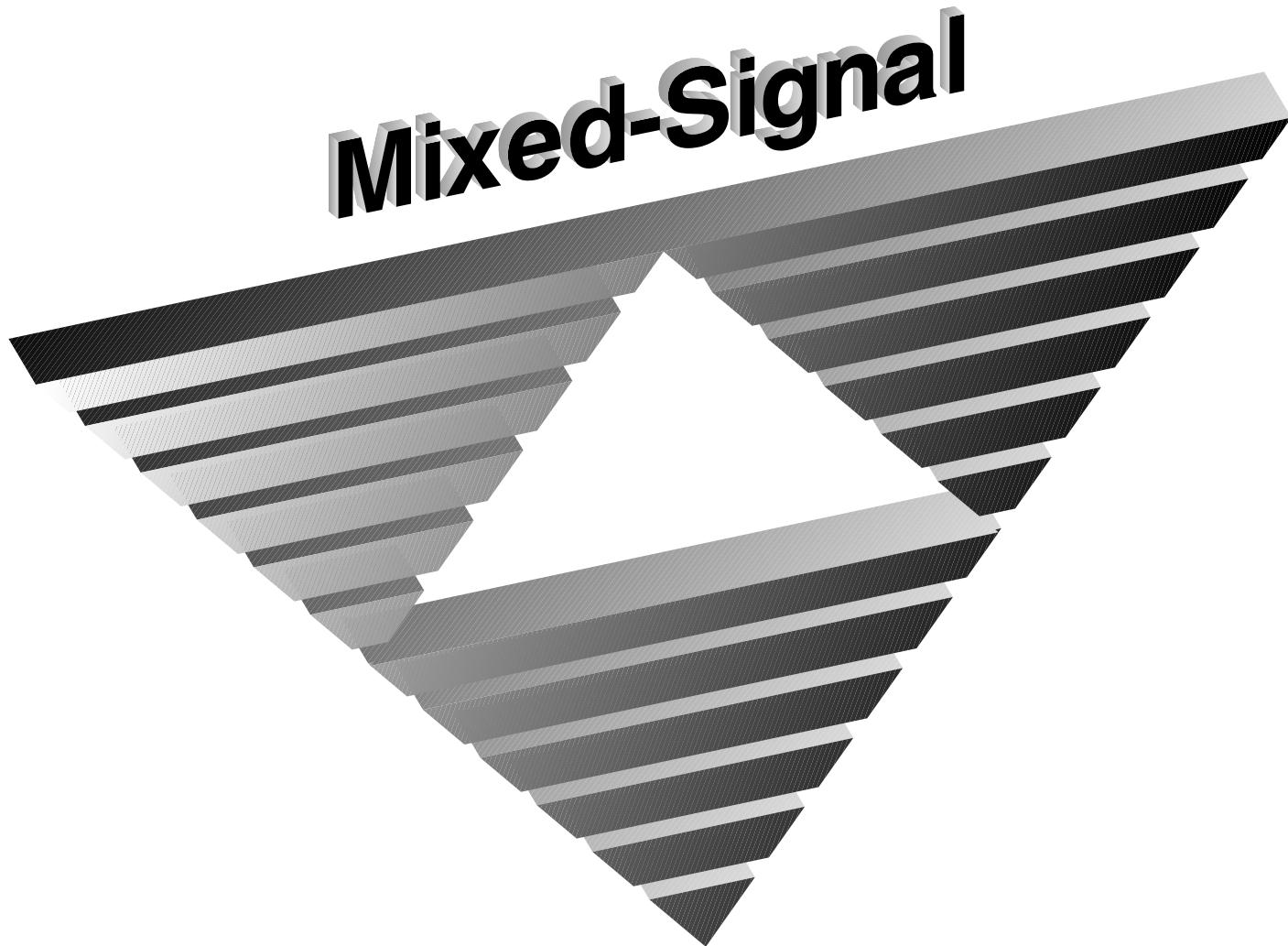
- Linearized Thermistor Replacement
- Direct Centigrade Output Voltage Scaling (TC1133)
- Wide Measurement Range ..... – 20°C to +125°C (TC1132)
- Excellent Converter Linearity..... 0.8°C
- Guaranteed Accuracy at ..... 25°C ±3°C
- Small Packages ..... SOT-23B-3, TO-92-3

The TC1132/1133 temperature-to-voltage converters furnish a linearized output voltage directly proportional to temperature. The TC1133 has a temperature measurement range of – 20°C to +100°C. Its output voltage is directly calibrated in degrees centigrade (i.e.,  $V_{OUT} = 10, V/^\circ C \times \text{temperature } ^\circ C$ ). An external pull-down resistor to a negative voltage source is required for temperature measurement below 0°C.

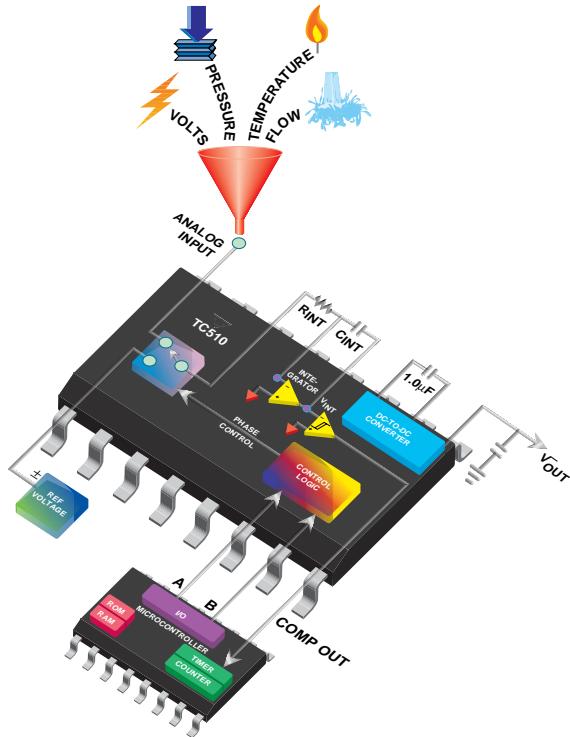
The TC1132 has a temperature measurement range of – 20°C to

+125°C, and operates from a single supply. It has the same output slope with temperature as the TC1133 (10mV/°C). The output voltage range is 100mV at – 20°C to 1.75V at +125°C.

Small size, low cost, low power operation, and linear voltage output with temperature make the TC1132/1133 suitable replacements for thermistors in a wide variety of applications.



## TC510/514 Precision Analog Front Ends



The TC510 and TC514 implement dual slope A/D converters (with resolutions as high as 17 bits plus sign) when supervised by the system processor. The TC510 is a single-channel converter. The TC514 adds a 4-input, differential analog multiplexer to the basic TC510 design.

Powered by a single 5V supply, the TC510/514 accept differential (and bipolar) input signals and exhibits a high degree of 50/60Hz noise rejection. They consume under 20mW of power. The output of the on-

### FEATURES

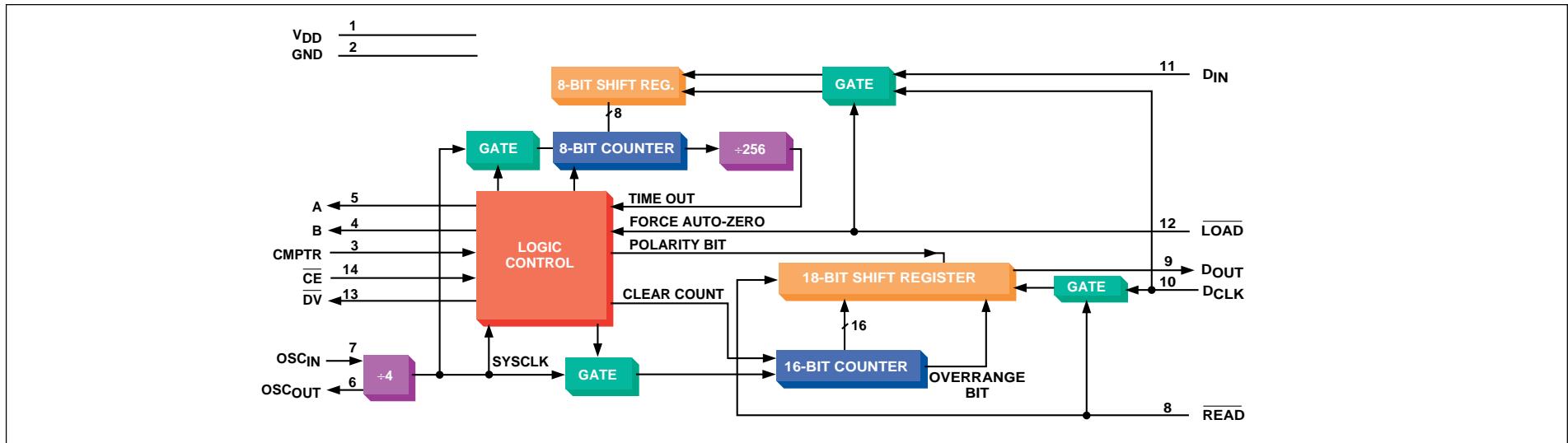
- Precision (up to 17 Bits) A/D Converter "Front End"
- 3-Pin Control Interface to Microprocessor
- Flexible: User Can Trade-Off Conversion Speed for Resolution
- Single-supply Operation (TC510/514)
- 4 Input, Differential Analog MUX (TC514)
- Automatic Input Voltage Polarity Detection
- Low Power Dissipation ..... 18mW
- Wide Analog Input Range (TC510) ..... ±4.2V
- Directly Accepts Bipolar and Differential Input Signals

board charge pump (which generates negative Bias for the TC510/514) is also available as a negative supply for other components in the system. This allows the use of less expensive, dual-supply op amps and comparators without the added cost of a dedicated charge pump converter.

The low interconnect overhead (3-wire logic port) consumes a minimum amount of I/O resources, making the TC510/514 ideal for microcontroller-based systems of all kinds. This interface also enables the user to trade-off resolution for increased conversion speed under software control.

Their low operating power, excellent noise rejection, high resolution, flexibility, and low cost make the TC510/514 the ideal choice for many portable, cost-sensitive system applications, such as consumer medical electronics, mid-to-low end instrumentation and controls, battery charging systems, and test equipment.

# TC520A Serial Interface Adapter for TC500 A/D Converter Family



## FEATURES

- Converts TC500/500A/510/514 to Serial Operation
- Programmable Conversion Rate and Resolution for Maximum Flexibility
- Supports up to 17 Bits of Accuracy Plus Polarity Bit
- Low Power Operation ..... Typically 7.5mW
- 14-Pin PDIP or 16-Pin SOIC Packages
- Polled or Interrupt Mode Operation

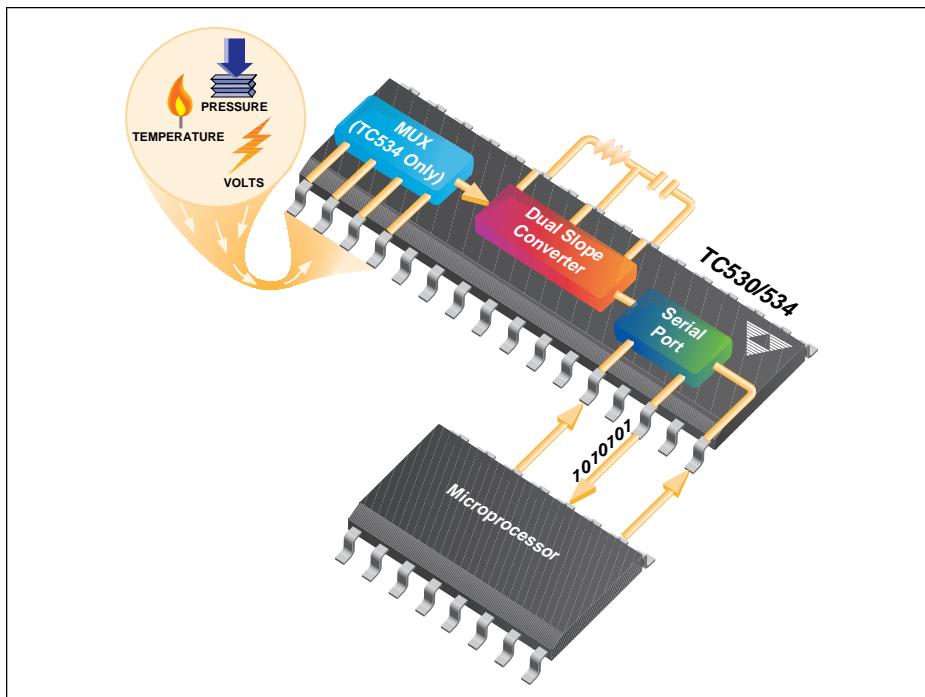
The TC520A Serial Interface Adapter provides logic control for TelCom's TC500/500A/510/514 family of dual slope, integrating A/D converters. It directly manages TC500 converter phase control signals A, B, and CMPTR, thereby reducing host processor task loading and software complexity. Communication with the TC520A is accomplished over

a 3-wire serial port. Key converter operating parameters are programmable for complete user flexibility.

Data conversion is initiated when the  $\overline{CE}$  input is brought low. The converted data (plus overrange and polarity bits) are held in an 18-bit shift register until read by the processor or until the next conversion is completed. Data may be clocked out of the TC520A at any time, and at any rate the user prefers. A Data Valid ( $\overline{DV}$ ) output is driven active at the start of each conversion cycle, indicating the 18-bit shift register update has just been completed. This signal may be polled by the processor or can be used as data-ready interrupt.

The TC520A timebase can be derived from an external frequency source of up to 6MHz or can operate from its own external crystal. It requires a single 5V logic supply and dissipates less than 7.5mW.

## TC530/534 Precision Data Acquisition Systems



The TC530/534 are low cost 5V serial data acquisition systems targeted at precision measurement applications. The TC530 and TC534 utilize dual slope integration conversion technology and deliver 17-bit accuracy with greater than 60db of 50/60Hz noise rejection. The user can readily adapt the TC530/534 to the measurement task at hand by trading off decreased resolution for faster conversion time.

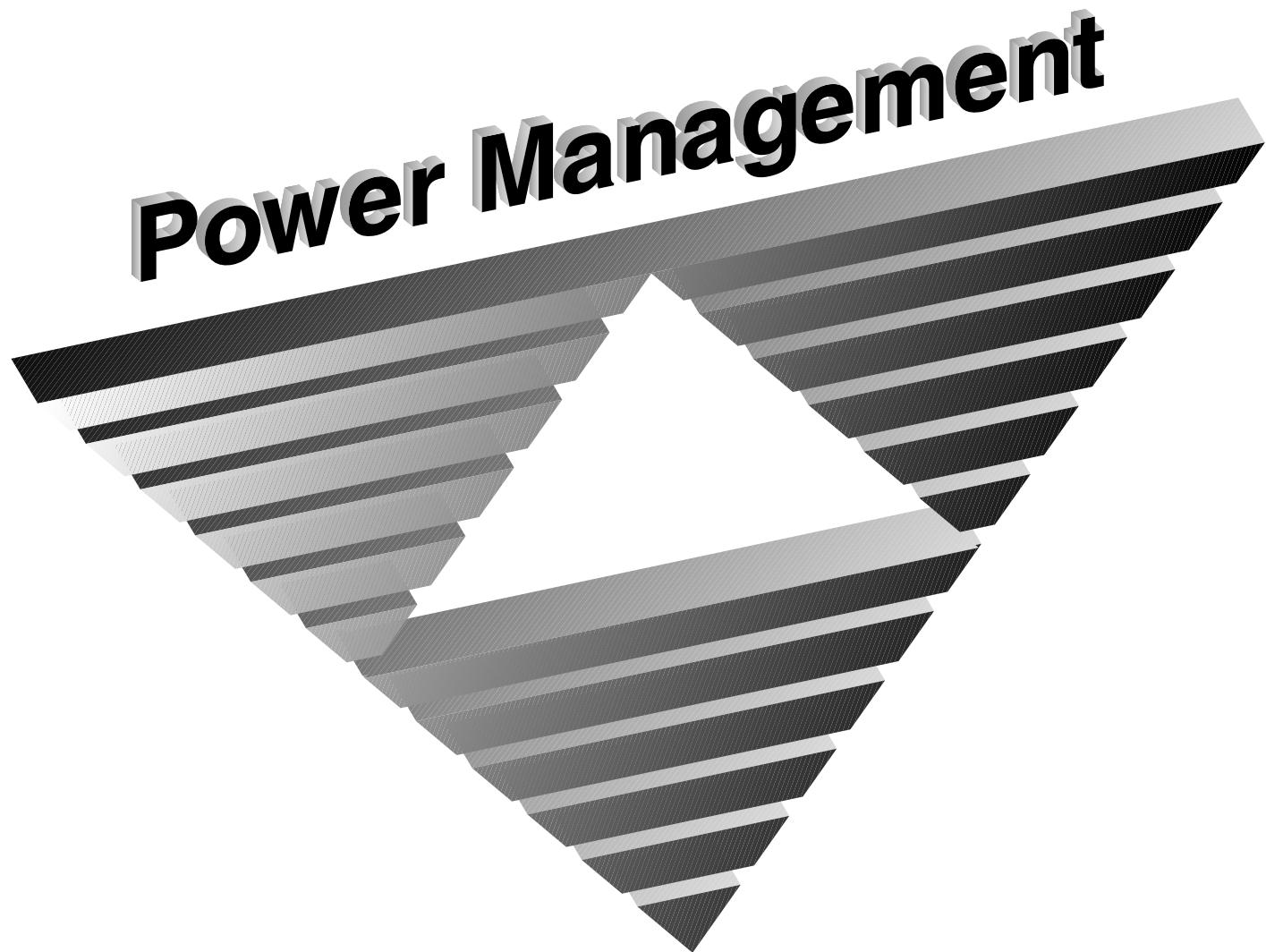
Powered by a single 5V supply, the TC530/534 accept both differential and bipolar input signals (maximum of +4.5V), eliminating the need for additional input signal conditioning circuitry. The TC534 has an on-

### FEATURES

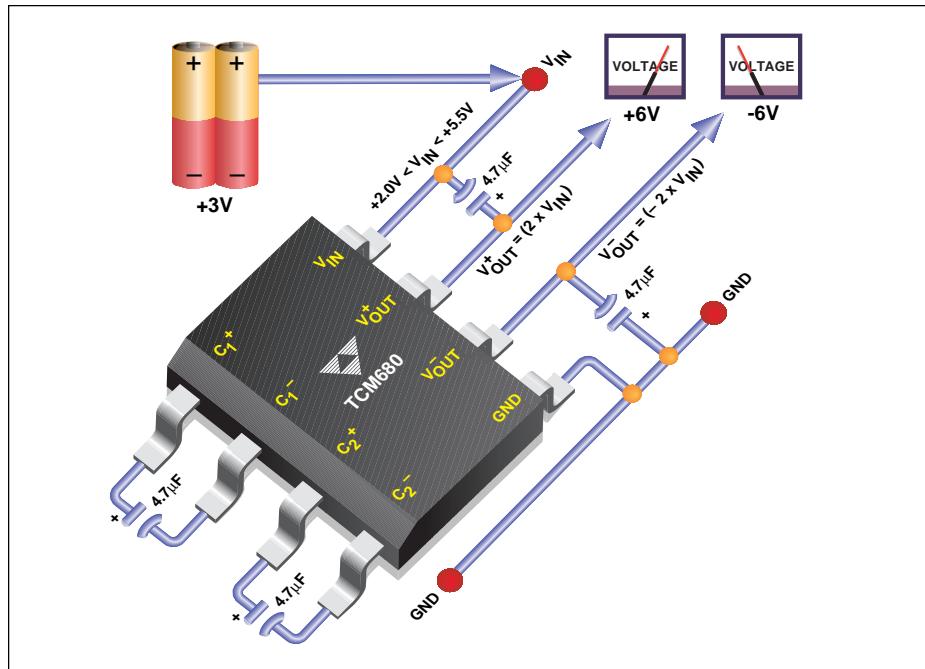
- Precision (up to 17 Bits) A/D Converter
- 3-Wire Serial Port
- Flexible: User Can Trade-Off Conversion Speed Against Resolution
- Single Supply Operation
- - 5V Output Pin
- 4-Input, Differential Analog MUX (TC534)
- Automatic Input Polarity and OVERRANGE Detection
- Low Operating Current ..... 5mA Max
- Wide Analog Input Range ..... ±4.2V Max
- Cost Effective

board 4-channel analog multiplexer, while the TC530 is the single channel version. Each device has its own on-board charge pump converter with a - 5V, 10mA output to provide negative Bias to other analog circuitry in the system. This allows the use of less expensive, dual supply op amps, comparators, and interface circuitry without the added cost of a dedicated charge pump converter. The TC530/534 also consumes 25mW of power, making it ideal for many battery-operated applications such as blood glucose meters, consumer electronics, and portable testers.

# Power Management



## TCM680 Dual Charge Pump Voltage Converter



The TelCom TCM680 is a dual-capacitive charge pump converter that develops  $\pm 10V$  from a single  $+5V$  logic power supply or  $\pm 6V$  from a  $+3V$  lithium cell. The TCM680 requires only four inexpensive electrolytic capacitors and no inductors.

Housed in an 8-pin SOIC or PDIP, the TCM680 is useful when both positive and negative analog supply voltages are required, but only a single low voltage supply is available. High differential output voltage makes the TCM680 especially useful in LCD Bias applications, allowing the use of less expensive, higher voltage displays. Other applications include

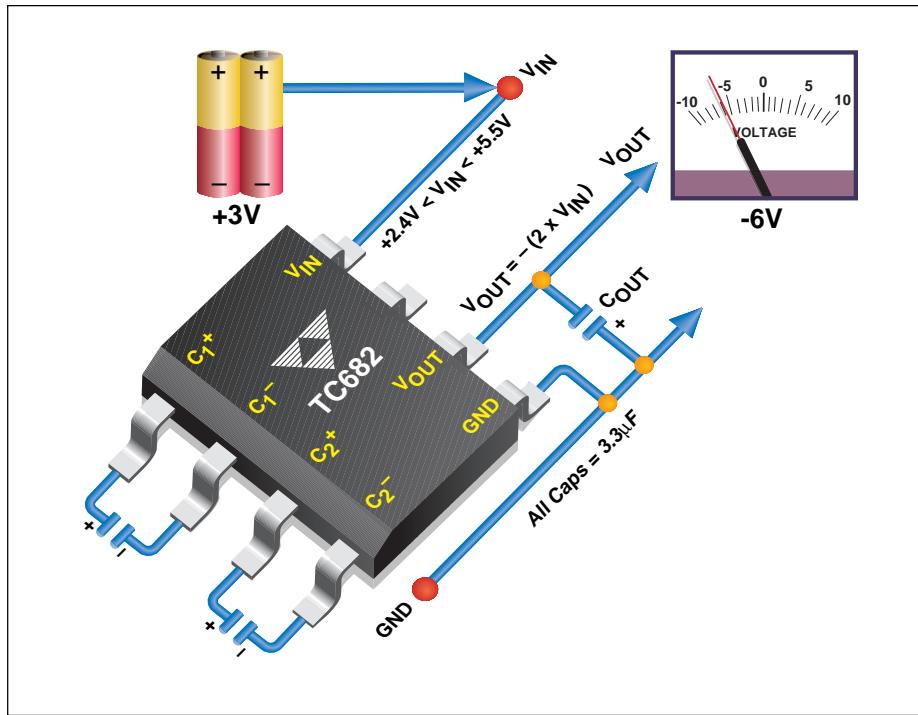
### FEATURES

- 99% Voltage Conversion Efficiency
- 85% Power Conversion Efficiency
- Wide Voltage Range .....  $+2.0V$  to  $+5.5V$
- Only 4 External Capacitors Required
- Space Saving 8-Pin SOIC Design and 8-Pin PDIP

analog Bias supplies in portable systems such as cellular phones, portable instrumentation, and portable computing equipment.

# TC682

## Inverting Doubler Charge Pump



### FEATURES

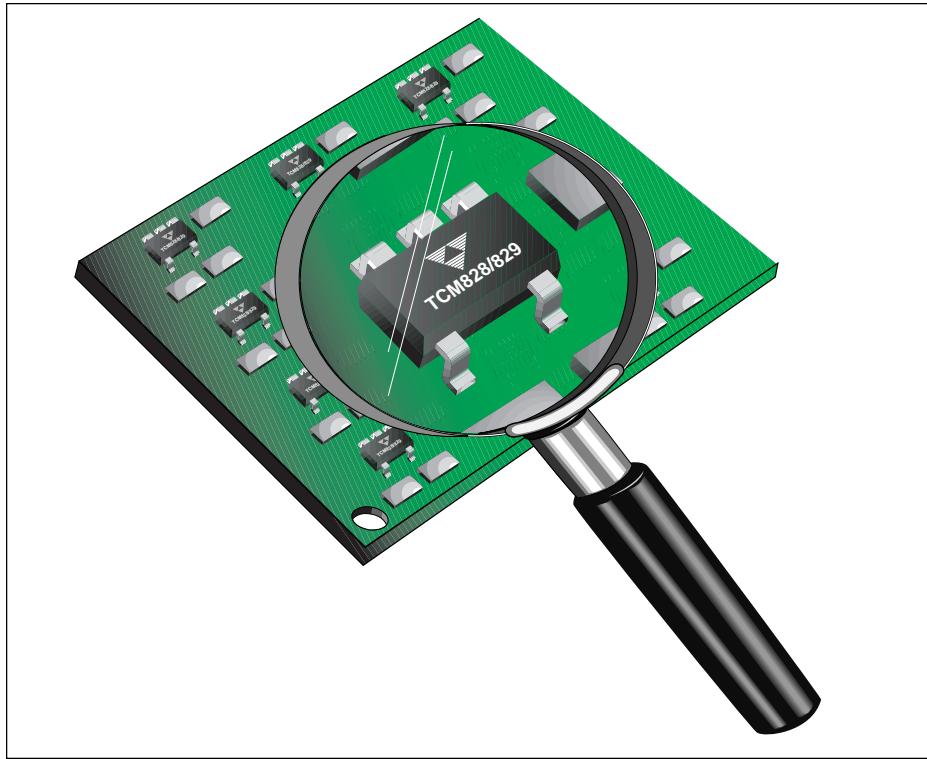
- 99.9% Voltage Conversion Efficiency
- 92% Power Conversion Efficiency
- Wide Input Voltage Range ..... +2.4V to +5.5V
- Only 3 External Capacitors Required
- 185µA Supply Current
- Space-Saving 8-Pin SOIC and 8-Pin PDIP Packages

The TC682 differs from older charge pump topologies in that it both inverts and doubles its supply voltage (i.e.,  $V_{OUT} = -2 V_{IN}$ ). The TC682 boasts low supply current (typically less than 200µA at a clock frequency of 10kHz) and a maximum output current of - 10mA. Typical voltage conversion efficiency is in excess of 90%, and only three external capacitors are required.

Housed in an 8-pin SOIC, the TC682 is useful for a wide variety of applications where a negative power supply is required, but only a posi-

tive supply is available. Typical applications are - 10V from a +5V logic supply, and - 6V from a 3V battery supply. The TC682 is particularly useful in systems that operate from a +3V power supply and use inexpensive, higher voltage LCD displays. The +3V supply added to the - 6V Bias generated by the TC682 results in a total of 9V available for LCD Bias. Other applications include general purpose negative supplies for op amps and other analog components. Its high efficiency and low supply current make the TC682 a natural for many applications such as medical instruments, panel meters, cellular phones, and portable computing equipment.

## TCM828/829 Micro Charge Pump Voltage Converters



Housed in ultra-small SOT-23A-5 packages, the TCM828/829 charge pump converters consume only 25% of the space of a standard 8-pin SOIC charge pump. Both devices invert or double an input voltage of +1.5V to +5.5V and can deliver up to 25mA of output current. Only two low-cost capacitors are required when operating as a voltage inverter.

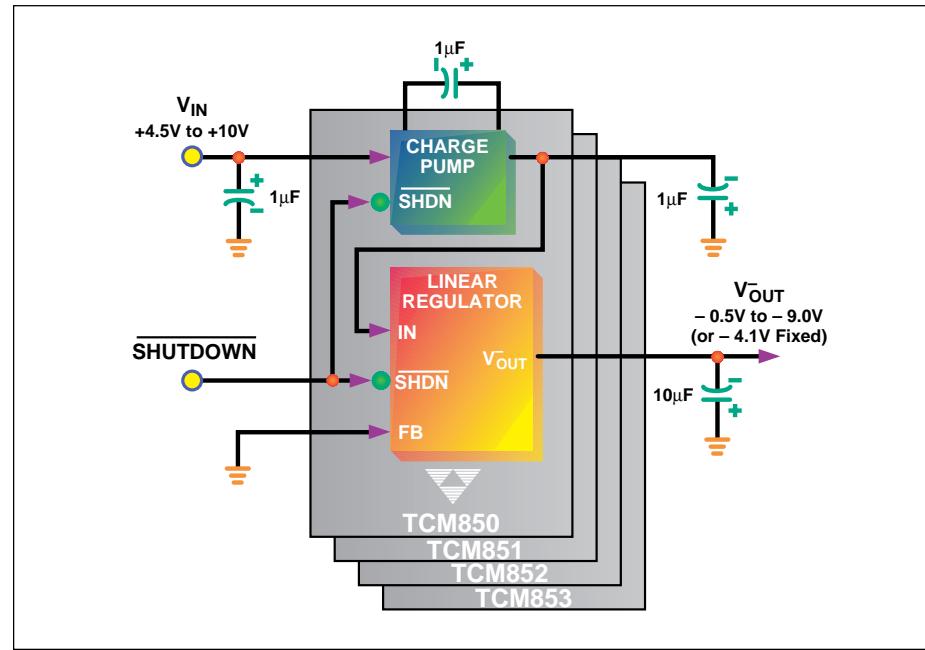
### FEATURES

- Small Size ..... 5-Pin SOT-23A Package
- High Output Current Capability ..... 25mA
- Low Supply Current (TCM828) ..... 60 $\mu$ A
- High Voltage Conversion Efficiency ..... 95%

The TCM828 operates at a frequency of 12KHz while the TCM829 operates at a frequency of 35KHz.

Small size, high efficiency, and low operating current make these converters ideal for battery-powered applications.

# TCM850/851/852/853 GaAs FET Bias Supplies



The TCM850/851/852/853 combine an inverting charge pump and a linear post-regulator in a single 8-pin SOIC package. The regulated, low noise output makes these devices ideal in GaAs FET bias applications. They work particularly well in GSM phones, where the devices' output may also be used as the reference for a digital-to-analog converter (DAC).

All four devices accept a range of input voltages from 4.5V to 10.0V and have a maximum output current of – 5mA. The TCM850/851/852 default to a preset output voltage (– 4.1V) when the feedback input (FB) is grounded. The user can adjust the output voltage from – 0.5V to

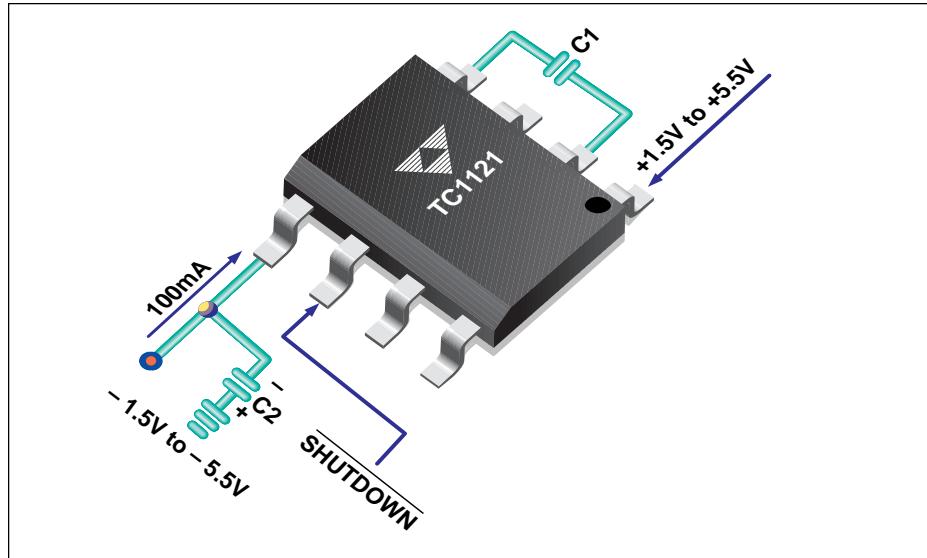
## FEATURES

- Fixed – 4.1V or Adjustable – 0.5V to – 9V Output at 5mA
- 4.5V to 10V Input Voltage Range
- Low Output Voltage Ripple:  
TCM850-852 ..... 2mVp-p  
TCM853 ..... 1mVp-p
- 100kHz Charge Pump Switching Frequency
- Optional External Synchronizing Clock Input (TCM852)
- Logic Level Shutdown Mode ..... 0.5µA Typ.
- Low Cost, 8-Pin SOIC Package

– 9.0V with a simple external resistor divider connected from the output to the FB input. The output voltage of the TCM853 is programmable with an external positive control voltage.

While these devices are targeted at GaAs FET bias in cellular phones and wireless data loggers, they also are suitable in any application requiring a precision source of negative voltage, such as LCD contrast controls and negative regulated supplies for op amps and other analog circuits.

## TC1121 100mA Charge Pump Voltage Converter with Shutdown



The TC1121 charge pump converter is a higher output current upgrade to the MAX860 and similar charge pump devices. It is capable of supporting a 100mA output load. Typical applications include voltage inverters and doublers from an input voltage range of 1.5V to 5.5V. As with all charge pump converters, the TC1121 uses no inductors which saves cost, size and EMI.

The on-board oscillator operates at a typical frequency of 10KHz (at  $V^+ = 5V$ ) when the Frequency Control input (FC) is connected to ground. The oscillator frequency increases to 200KHz when FC is connected to  $V^+$ , allowing the use of smaller capacitors. Operation at sub-10KHz frequencies results in lower quiescent current and is accomplished

### FEATURES

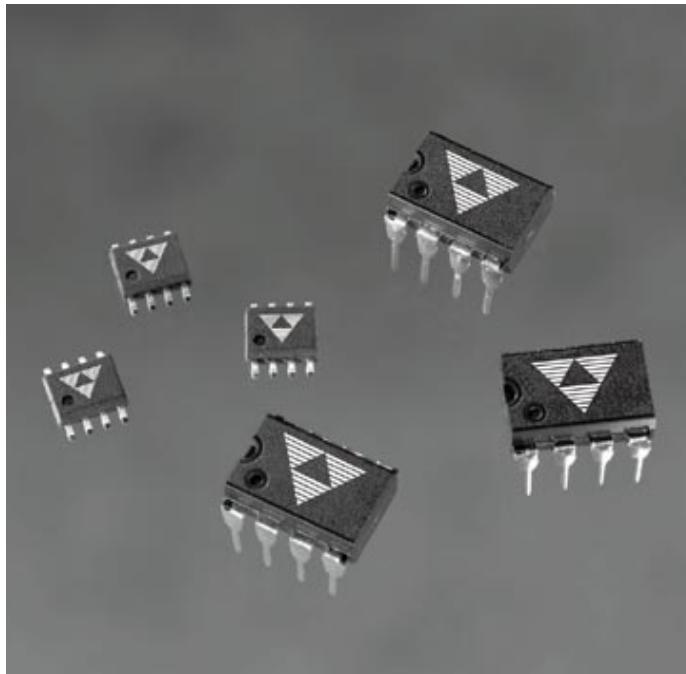
- High Output Current ..... 100mA
- High Power Efficiency at 100mA ..... 91%
- Uses Only 2 Capacitors ..... NO Inductors Required!
- Selectable Oscillator Frequency ..... 10KHz to 200KHz
- Power-Saving Shutdown Input
- Small Packages ..... 8-Pin PDIP, SOIC and MSOP

with the addition of an external capacitor from OSC (pin 7) to ground. The TC1121 also can be driven from an external clock connected OSC if so desired.

Typical supply current at 10KHz is 200 $\mu$ A, and falls to less than 2 $\mu$ A when the shutdown input ( $\overline{SHDN}$ ) is brought low, regardless of whether the internal or an external clock is used. The TC1121 is available in an industry-standard 8-pin SOIC package or a space-saving 8-pin MSOP package (which occupies half the space of an 8-pin SOIC).

Small size, high output current and shutdown mode capability make the TC1121 ideal for both line-and battery-powered applications.

# TC7660H High Frequency DC-to-DC Converter



## FEATURES

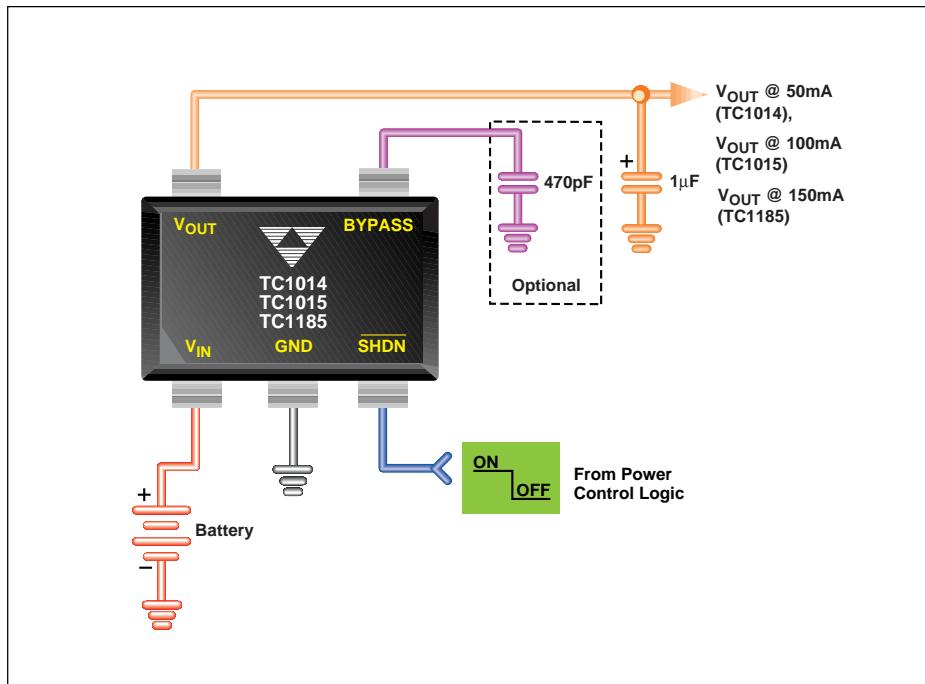
- Pin Compatible with 7660, High Frequency Performance DC-to-DC Converter
- Low Cost, Two Low Value External Capacitors Required (1.0 $\mu$ F)
- Converts +5V Logic Supply to  $\pm$ 5V System
- Wide Input Voltage Range ..... 1.5V to 10V
- Voltage Conversion ..... 99.7%
- Power Efficiency ..... 85%
- Available in 8-Pin SOIC and PDIP Packages

The TC7660H is a high frequency DC-to-DC voltage converter, pin compatible to the industry standard 7660. Its higher frequency operation, 120kHz versus the 7660's 10KHz, allows for the use of significantly smaller capacitors. The resulting board space and weight savings benefit battery-operated applications such as cellular phones, pagers, portable instrumentation devices, and display modules.

The TC7660H also features a wide input voltage range of 1.5V to 10V, 85% power efficiency, 99.7% voltage conversion, space-saving 8-pin PDIP and SOIC packaging, and requires only two low cost, low value external capacitors (1.0 $\mu$ F).

# Power Management

## TC1014/1015/1185 50mA, 100mA, and 150mA CMOS LDOs



The TC1014/1015/1185 are CMOS upgrades to bipolar low dropout regulators, such as the LP2980. CMOS construction guarantees no ground current, as in bipolar regulators, resulting in significantly lower supply current over the entire load range. A reference bypass input also is provided for excellent low noise operation.

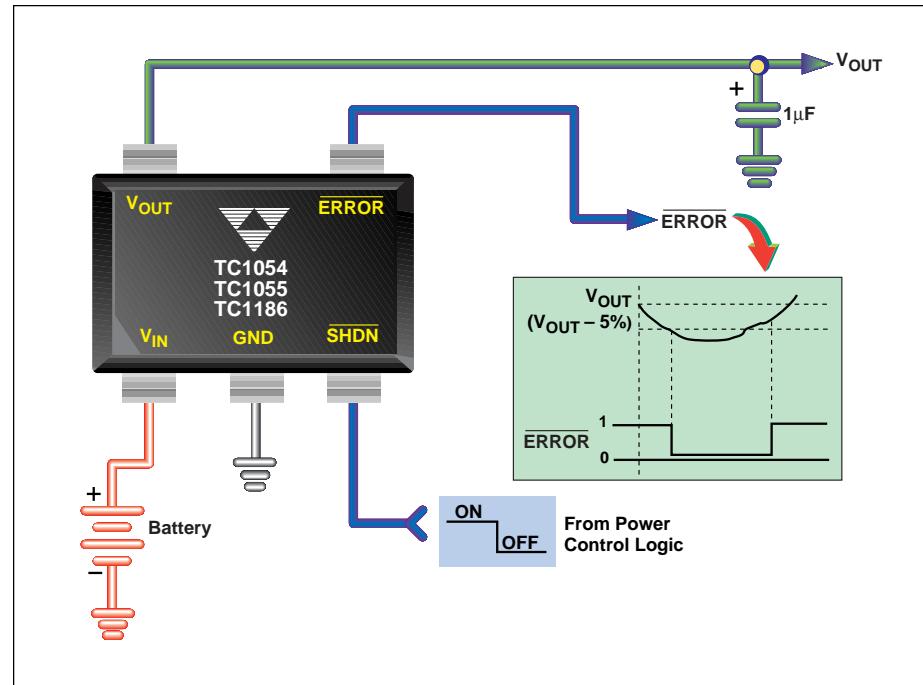
### FEATURES

- Very Low Dropout Voltage
- High Output Current (TC1185) ..... 150mA
- High Precision ..... ±2%
- Standard or Custom Output Voltages
- Better than Bipolar ..... No Ground Currents!
- Shutdown Input
- Reference Bypass Input for Ultra Low-Noise Operation
- Over-Temperature Shutdown
- Small Package ..... SOT-23A-5
- Pin Compatible with MIC5205 and LP2980

Maximum output currents of 50mA (TC1014), 100mA (TC1015), and 150mA (TC1185) are available. Typical dropout voltage is 85mV (TC1014), 180mV (TC1015), and 270mV (TC1185) at full load. An output capacitor of only 1μF is required for stability. The TC1014/1015/1185 enter a low power shutdown state (supply current 0.5μA max) when SHDN is brought low.

# TC1054/1055/1186

## 50mA, 100mA, and 150mA CMOS LDOs with Shutdown and ERROR Output



The TC1054/1055/1186 are CMOS upgrades to bipolar low dropout regulators such as the LP2980. CMOS construction guarantees no ground current as in bipolar regulators, resulting in significantly lower supply current over the entire load range. Maximum output currents of 50mA (TC1054), 100mA (TC1055), and 150mA (TC1186) are available. Typical dropout voltage is 85mV (TC1054), 180mV (TC1055), and 270mV (TC1186) at full load. An output capacitor of only 1μF is required for stability.

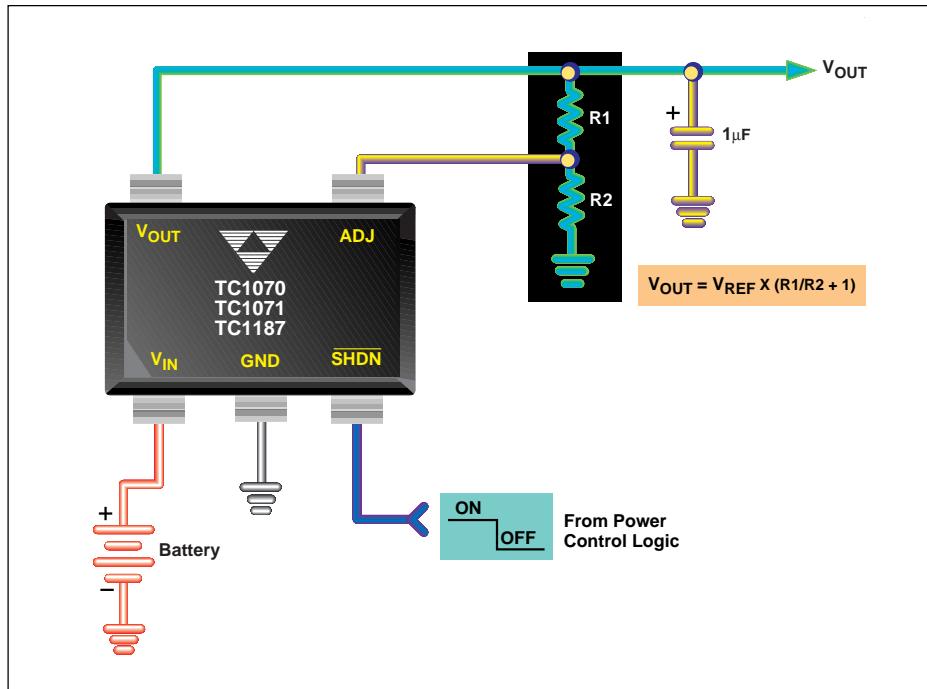
### FEATURES

- Better than Bipolar ..... No Ground Currents!
- Very Low Dropout Voltage
- High Output Current (TC1186) ..... 150mA
- High Precision ..... ±2%
- Standard or Custom Output Voltages
- Shutdown Input
- ERROR Output can be Used to Detect Low Battery or Used as a Power-on Reset Generator
- Over-Temperature Shutdown
- Small Package ..... SOT-23A-5

The error output (ERROR) is asserted when the TC1054/1055/1186 are out-of-regulation (usually due to low input voltage, or excessive output current). ERROR can be used as a low battery warning or as a processor RESET signal (with the addition of an external RC network). The TC1054/1055/1186 enter a low power shutdown state (supply current  $\leq 0.5\mu\text{A}$  max) when SHDN is brought low. During shutdown, both VOUT and ERROR are disabled.

# Power Management

## TC1070/1071/1187 50mA, 100mA, and 150mA Adjustable CMOS LDOs



### FEATURES

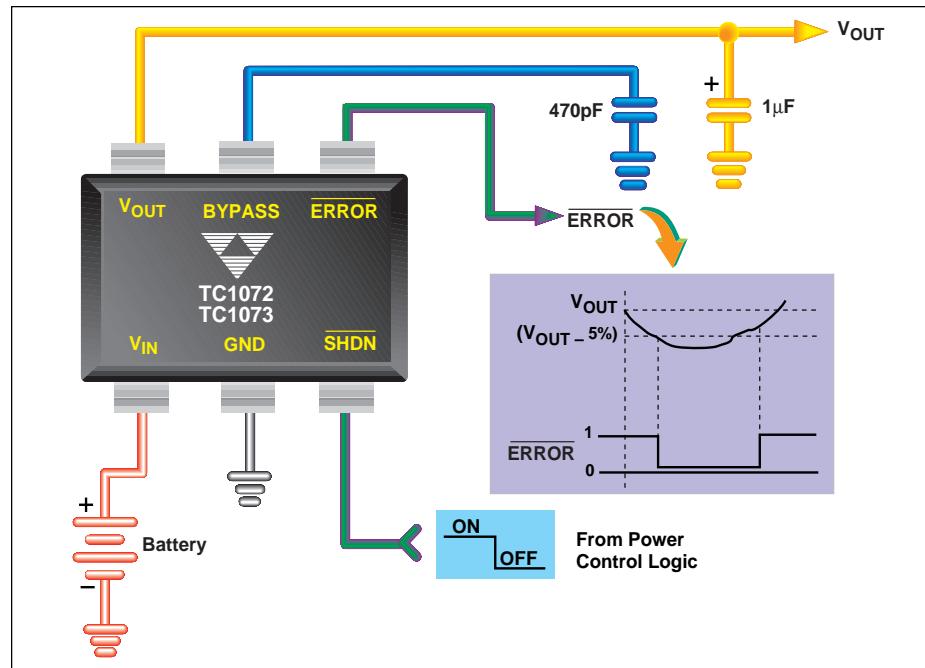
- Very Low Dropout Voltage
- High Output Current (TC1187) ..... 150mA
- Adjustable Output Voltage
- Better than Bipolar ..... No Ground Currents!
- Shutdown Input
- Over-Temperature Shutdown
- Small Package ..... SOT-23A-5

The TC1070/1071/1187 are adjustable CMOS upgrades to bipolar low dropout regulators. Output voltage is programmed with a simple external resistor divider from  $V_{OUT}$  to  $ADJ$ . CMOS construction guarantees no ground current, as in bipolar regulators, resulting in significantly lower supply current over the entire load range.

Maximum output currents of 50mA (TC1070), 100mA (TC1071), and 150mA (TC1187) are available. Typical dropout voltage is 85mV (TC1070), 180mV (TC1071), and 270mV (TC1187) at full load. An output capacitor of only  $1\mu F$  is required for stability. The TC1070/1071/1187 enter a low power shutdown state (supply current 0.5 $\mu A$  max) when  $SHDN$  is brought low.

# TC1072/1073

## 50mA and 100mA LDOs with Shutdown, **ERROR** Output, and $V_{REF}$ Bypass



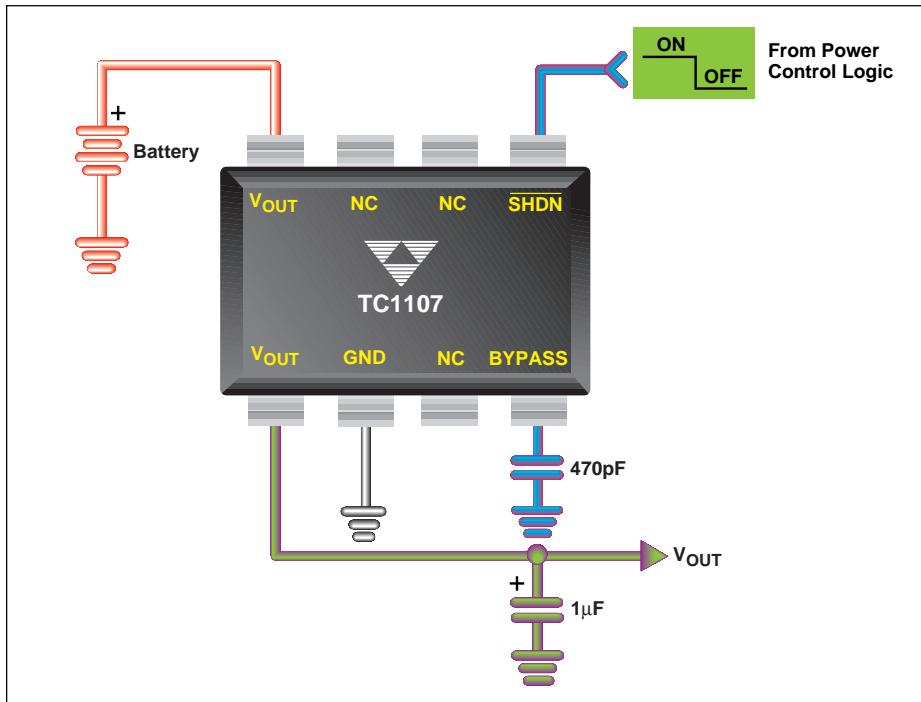
### FEATURES

- Better than Bipolar ..... No Ground Currents!
- Very Low Dropout Voltage
- High Output Current (TC1073) ..... 100mA
- High Precision ..... ±2%
- Standard or Custom Output Voltages
- Shutdown input
- ERROR Output can be Used to Detect Low Battery or as a Power-on Reset Generator
- Reference Bypass Input for Low Noise Operation
- Over-Temperature Shutdown
- Small Package ..... SOT-23A-6

The TC1072/1073 are CMOS upgrades to bipolar low dropout regulators such as the LP2980. CMOS construction guarantees no ground current, as in bipolar regulators, resulting in significantly lower supply current over the entire load range. Maximum output currents of 50mA (TC1072) and 100mA (TC1073) are available. Typical dropout voltage is 85mV (TC1072) and 180mV (TC1073) at full load. An output capacitor of only 1μF is required for stability. A reference bypass input is provided for excellent low noise operation.

The error output (**ERROR**) is asserted when the TC1072/1073 is out-of-regulation (usually due to low input voltage, or excessive output current). **ERROR** can be used as a low battery warning or as a processor **RESET** signal (with the addition of an external RC network). The TC1072/1073 enter a low power shutdown state (supply current  $\leq 0.5\mu A$  max) when **SHDN** is brought low. During shutdown, both **V<sub>OUT</sub>** and **ERROR** are disabled.

## TC1107 300mA CMOS LDO with Shutdown



### FEATURES

- Better than Bipolar ..... No Ground Currents!
- High Output Current ..... 300mA
- Very Low Dropout Voltage ..... 350mV @ 300mA
- High Precision ..... ±2%
- Low Quiescent Current ..... 50μA
- Fixed and Adjustable Output Voltages
- Shutdown Input
- Over-Temperature and Over Current Protection
- Reference Bypass Input
- Small Packages ..... 8-Pin SOIC and MSOP

The TC1107 is a CMOS LDO with very low dropout voltage. CMOS construction guarantees no ground current, as in bipolar regulators, resulting in significantly lower supply current over the entire load range. The TC1107 enters a low power shutdown state (supply current  $\leq 0.5\mu\text{A}$  max) when  $\overline{\text{SHDN}}$  is brought low. Short circuit and over-temperature protection also is included.

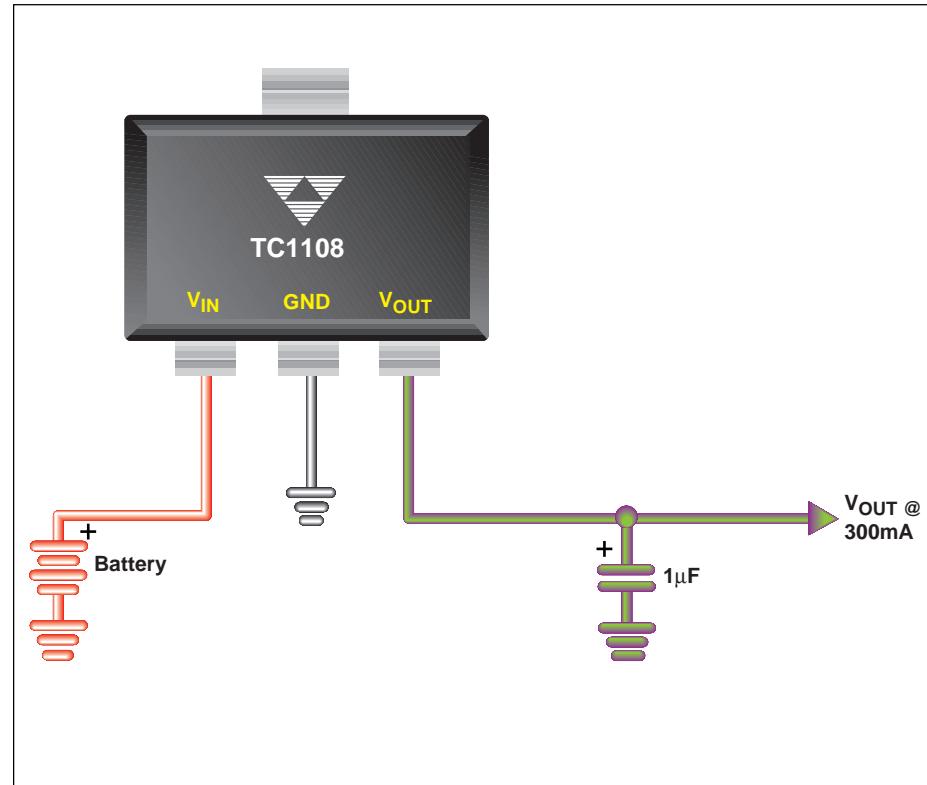
The TC1107 is available in several fixed voltages and has the same pin out as the MIC5201 and LT1121, with lower quiescent current and greater output current capability.

A reference bypass input also is included for very low noise operation. An output capacitor of only 1μF is required for stability.

It is available in an industry-standard 8-pin SOIC package or in a space-saving 8-pin MSOP package (which takes up half the space of an 8-pin SOIC).

# TC1108

## 300mA CMOS LDO



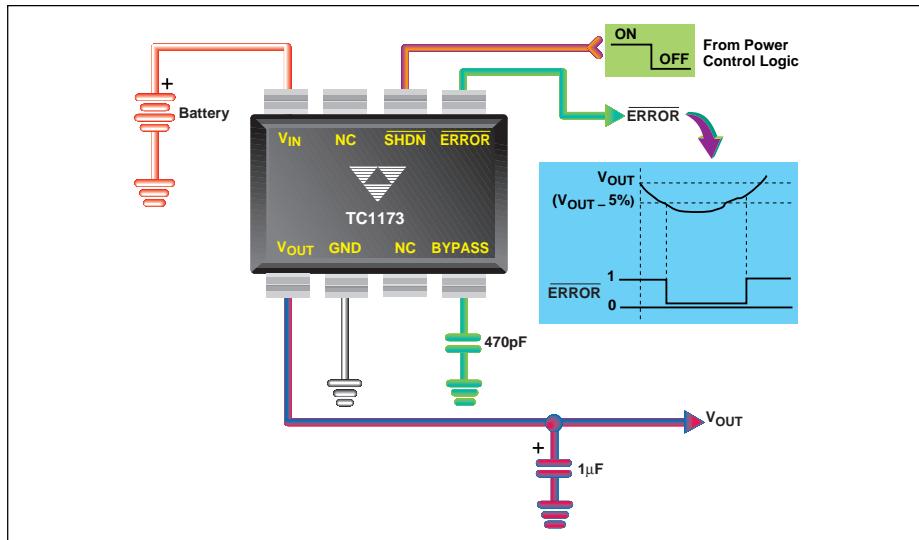
### FEATURES

- Very Low Dropout Voltage ..... 300mA
- High Output Current .....  $\pm 2\%$
- High Precision .....  $\pm 2\%$
- Fixed and Adjustable Output Voltages
- Low Quiescent Current .....  $50\mu A$
- Better than Bipolar ..... No Ground Currents!
- Over-Temperature Shutdown
- Small Package ..... SOT-223

The TC1108 is a CMOS LDO with very low dropout voltage. CMOS construction guarantees no ground current, as in bipolar regulators, resulting in significantly lower supply current over the entire load range.

An output capacitor of only  $1\mu F$  is required for stability. The TC1108 is available in several fixed voltages and is available in an SOT-223 power tab package.

## TC1173 300mA CMOS LDO with Shutdown, ERROR Output, and Bypass



The TC1173 is a precision output (typically  $\pm 0.5\%$ ) CMOS low dropout regulator. Designed specifically for battery-operated systems, the TC1173's CMOS construction eliminates wasted ground current, significantly extending battery life. Total supply current is typically  $50\mu\text{A}$  at full load (*20 to 60 times lower than in bipolar regulators!*).

TC1173 key features include ultra low noise operation (plus optional Bypass input); very low dropout voltage (typically 240mV at full load) and internal feed-forward compensation for fast response to step changes in load. An error output (ERROR) is asserted when the TC1173 is out-of-regulation (due to a low input voltage or excessive output current). ERROR can be set as a low battery warning or as a processor RESET

### FEATURES

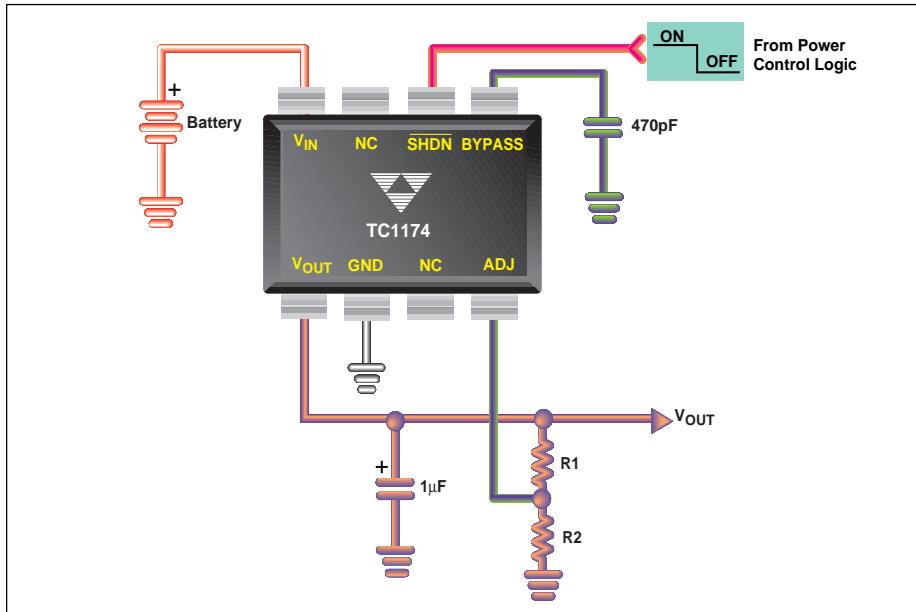
- Zero Ground Current for Longer Battery Life!
- Very Low Dropout Voltage
- Guaranteed 300mA Output
- Standard or Custom Output Voltages
- ERROR Output Can be Used as a Low Battery Detector or Processor Reset Generator
- Power-Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- Over-Current and Over-Temperature Protection
- Space-Saving MSOP Package Option

signal (with the addition of an external RC network). Supply current is reduced to  $0.5\mu\text{A}$  (max) and V<sub>OUT</sub> and ERROR falls to zero when the shutdown input is low.

The TC1173 incorporates both over-temperature and over-current protection. The TC1173 is stable with an output capacitor of only  $1\mu\text{F}$  and has a maximum output current of 300mA.

# TC1174

## 300mA Adjustable CMOS LDO with Shutdown and V<sub>REF</sub> Bypass



### FEATURES

- Zero Ground Current for Longer Battery Life!
- Very Low Dropout Voltage
- Guaranteed 300mA Output
- Adjustable Output Voltage
- Power-Saving Shutdown Mode
- Bypass Input for Ultra-Quiet Operation
- Over-Current and Over-Temperature Protection
- Space-Saving MSOP Package Option

The TC1174 is an adjustable output CMOS low dropout regulator. Designed specifically for battery-operated systems, the TC1174's CMOS construction eliminates wasted ground current, significantly extending battery life. Total supply current is typically 50 $\mu$ A at full load (*20 to 60 times lower than in bipolar regulators!*).

TC1174 key features include ultra low noise operation (plus optional Bypass input); very low dropout voltage (typically 240mV at full load) and internal feed-forward compensation for fast response to step changes

in load. Supply current is reduced to 0.5 $\mu$ A (max) and V<sub>OUT</sub> falls to zero when the shutdown input is low. The TC1174 incorporates both over-temperature and over-current protection. The TC1174 is stable with an output capacitor of only 1 $\mu$ F and has a maximum output current of 300mA.

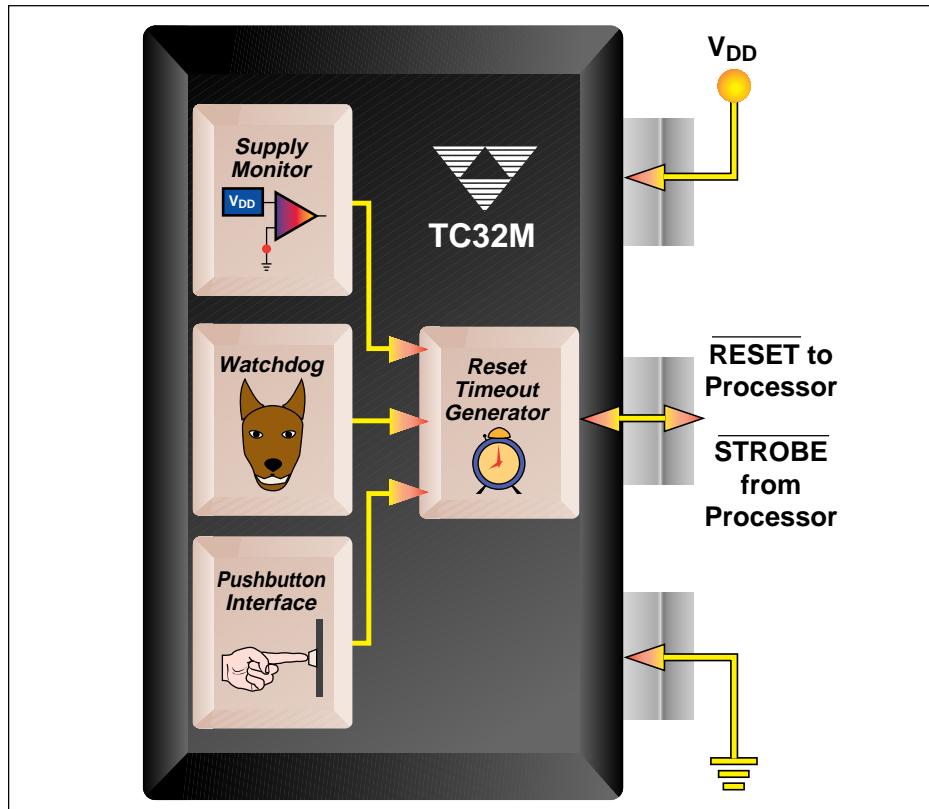
# Power Management

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# System Management



## TC32M 3-Pin Processor Supervisor with Watchdog Timer



The TC32M is the industry's first processor supervisor to incorporate a power supply monitor, reset generator (with external override) and watchdog timer in a 3-pin package. Available in a TO-92 package and SOT-223 package, the TC32M offers the same functionality as the industry standard, TC1232, but in a smaller, lower cost configuration.

The TC32M maintains the processor in the reset state when supply

### FEATURES

- Incorporates the Functionality of the Industry Standard TC1232 (Processor Monitor, Watchdog and Manual Override RESET Controller) into a Small, Lower Cost Package
- Guards Against Unstable Processor Operation Resulting from Power "Brown-Out"
- Automatically Halts and Restarts an Out-of-Control Microprocessor
- Output can be Wire-ORed, or Hooked to Manual RESET Push-button Switch
- Space-Saving 3-Pin TO-92 or SOT-223 Package

voltage is out-of-tolerance. Once the supply is within tolerance, the TC32M maintains the processor in reset for an additional 250msec to allow time for the system to stabilize. During normal system operation, the processor must apply pulses to the TC32M at a prescribed rate. Should the processor fail to do this, a system fault is indicated, and the TC32M issues a momentary processor reset. The output of the TC32M may be wire-ORed with an external auxiliary reset signal or push-button switch for reset override control.

The TC32M is ideal for applications which require a fully-integrated processor supervisor such as battery-powered computers and controllers, automotive instruments, embedded controllers, and critical microprocessor power monitoring.

# TC70/71

## Micromaster™ – System Supervisor with Power Supply Monitor, Watchdog, and Battery Backup



The TC70/71 are fully-integrated power supply monitors, watchdogs and battery backup circuits in a space-saving 8-pin package.

When power is initially applied, the TC70/71 hold the processor in its reset state for a minimum of 500msec after V<sub>CC</sub> is in tolerance to ensure stable system start-up. After start-up, processor sanity is monitored by the on-board watchdog circuit. The processor must provide periodic high-to-low level transitions to the TC70/71 to verify proper execution. Should the processor fail to supply this signal within the specified timeout pe-

### FEATURES

- Maximum Functional Integration: Precision Power Supply Monitor, Watchdog Timer, External RESET Override, Threshold Detector and Battery Backup Controller in an 8-Pin Package
- Generates Power-on RESET and Guards Against Unstable Processor Operation Resulting from Power "Brown-Out"
- Automatically Halts and Restarts an Out-of-Control Microprocessor
- Output Can Be Wire-ORed, or Hooked to Manual RESET Push-button Switch
- Watchdog Disable Pin for Easier Prototyping (TC70)
- Voltage Monitor for Power Fail or Low Battery Warning (TC71)
- Available in 8-Pin Plastic DIP or 8-Pin SOIC Packages
- Cost Effective

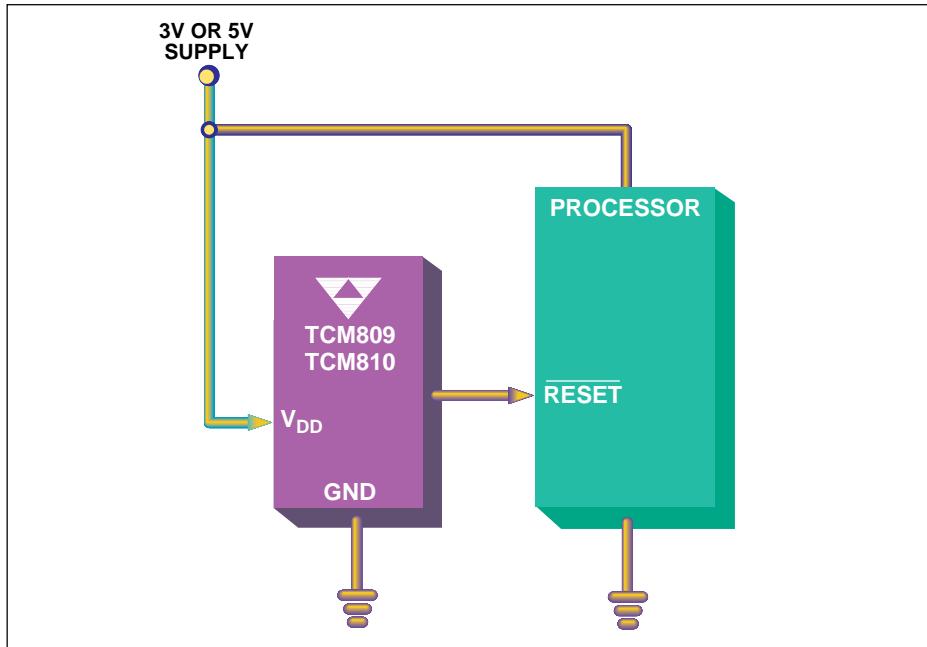
riod, an out-of-control processor is indicated and the TC70/71 issue a momentary processor reset as a result. The TC70 also features a watchdog disable pin to facilitate system test and debug.

The output of the TC70/71 can be wire-ORed to a push-button switch (or electronic signal) to reset the processor. When connected to a push-button switch, the TC70/71 provides contact debounce.

The integrated battery backup circuit on board the TC70/71 converts CMOS RAM into nonvolatile memory by first write-protecting, then switching the V<sub>CC</sub> line of the RAM to an external battery.

The TC71 incorporates an additional 1.3V threshold detector for power fail warning, low battery detection, or to monitor other system voltages.

## TCM809/810 3-Pin $\mu$ P RESET Monitors



The TCM809/810 are cost-effective processor supervisor circuits that monitor the supply voltage in digital systems and provide a processor reset signal when necessary. No external components are required. The TCM809 has an active low reset output, while the TCM810 has an active high reset output.

The TCM809/810 output are driven active within 20msec of detecting supply voltage out-of-tolerance. They are maintained active for a minimum of 140msec after the supply voltage is in-tolerance. The output of the TCM809 is guaranteed valid down to  $V_{DD} = 1.0V$ . Both the TCM809 and TCM810 are available in a tiny SOT-23B-3 package.

### FEATURES

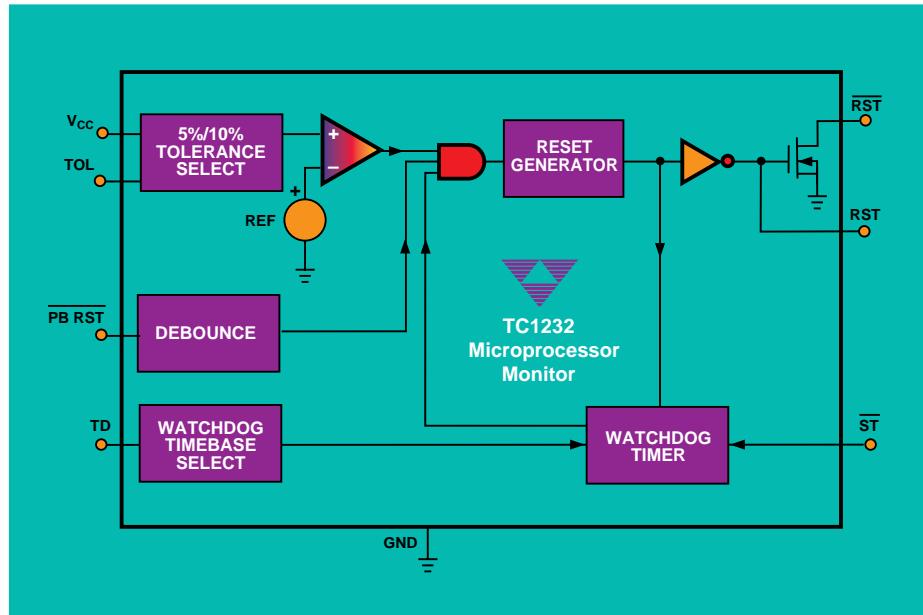
- Precision Monitor for 3.0V, 3.3V and 5V Nominal Supplies
- 140msec Guaranteed Minimum RESET (or  $\overline{\text{RESET}}$ ) Duration
- Output Guaranteed Valid to  $V_{DD} = 1.0V$
- Low ( $17\mu\text{A}$ ) Operating Current
- Power Supply Noise Immunity
- Small Package ..... SOT-23B-3
- No External Components

The TCM809/810 reject fast transient glitches on the power supply voltage, preventing unwanted system resets. A variety of preset detection voltages accommodate 3V, 3.3V, and 5V system supply applications.

Low supply current, small size, reliable operation, and low installed cost make the TCM809/810 desirable for all microcontroller/microprocessor applications.

# TC1232

## Microprocessor Supervisory Circuit



### FEATURES

- Precision Voltage Monitor ..... Adjustable: +4.5V or +4.75V
- Reset Pulse Width ..... 250msec Min
- No External Components
- Adjustable Watchdog Timer .. 150msec, 600msec or 1.2sec
- Debounced Manual Reset Input for External Override

The TC1232 is a pin-for-pin compatible second source device to the MAX1232 and DS1232LP.

Advanced design, processing, and testing techniques make TelCom's TC1232 the superior choice over previous industry designs. Key features include precision power on/off RESET control, a user-programmable watchdog timer, external RESET override, an adjustable precision voltage monitor, and space-saving 8-pin SOIC and 8-pin PDIP packaging.

The TC1232 series is ideal for applications which require a fully-integrated processor supervisor, such as computers, microprocessor-based controllers, process instrumentation, automotive instruments, and critical microprocessor power monitoring.



# Evaluation Kits



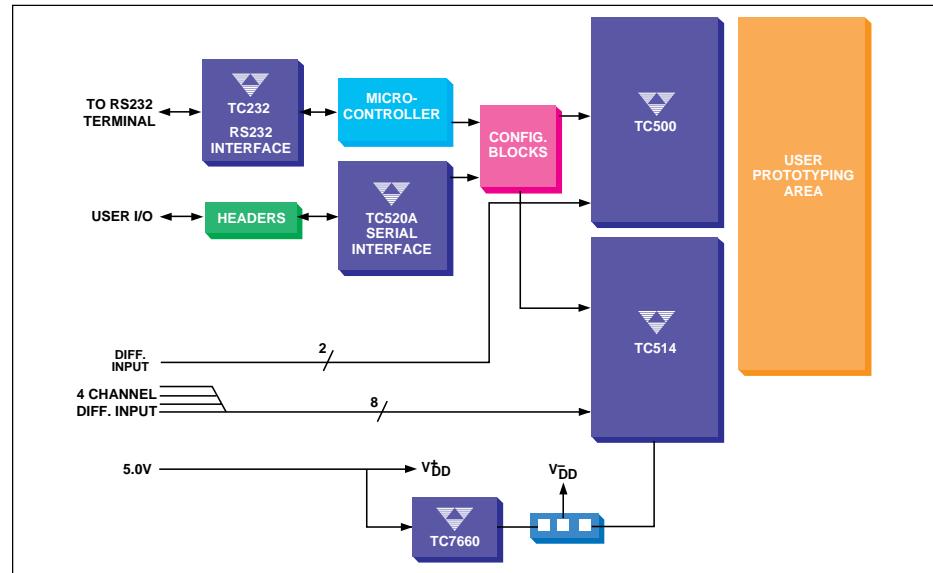
# Evaluation/Development Kits

TelCom's pre-wired evaluation kits speed time to market. Each kit consists of a pre-wired, 4 inch x 6 inch circuit board, data sheets, and application notes.

## TC500EV

### FEATURES

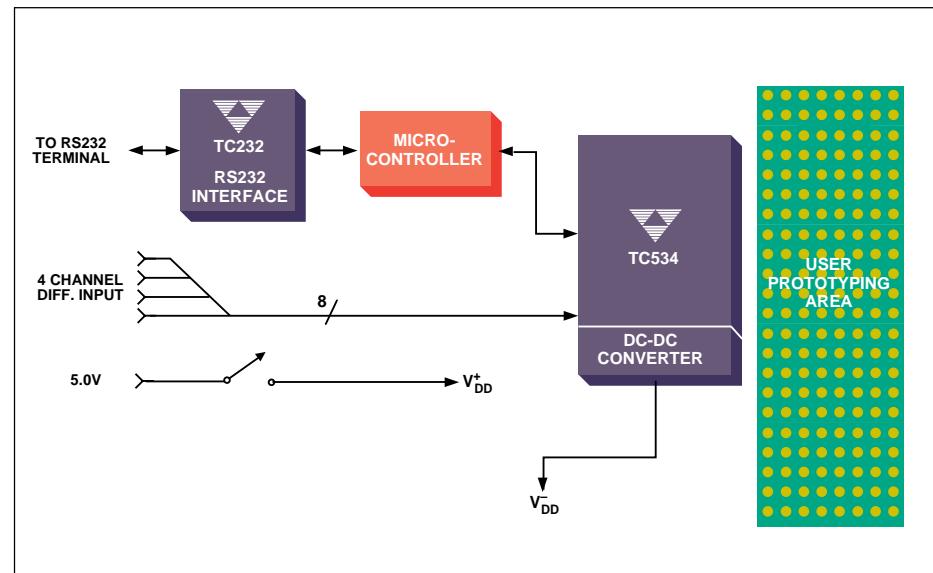
- Evaluation and Prototyping Kit for TC500, TC510, TC514, and TC520A
- Pre-programmed Control Processor for Easy Operation with Any RS232 Terminal, Personal Computer, etc.
- User Interface Allows Programming System Parameters and Displaying/Logging Data Using High-level Commands
- Prototyping Area for User Application Circuitry
- On-board Positive Voltage Regulator and Negative Supply Generator for Single-supply Operation
- Can be Used as a TC5xx Control Emulator for System Debugging
- Windows™ Terminal™ and Microsoft™ Excel™ Support Files Included - No Circuit Design Required!\*



## TC530EV

### FEATURES

- Evaluation and Prototyping Kit for TC530/534
- Pre-programmed Control Processor for Easy Operation with Any RS232 Terminal, Personal Computer, etc.
- User Interface Allows Programming System Parameters and Displaying/Logging Data Using High-level Commands
- Prototyping Area for User Application Circuitry
- On-board Positive Voltage Regulator and Negative Supply Generator for Single-Supply Operation
- Can be Used as a TC53x Control Emulator for System Debugging
- Windows™ Terminal™ and Microsoft™ Excel™ Support Files Included - No Circuit Design Required!\*



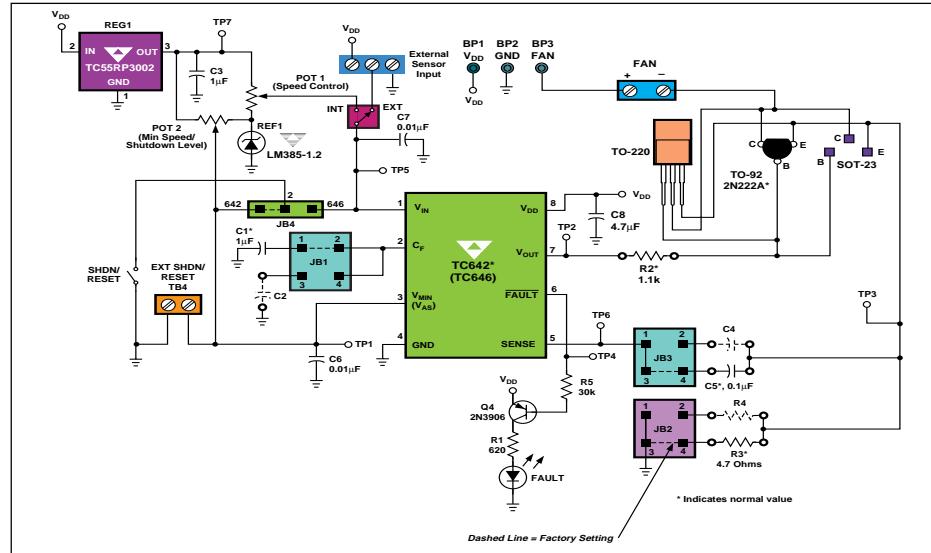
\*All Trademarks and Trade Names are the property of their respective owners.

# Evaluation/Development Kits

## TC642EV

### FEATURES

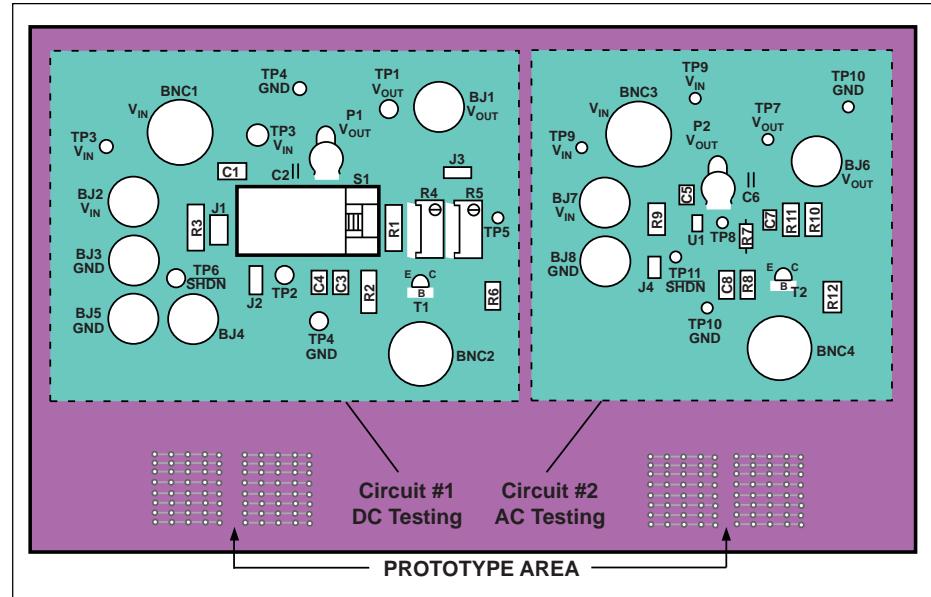
- Complete Evaluation / Prototyping Vehicle for TelCom's TC642 and TC646 BDC Fan Controllers
- Works with Any BDC Fan
- User Prototyping Area
- Configurable Output Driver Circuit
- External or Internal Control Voltage
- Convenient User Test Points



## TC1015EV

### FEATURES

- No Ground Currents
- Very Low Dropout Voltage
- ±2% Output Regulation
- 50 mA and 100mA Output Currents
- Adjustable and Fixed Output Voltages
- Shutdown Mode
- Error Output (TC1054/5 and TC1072/3)
- SOT-23A-5 and SOT-23A-6 Packaging
- Over-Temperature Shutdown
- Evaluation and Prototyping Kit for TC1014/5, TC1054/5, and TC1070/1/2/3
- Designed to Simplify Evaluation of Ground Current, Dropout Voltage, Load/Line Transient Response, and Ripple Rejection Performance
- User Prototyping Area for Application Circuitry

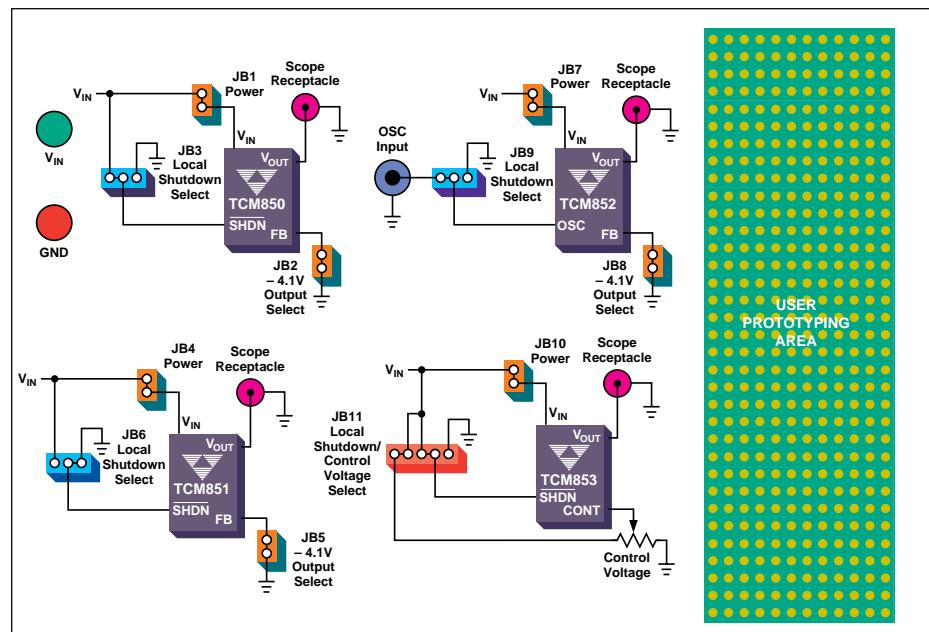


# Evaluation/Development Kits

## TCM850EV

### FEATURES

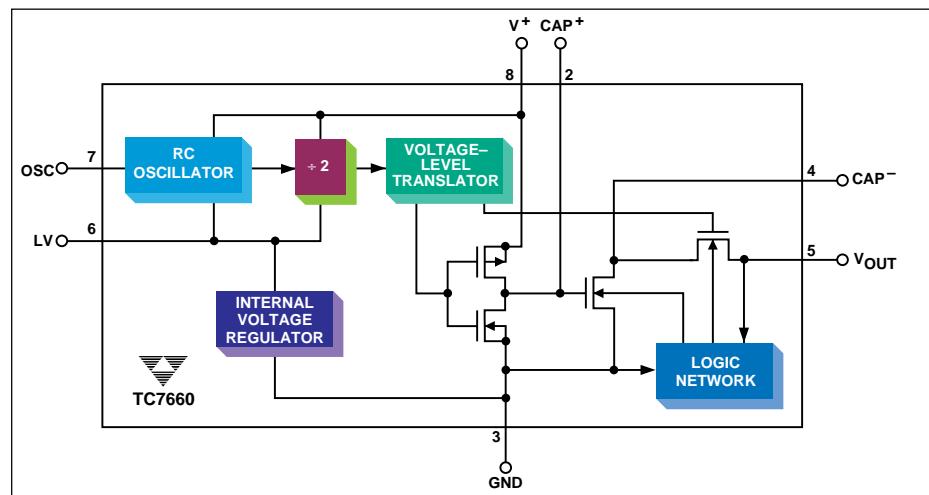
- Separate Evaluation Sites for TCM850, TCM851, TCM852, TCM853
- Optimized Layout Maintains Less than 2mV p-p Output Ripple
- User Prototyping Area
- Scope Probe Receptacles at Each Test Site for Accurate Ripple Measurement
- On-board Control Voltage Pot for TCM853
- Convenient User Test Points



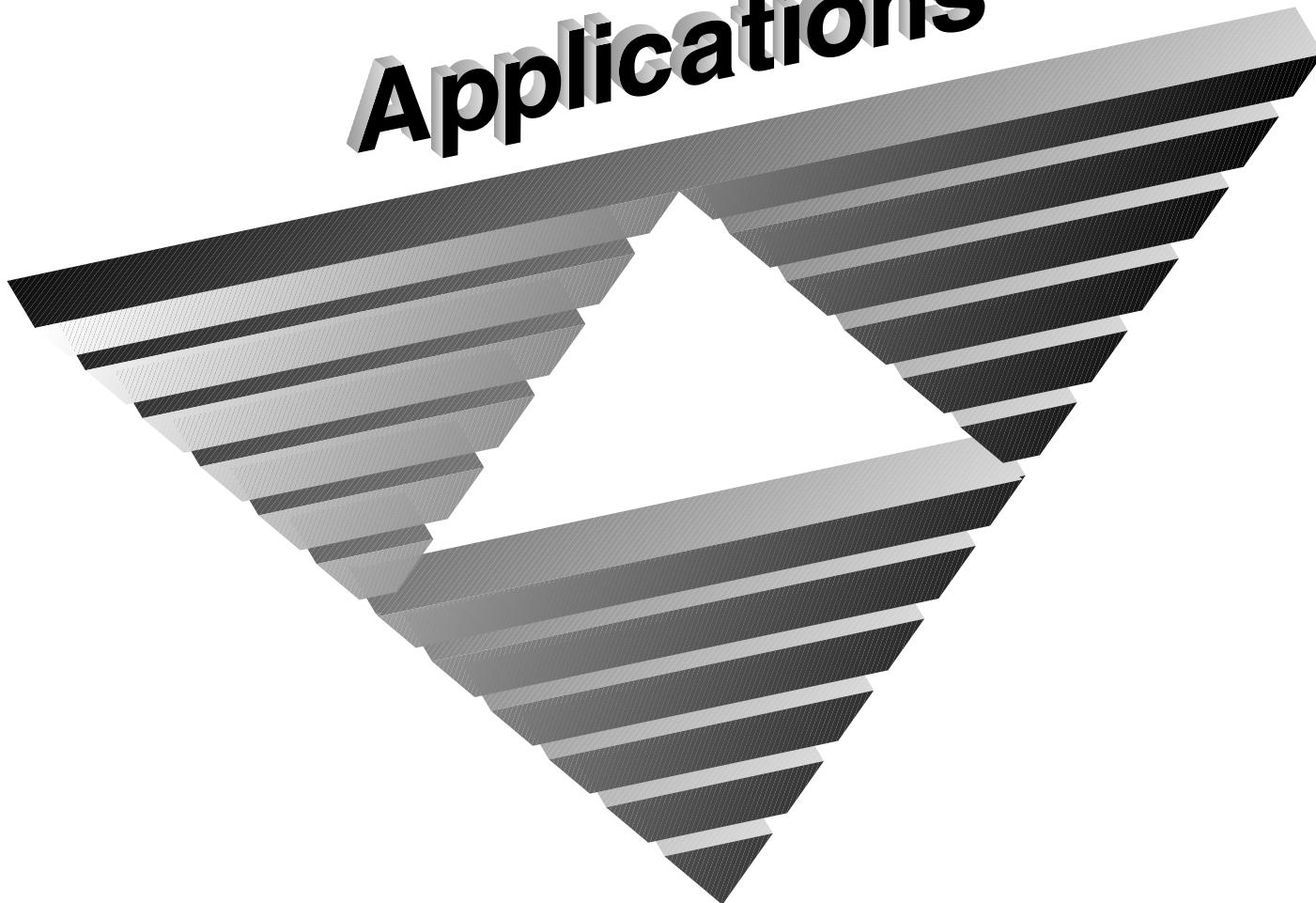
## TC7660EV

### FEATURES

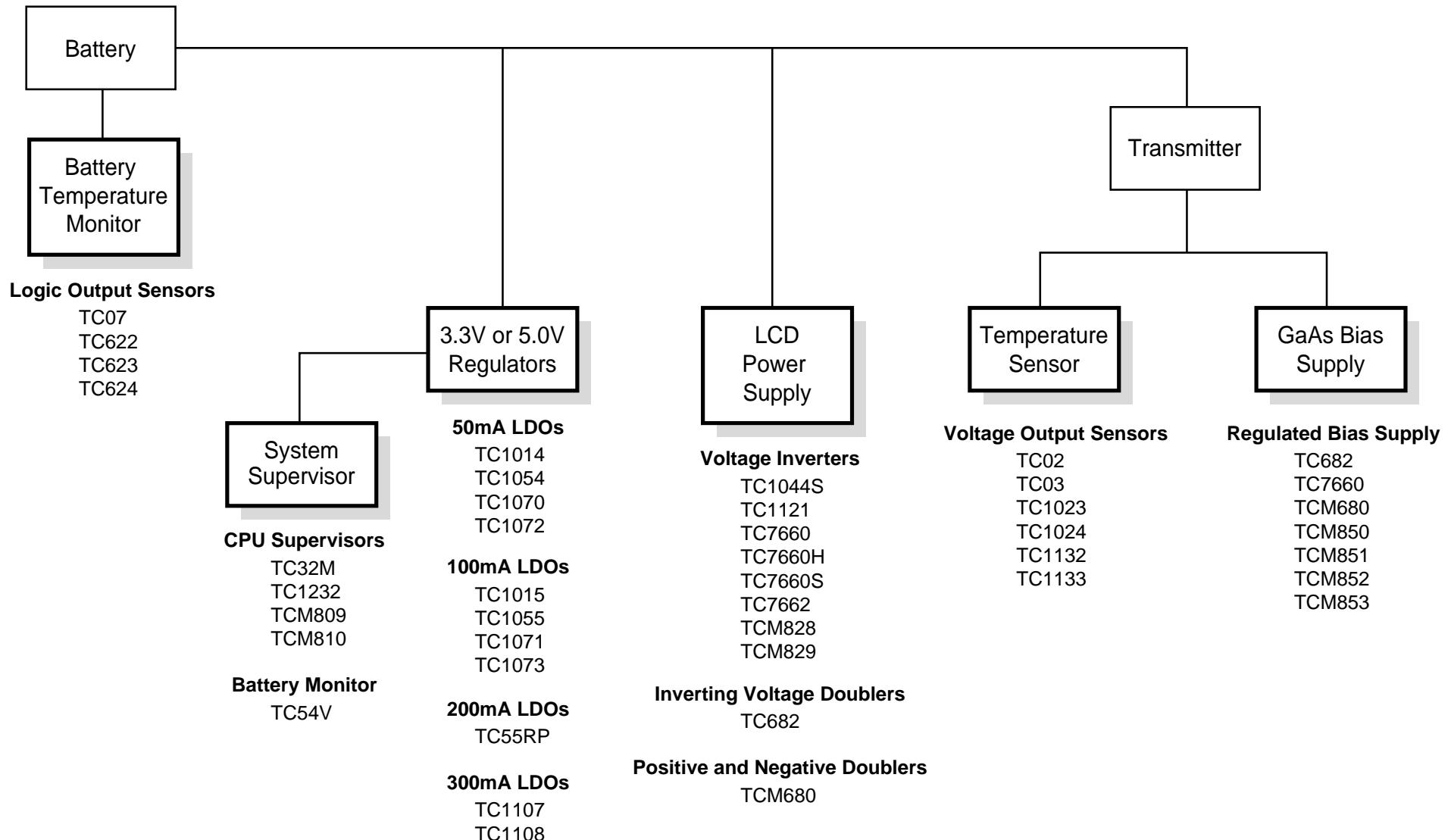
- Evaluates TC7660/S, TC7660H, TC7662, TCM680, TC682, TCM850, TC962, TC1102, TC1121, TC1122, Charge Pump Converters
- Pre-configured Application Circuits: Inverter, Doubler, Doubler Plus Inverter
- User Prototyping Area
- BNC Connector for External Oscillator Input
- Application Design Notes Included



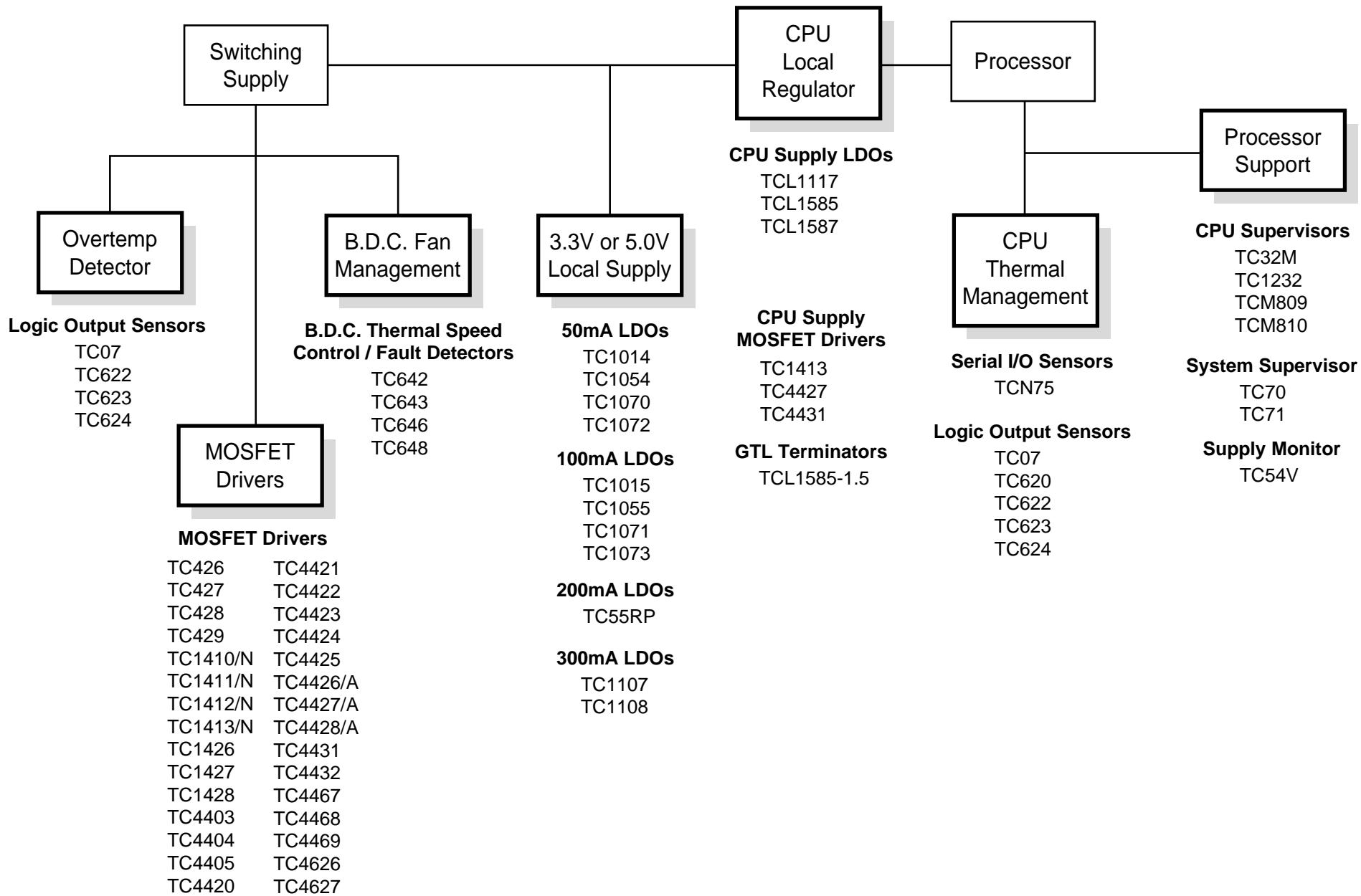
# Applications



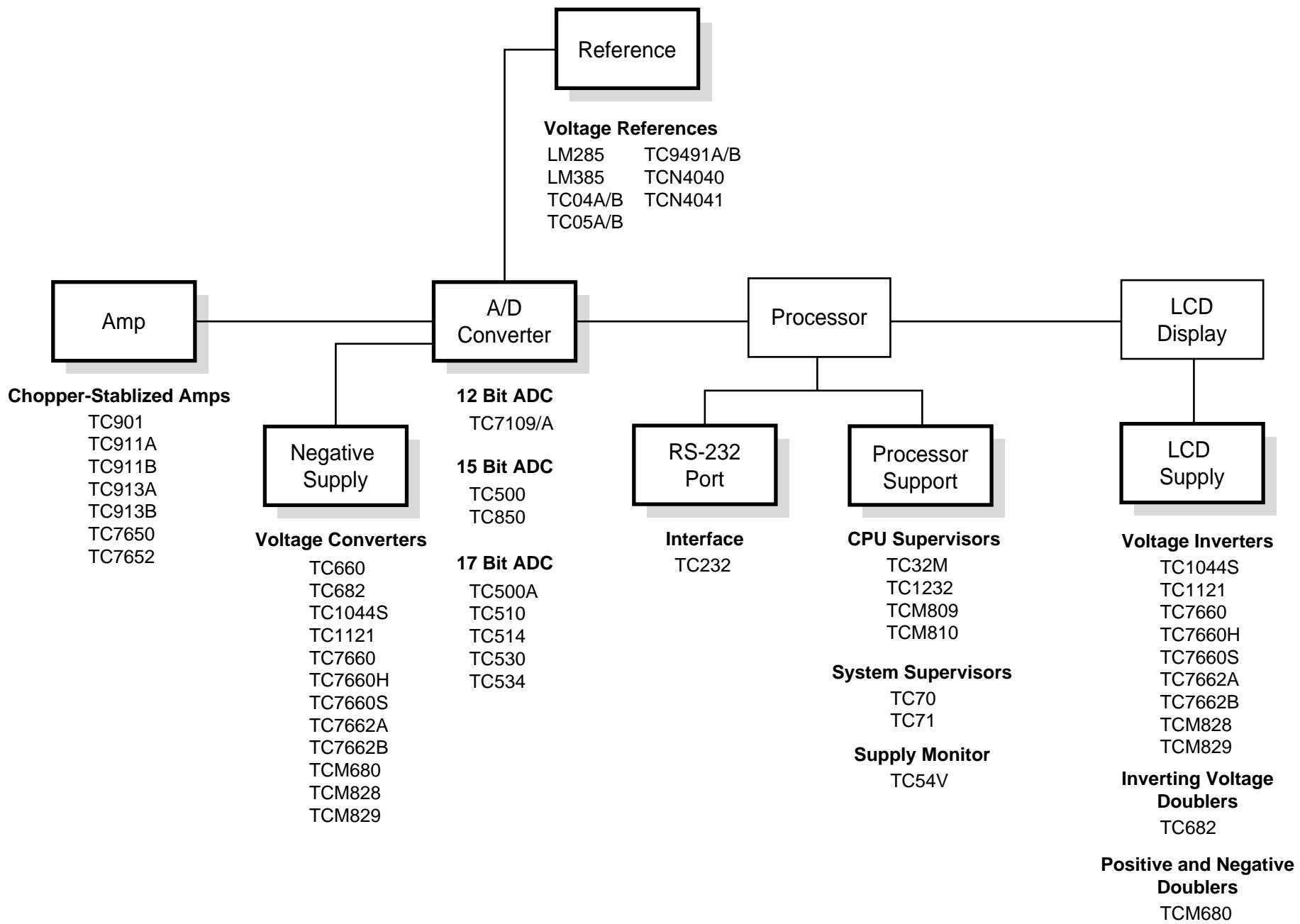
# Hand-Held Power Management Application Areas



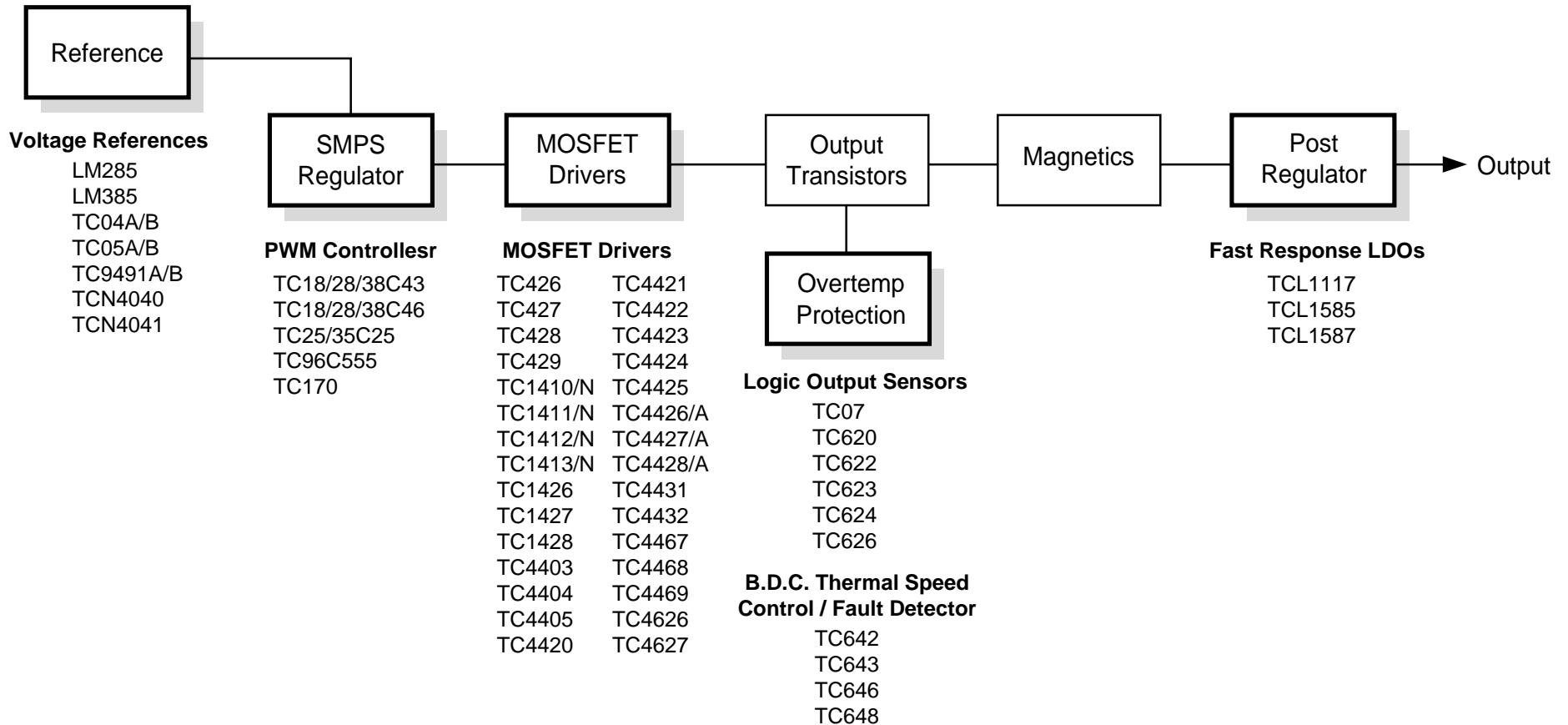
# Notebook / Computer / Peripheral Application Areas



# Instrumentation Application Areas



# Switched Mode Power Supply Application Areas



# Application Notes

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<b>THERMAL MGMT.</b>	<b>NO.</b>	<b>TITLE</b>	<b>DEVICE NO.</b>
Temperature Sensors	3	TC620/621/626 Solid-State Temperature Sensors	TC620/621/626
Temperature Sensors	6	TC620/621 Solid-State Temperature Sensors	TC620/621
Fan Speed Controllers	38	Implementing Temperature-Based Fan Speed Control in NLX Power Supplies	TC646
Fan Speed Controllers	51	Interfacing TelCom's Fan Speed Controllers to the I <sup>2</sup> C Bus	TC642, TC643, TC646
Temperature Sensors	52	Self-Heating Issues with Thermal Sensing ICs	TC02
Fan Speed Controller	53	Redundant Fan Systems Using the TC642	TC642
<b>MIXED-SIGNAL</b>	<b>NO.</b>	<b>TITLE</b>	<b>DEVICE NO.</b>
System A/D Converters	1	TC500A/TC500 Auto-Ranging Application	TC500/500A/520A
System A/D Converters	4	15-Kilogram Scale Using the TC520	TC500/500A/520A
Display A/D Converters	7	Solving Sensor Offset Problems	TC7106
V/F-F/V Converters	10	Applications of the TC9400 V/F and F/V Converter	TC9400
Display A/D Converters	12	±5V Power Supply Operation w/ TC7106A/7107A	TC7106/7106A/7107/7107A
System A/D Converters	16	TC7135 Microprocessor Interface	TC7135
System A/D Converters	17	Simplify A/D Converter Interface with Software	TC7135
System A/D Converters	24	TC7109 Records Remote Data Automatically	TC7109
System A/D Converters	27	Numerical Integration Techniques	TC7109
System A/D Converters	29	Integrating Converter Analog Processor - TC500A	TC500A
Voltage References	35	An Overview of Reference Parameters	TC04A/04B/05A/05B
Display A/D Converters	37	TC7136/TC9400 - Digital Readout Frequency Meter	TC7136/7136A/TC9400
System A/D Converters	43	DACS850 Data Acquisition and Control System	DACS850
<b>POWER MGMT.</b>	<b>NO.</b>	<b>TITLE</b>	<b>DEVICE NO.</b>
Voltage Detectors	2	Using the TelCom TC54 Voltage Detector	TC54
DC-DC Converters	8	TC7660 Powers RS-232 Data Loop	TC7660
MOSFET Drivers	22	Considerations for Driving Power MOSFETs in High-Current, Switch Mode	MOSFET Drivers
Linear Regulators	23	LDO Thermal Considerations	TCL1587 LDOs
MOSFET Drivers	25	System Design Practice	TC4426/4427/4428
Linear Regulators	26	Using the TCL1117 for Single-Ended SCSI Active Termination	TCL1117
MOSFET Drivers	28	Universal Power MOSFET Interface IC	TC4420/4429

# Application Notes and Evaluation Kits

POWER MGMT. (Cont.)	NO.	TITLE	DEVICE NO.
MOSFET Drivers	30	Matching MOSFET Drivers to MOSFETs	MOSFET Drivers
CMOS ICs	31	Latch-up Protection of CMOS ICs	CMOS ICs
DC-DC Converters	32	CMOS SMPS Current-Mode Controller	TC170
Voltage Detector	39	Upgrading the Motorola MC33x64/34x64 Reset IC	TC54
Power Supplies	40	Switched Attenuation to Improve Current Sensing	Power Supplies
Linear Regulators	41	Using TelCom' Micropower LDOs	TC1070, TC1071
MOSFET Drivers	42	Low-Cost DC Motor Speed Control	TC4469
Linear Regulators	47	Pin Compatible CMOS Upgrades to Bipolar LDOs	TC1014/15, TC1054/55 TC1070/71, TC1072/73, TC1107, TC1108, TC1173/74
SYSTEM MGMT.	NO.	TITLE	DEVICE NO.
CPU/System Supervisors	36	Selecting a Processor Supervisor IC	TCM809/810, TC54
System Supervisors	54	Using TelCom Battery Backup System Supervisors with Fast Static Ram Devices	TC70/71
INTERFACE	NO.	TITLE	DEVICE NO.
Display A/D Drivers	19	TC7211AM Display Driver Microprocessor Interface	TC7211AM
Data Communications	34	Using the TC232	TC232

## Evaluation Kits

MIXED-SIGNAL	DEVICE NO.	TITLE
System A/D Converters	TC500EV	Evaluation Kit for TC500/510/514
System A/D Converters	TC530EV	Evaluation Kit for TC530 A/D Converters
POWER MGMT.	DEVICE NO.	TITLE
Linear Regulators	TC1015EV	Evaluation Kit for TC1015
Charge Pump	TC7660EV	Charge Pump Evaluation Kit
DC-DC Converters	TCM850EV	Evaluation Kit for TCM850/1/2/3
THERMAL MGMT.	DEVICE NO.	TITLE
BDC Fan Managers	TC642EV	Evaluation Kit for TC642/646 BDC Fan Controllers

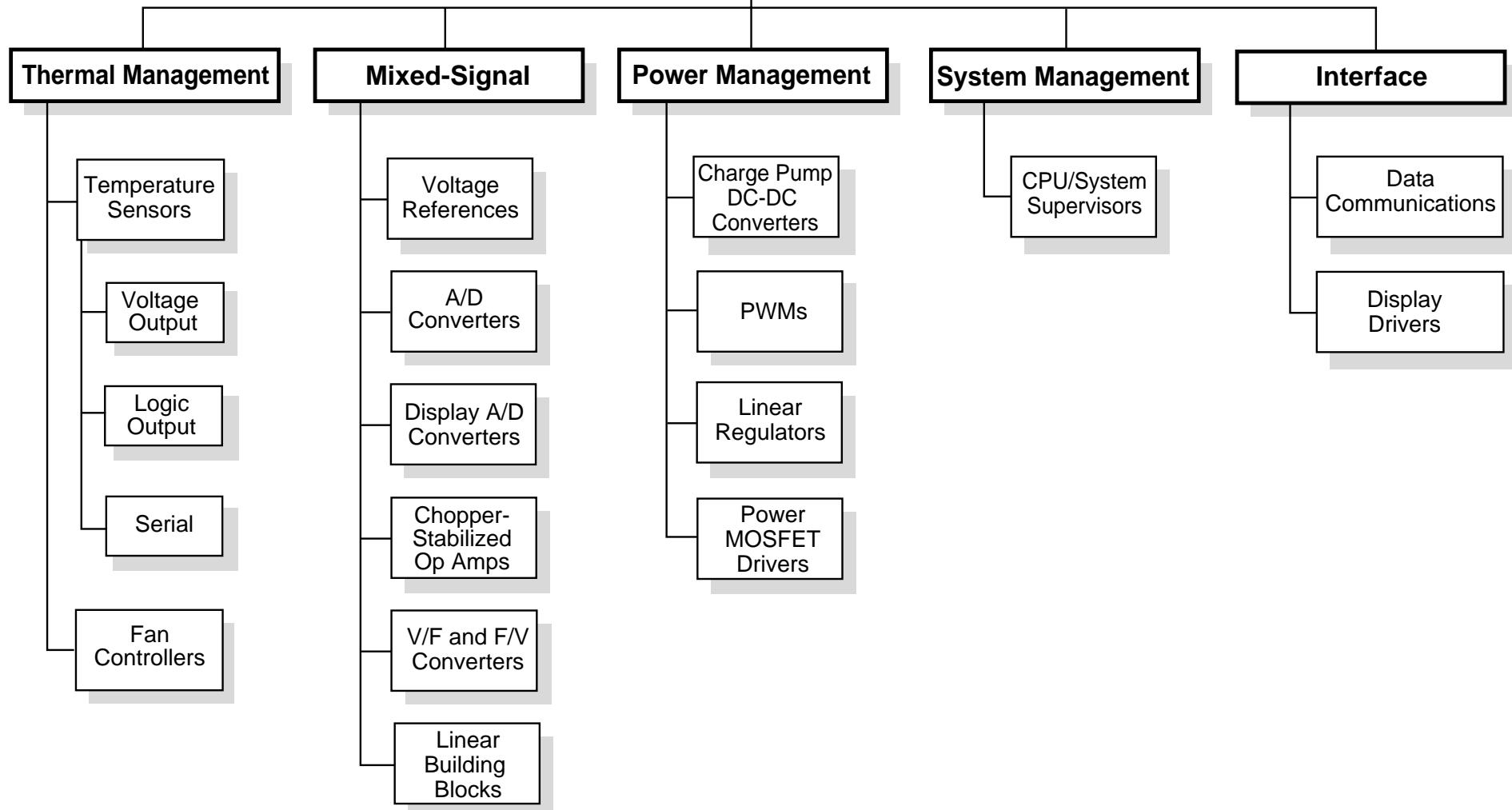
To receive a copy of any of these documents, contact TelCom Semiconductor's Literature Line at (800) 888-9966, or call your local TelCom representative or distributor.

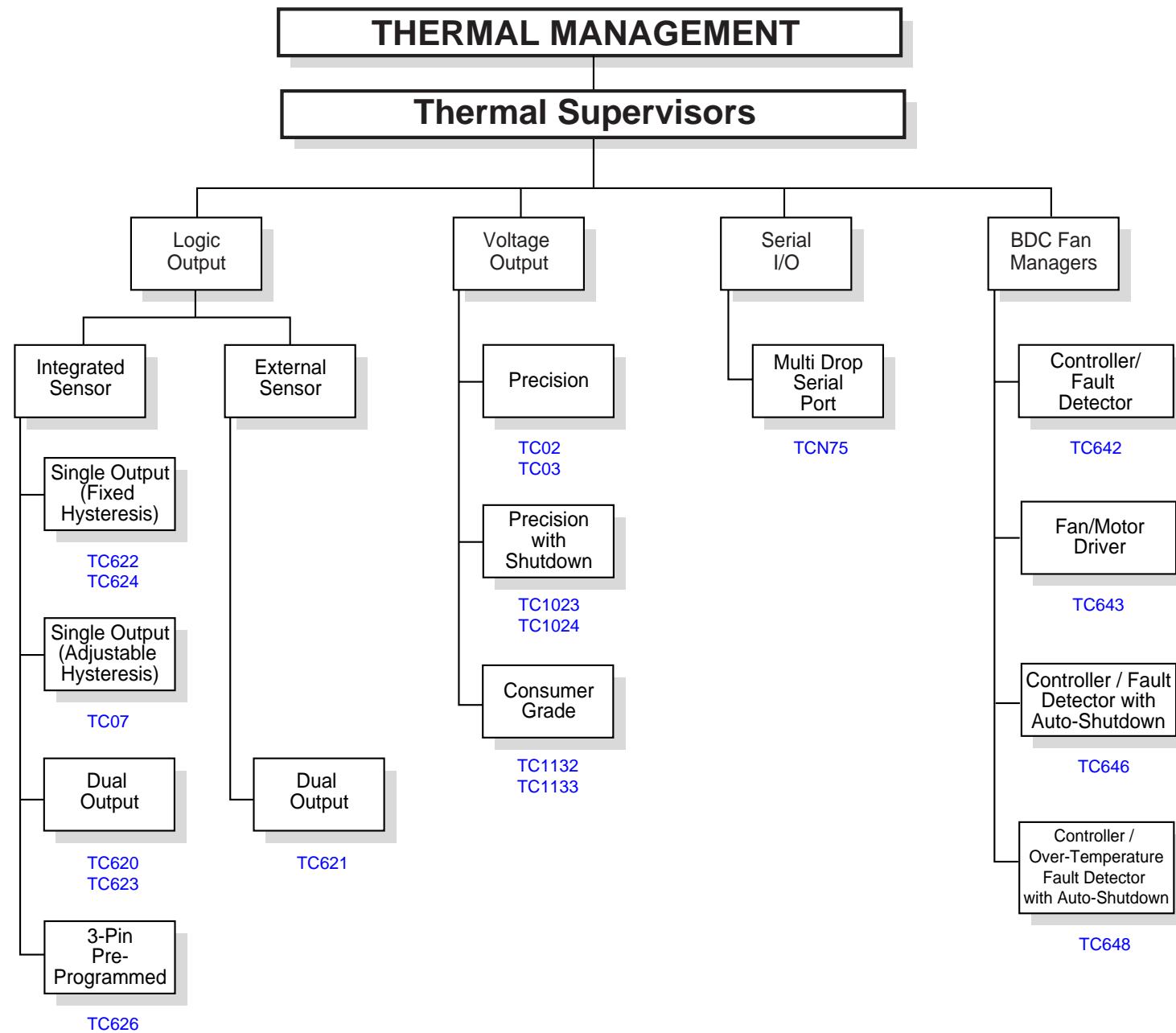


# Selection Guides



# TelCom Product Portfolio





# Thermal Management

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## THERMAL SUPERVISORS

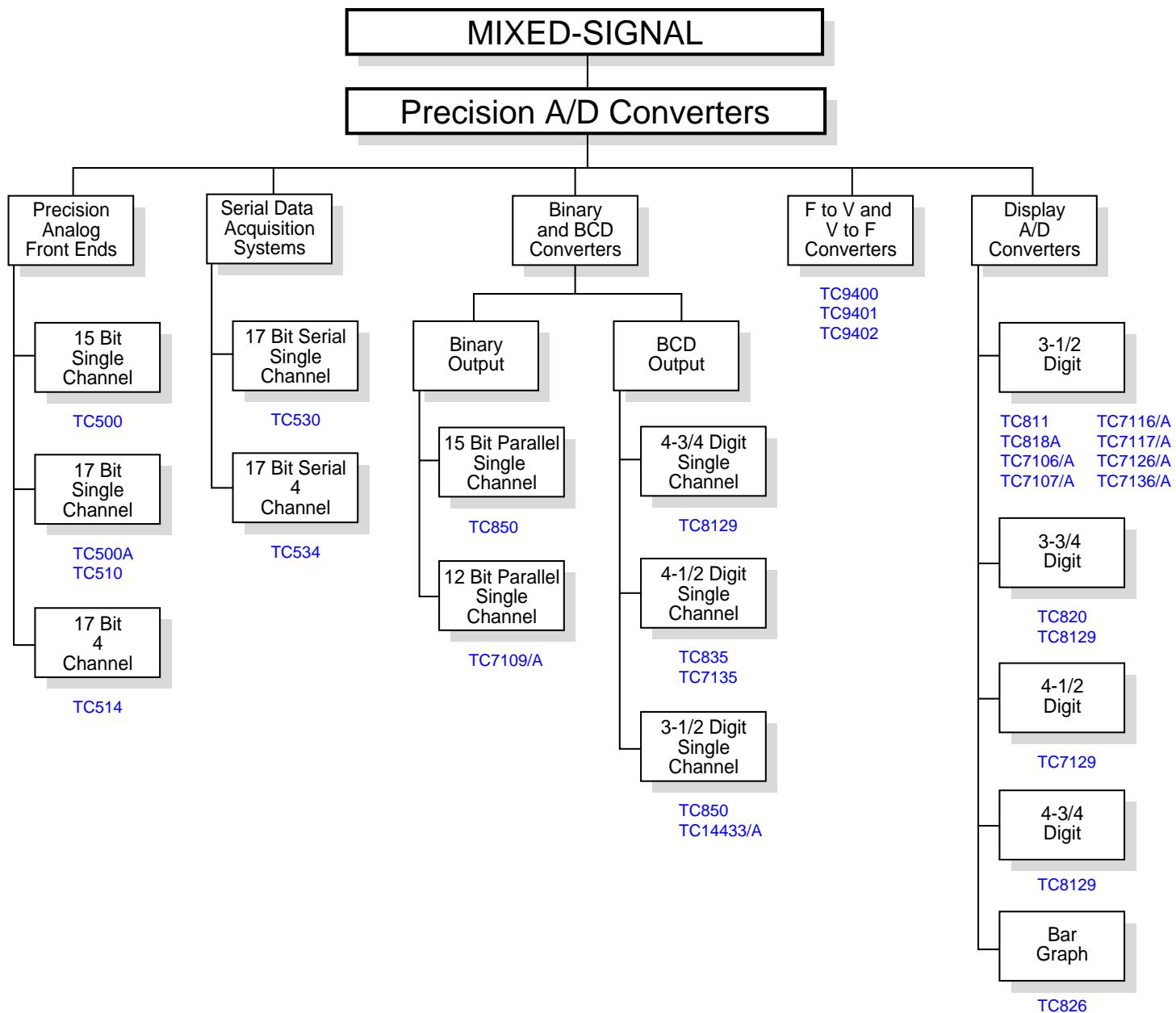
TelCom's family of temperature sensors and brushless DC fan controllers serve a broad spectrum of applications. Logic output temperature sensors are autonomous, programmable temperature devices that output a logic state change when measured temperature is too high or too low. Voltage output sensors supply a linearized output voltage directly proportional to measured temperature. These devices are useful in thermometer circuits, temperature compensation applications, and as general purpose replacements to older thermistor technology. Serial I/O sensors are designed for easy interface to the system processor. Both multidrop and single zone sensors are available. TelCom's brushless DC Fan Managers provide temperature-proportional fan speed control and fan fault detection. These devices extend fan service life, lower average fan supply current, reduce noise, and protect the system from fan and over-temperature related failures.

Part #	Device Type				Typical Accuracy (°C)	Maximum Accuracy @25°C (°C)	Maximum Temperature Range (°C)	Supply Voltage Range (V)	Max Supply Current (µA)	EVAL Kit	Package Options	Comments
	Logic Output Sensor	Voltage Output Sensor	Serial I/O Sensor	Fan Manager								
TC02		X			±0.5	±2	-40 → +125	+3 → +12	60		SOT-23B-3, TO-92	Replaces NSC LM50
TC03		X			±0.5	±2	-20 → +100	+2.2 → +12	60		SOT-23B-3, TO-92	Replaces NSC LM35, LM45
TC07	X				±1	±3	-40 → +125	+2.7 → +5.5	300		MSOP-8, SO-8	Single output, programmable hysteresis
TC620	X				±1	±3	-40 → +125	+4.5 → +18	400		DIP-8, SO-8	Dual outputs plus prog. hysteresis output
TC621	X				Note 1	Note 1	Note 2	+4.5 → +18	400		DIP-8, SO-8	Uses external temperature sensor
TC622	X				±1	±5	-40 → +125	+4.5 → +18	600		DIP-8, SO-8, TO-220-5	Single output. TO-220 for heat sink mounting
TC623	X				±1	±3	-40 → +125	+2.7 → +4.5	250		DIP-8, SO-8	Dual outputs plus prog. hysteresis output
TC624	X				±1	±5	-40 → +125	+2.7 → +4.5	300		DIP-8, SO-8	Single output
TC626	X				±1	±3	-55 → +125	+4.5 → +18	600		TO-92, TO-220-3	Pre-programmed, 3 pin packages
TC642			X	Note 1	Note 1	Note 1	Note 2	+3.0 → +5.5	1000	TC642EV	DIP-8, SO-8	BDC fan manager
TC643			X	Note 1	Note 1	Note 1	Note 2	+2.7 → +5.5	TBD		DIP-8, MSOP-8, SO-8	BDC fan driver circuit
TC646			X	Note 1	Note 1	Note 1	Note 2	+3.0 → +5.5	1000	TC642EV	DIP-8, SO-8	BDC fan manager with auto-shutdown
TC648			X	Note 1	Note 1	Note 1	Note 2	+3.0 → +5.5	1000	TC642EV	DIP-8, SO-8	BDC fan manager with auto-shutdown
TC1023		X			±0.5	±2	-20 → +100	+2.2 → +12	60		MSOP-8, SO-8	TC03 with 1µA shutdown mode
TC1024		X			±0.5	±2	-40 → +125	+3 → +12	60		MSOP-8, SO-8	TC02 with 1µA shutdown mode
TC1132		X			±0.5	±3	-40 → +125	+3 → +12	80		SOT-23B-3, TO-92	Consumer grade TC02
TC1133		X			±0.5	±3	-20 → +100	+2.2 → +12	80		SOT-23B-3, TO-92	Consumer grade TC03
TCN75			X		±1	±2	-55 → +125	+2.7 → +5.5	1000*		DIP-8, MSOP-8, SO-8	Two wire multidrop sensor with interrupt

**NOTES:** 1. These devices use an external temperature sensor. Accuracy of the total solution is a function of the accuracy of the external sensor.

2. Determined by temperature range of external thermistor.

\* TCN75 idle current is 250µA. This device also has a software shutdown mode that reduces supply current to <1µA.



# Mixed-Signal

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## PRECISION ANALOG FRONT ENDS

TelCom's Precision Analog Front Ends contain all the analog circuitry necessary to implement a dual slope integrating A/D converter. They connect to the host processor (or TC520A Serial Adapter) with only 3 wires, and they feature programmable resolution and conversion speed and a low installed cost versus other integrating converters. All TelCom Analog Front Ends directly handle both differential and bipolar input voltages.

Part #	Description	Resolution	Conv/ Sec	Input Channels	Data Interface	Supply Voltage (V)	Input Range (V)	EVAL Kit	Features
TC500	Front End	16 Bits	4 → 10	1	3 Wire Logic	$\pm 4.5 \rightarrow \pm 7.5$	$V_{SS} + 1.5V \rightarrow V_{DD} - 1.5V$	TC500EV	<ul style="list-style-type: none"><li>1. Differential/bipolar voltage input</li><li>2. High noise rejection</li><li>3. Programmable resolution/conversion time</li><li>4. 2 wire logic interface</li></ul>
TC500A	Front End	17 Bits	4 → 10	1	3 Wire Logic	$\pm 4.5 \rightarrow \pm 7.5$	$V_{SS} + 1.5V \rightarrow V_{DD} - 1.5V$	TC500EV	<ul style="list-style-type: none"><li>1. Differential/bipolar voltage input</li><li>2. High noise rejection</li><li>3. Programmable resolution/conversion time</li><li>4. 2 wire logic interface</li></ul>
TC510	Front End	17 Bits	4 → 10	1	3 Wire Logic	$\pm 4.5 \rightarrow \pm 5.5$	$V_{SS} + 1.5V \rightarrow V_{DD} - 1.5V$	TC500EV	<ul style="list-style-type: none"><li>1. Differential/bipolar voltage input</li><li>2. Single-supply operation</li><li>3. High noise rejection</li><li>4. Programmable resolution/conversion time</li><li>5. 2 wire logic interface</li><li>6. Charge pump (-V) output pin</li></ul>
TC514	Front End	17 Bits	4 → 10	4	3 Wire Logic	$\pm 4.5 \rightarrow \pm 5.5$	$V_{SS} + 1.5V \rightarrow V_{DD} - 1.5V$	TC500EV	<ul style="list-style-type: none"><li>1. 4 Differential/bipolar voltage input channels</li><li>2. Single-supply operation</li><li>3. High noise rejection</li><li>4. Programmable resolution/conversion time</li><li>5. 2 wire logic interface</li><li>6. Charge pump (-V) output pin</li></ul>
TC520A	Serial Adapter	—	—	—	Serial Port	$\pm 4.5 \rightarrow \pm 5.5$	—	TC500EV	Optional serial interface adapter for TC500/500A/510/514

## SERIAL DATA ACQUISITION SUBSYSTEMS

These precision serial A/D converters have 17 bit resolution, superior noise rejection, and user-programmable resolution/conversion speed. Like the Precision Analog Front Ends, they directly handle both differential and bipolar input voltages.

Part #	Description	Resolution	Conv/ Sec	Input Channels	Data Interface	Supply Voltage (V)	Input Range (V)	EVAL Kit	Features
TC530	Serial A/D	17 Bits	3 → 10	1	Serial Port	$\pm 4.5 \rightarrow \pm 5.5$	$V_{SS} + 1.5V \rightarrow V_{DD} - 1.5V$	TC530EV	<ul style="list-style-type: none"> <li>1. Differential/bipolar voltage input</li> <li>2. Single-supply operation</li> <li>3. High noise rejection</li> <li>4. Programmable resolution/conversion time</li> <li>5. Serial interface</li> <li>6. Charge pump (<math>-V</math>) output pin</li> </ul>
TC534	Serial A/D	17 Bits	3 → 10	4	Serial Port	$\pm 4.5 \rightarrow \pm 5.5$	$V_{SS} + 1.5V \rightarrow V_{DD} - 1.5V$	TC530EV	<ul style="list-style-type: none"> <li>1. 4 Differential/bipolar voltage input channels</li> <li>2. Single-supply operation</li> <li>3. High noise rejection</li> <li>4. Programmable resolution/conversion time</li> <li>5. Serial interface</li> <li>6. Charge pump (<math>-V</math>) output pin</li> </ul>

## BINARY AND BCD A/D CONVERTERS

These single channel, integrating A/D converters are ideal for a wide variety of instrumentation applications.

Part #	Description	Resolution (Digits)	Resolution (Counts)	Max Power (mW)	Data Interface	Supply Voltage (V)	Input Range (V)	Features
TC835	BCD A/D	4-1/2	$\pm 20,000$	30	MUXed BCD	$\pm 5$	$\pm 1.99$	Higher speed upgrade to TC7135
TC850	Binary A/D	15-Bit	$\pm 32,768$	20	8 bit parallel	$\pm 5$	$\pm 3.5$	Highest conversion speed (40 conv/sec)
TC7109	Binary A/D	12-Bit	$\pm 4,096$	8	8/16 bit $\mu$ P/UART	$\pm 5$	$\pm 3.5$	3 state binary outputs
TC7109A	Binary A/D	12-Bit	$\pm 4,096$	8	8/16 bit $\mu$ P/UART	$\pm 5$	$\pm 3.5$	Faster recovery upgrade to TC7109
TC7135	BCD A/D	4-1/2	$\pm 20,000$	30	MUXed BCD	$\pm 5$	$\pm 3.5$	For DMM, DPM, dataloggers
TC8129	BCD A/D	4-3/4	$\pm 400,000$	18	Serial $\mu$ P	$+9$	$\pm 400mV$	Highest resolution, serial port
TC14433	BCD A/D	3-1/2	$\pm 2,000$	25	MUXed BCD	$\pm 4.5 \rightarrow \pm 8$	$\pm 1.99$	For DMM, DPM, dataloggers
TC14433A	BCD A/D	3-1/2	$\pm 2,000$	25	MUXed BCD	$\pm 4.5 \rightarrow \pm 8$	$\pm 1.99$	For DMM, DPM, dataloggers

# Mixed-Signal

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## DISPLAY A/D CONVERTERS

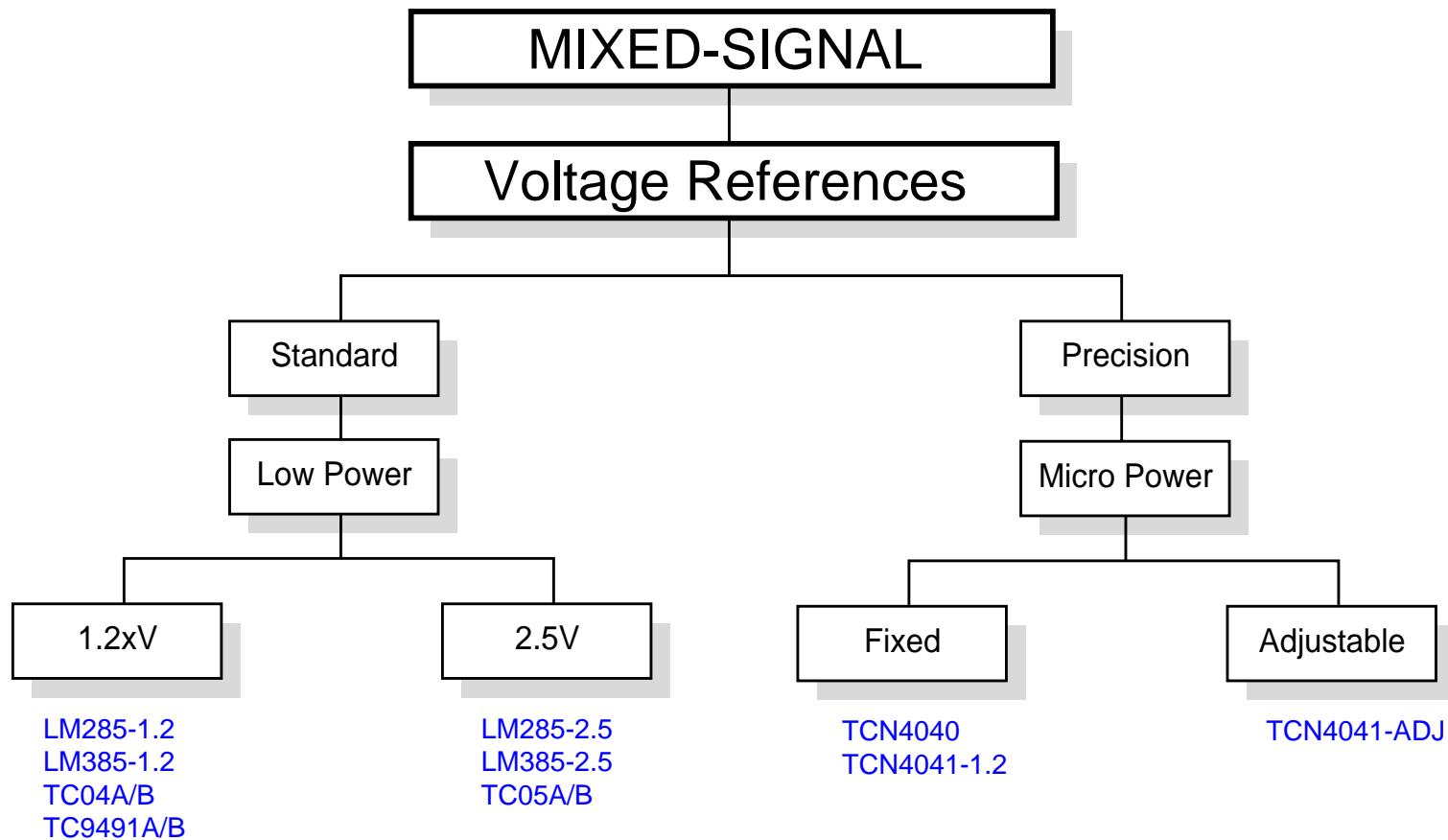
These single channel, dual slope A/Ds interface directly to a display with no need for an external processor. All have an on-board voltage reference.

Part #	Resolution (Digits)	Resolution (Counts)	Display Type	Supply Voltage (V)	Power (mW)	Features
TC811	3-1/2	±2,000	LCD	9	0.6	Display HOLD function, fast overrange recovery, very low power
TC818A	3-1/2	±2,000	LCD	9	10	Bar graph, memory, hold continuity and piezo drive
TC820	3-3/4	±40,000	LCD	9	10	DMM plus frequency counter and logic probe
TC826	2.5% Bar	—	LCD	9	20	Hold, non-muxed LCD drive, 40 data segments plus zero
TC7106	3-1/2	±2,000	LCD	9	10	For DMM, DPM, datalogger applications
TC7106A	3-1/2	±2,000	LCD	9	10	For DMM, DPM, datalogger applications
TC7107	3-1/2	±2,000	LED	±5	10	For DMM, DPM, datalogger applications
TC7107A	3-1/2	±2,000	LED	±5	10	For DMM, DPM, datalogger applications
TC7116	3-1/2	±2,000	LCD	9	10	Hold function
TC7116A	3-1/2	±2,000	LCD	9	10	Hold function
TC7117	3-1/2	±2,000	LED	±5	10	Hold function
TC7117A	3-1/2	±2,000	LED	±5	10	Hold function
TC7126	3-1/2	±2,000	LCD	9	0.5	Low power TC7106
TC7126A	3-1/2	±2,000	LCD	9	0.5	Low power TC7106
TC7129	4-1/2	±20,000	LCD	9	4.5	Lowest noise ±3µV sensitivity
TC7136	3-1/2	±2,000	LCD	9	0.5	Low power/low noise TC7106
TC7136A	3-1/2	±2,000	LCD	9	0.5	Low power/low noise TC7106

## FREQUENCY-TO-VOLTAGE/VOLTAGE-TO-FREQUENCY CONVERTERS

These versatile converters can be used for either F/V or V/F conversion.

Part #	Frequency Range (kHz)	Full Scale (ppm FS/°C)	Nonlinearity (%FS)
TC9400	100	±40	±0.05
TC9401	100	±40	±0.02
TC9402	100	±100	±0.25

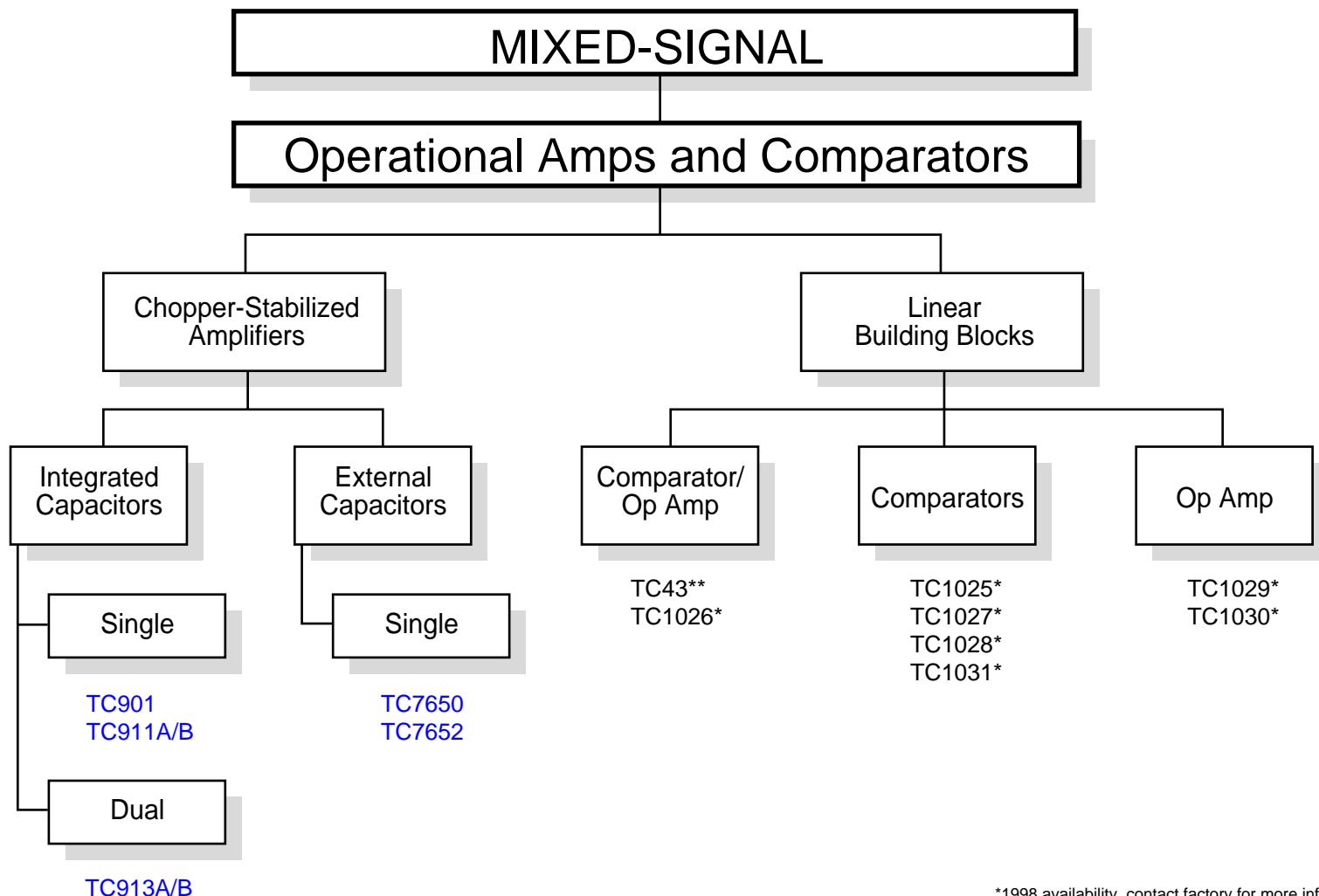


# Mixed-Signal

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## BANDGAP VOLTAGE REFERENCES

Part #	Voltage (V)	Temp Drift (ppm/ $^{\circ}$ C Max)	Min Current ( $\mu$ A)	Max Current (mA)	Initial Accuracy (% Max)	Package Options	Temperature Range ( $^{\circ}$ C)
TC04A	1.2	$\pm$ 50	15	20	$\pm$ 2	SO-8, TO-92	0 → 70
TC04B	1.2	$\pm$ 50	15	20	$\pm$ 2	SO-8, TO-92	0 → 70
TC05A	2.5	$\pm$ 50	20	20	$\pm$ 2	SO-8, TO-92	0 → 70
TC05B	2.5	$\pm$ 50	20	20	$\pm$ 2	SO-8, TO-92	0 → 70
LM285-1.2	1.2	$\pm$ 30	15	20	$\pm$ 2	SO-8, TO-92	-40 → +85
LM285-2.5	2.5	$\pm$ 30	20	20	$\pm$ 3	SO-8, TO-92	-40 → +85
LM285B-1.2	1.2	$\pm$ 30	15	20	$\pm$ 1	SO-8, TO-92	-40 → +85
LM285B-2.5	2.5	$\pm$ 30	20	20	$\pm$ 1.5	SO-8, TO-92	-40 → +85
LM385-1.2	1.2	$\pm$ 30	15	20	$\pm$ 2	SO-8, TO-92	0 → 70
LM385-2.5	2.5	$\pm$ 30	20	20	$\pm$ 3	SO-8, TO-92	0 → 70
LM385B-1.2	1.2	$\pm$ 30	15	20	$\pm$ 1	SO-8, TO-92	0 → 70
LM385B-2.5	2.5	$\pm$ 30	20	20	$\pm$ 1.5	SO-8, TO-92	0 → 70
TC9491A	1.2	$\pm$ 50	15	20	$\pm$ 2	SO-8, TO-92	0 → 70
TC9491B	1.2	$\pm$ 100	15	20	$\pm$ 2	SO-8, TO-92	0 → 70
TCN4040-2.5	2.5	$\pm$ 100	60	15	$\pm$ 2, $\pm$ 1, $\pm$ 0.5	SO-8, SOT-23B-3, TO-92	-40 → +85
TCN4041-1.2	1.2	$\pm$ 100	60	15	$\pm$ 2, $\pm$ 1, $\pm$ 0.5	SO-8, SOT-23B-3, TO-92	-40 → +85
TCN4041-ADJ	Adjustable	$\pm$ 100	60	15	$\pm$ 2, $\pm$ 1, $\pm$ 0.5	SO-8, SOT-23, TO-92	-40 → +85



\*1998 availability, contact factory for more information.

# Mixed-Signal

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## OP AMPS AND COMPARATORS

TelCom's chopper-stabilized operational amplifiers are ideal for a wide variety of precision instrumentation applications.

### Chopper-Stabilized Operational Amplifiers

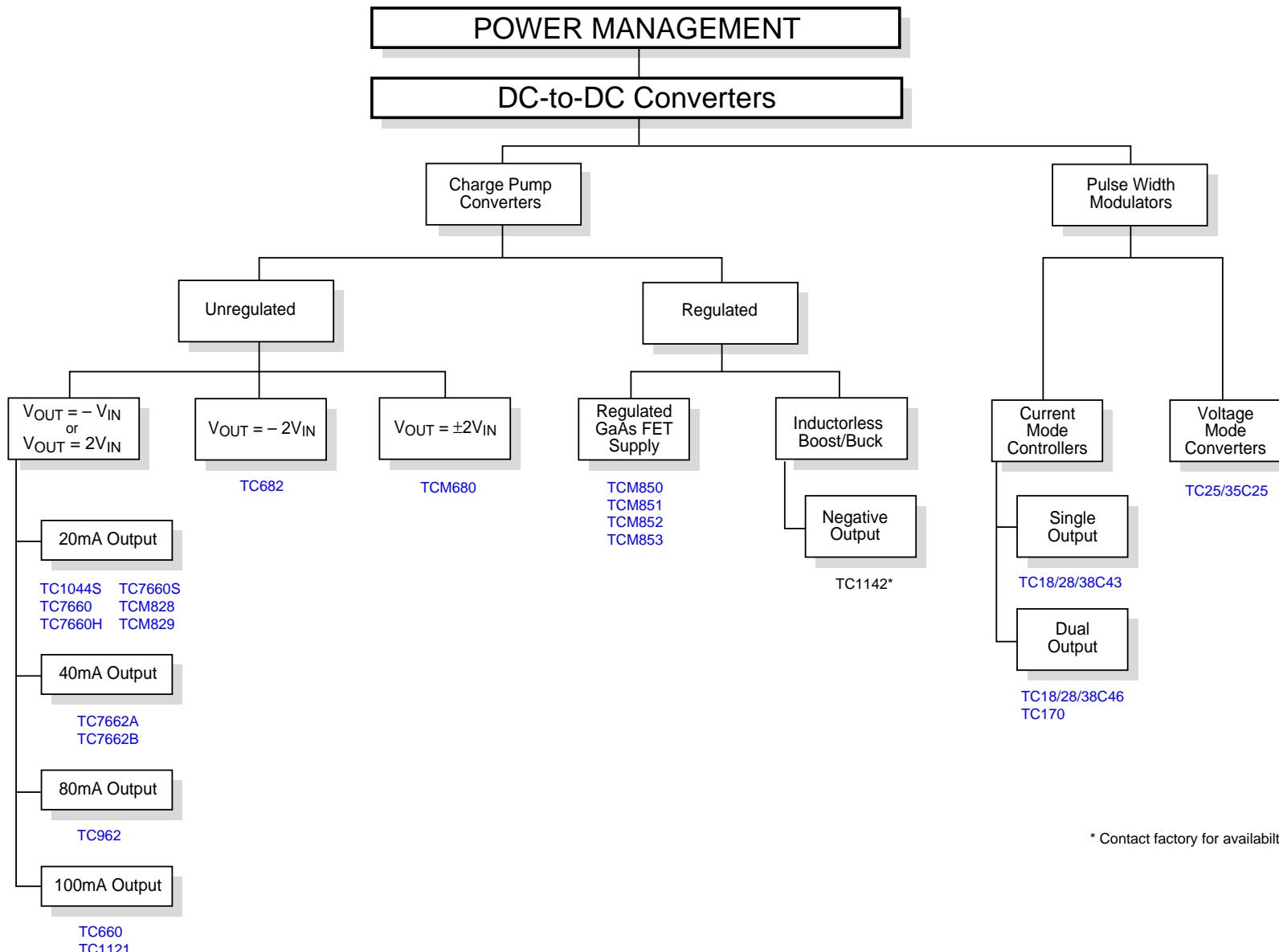
Part #	Integrated Capacitors	# Amps Per Package	V <sub>os</sub> (µV Max)	I <sub>BIAST</sub> (pA Max)	GBWP (kHz)	Supply Voltage	Supply Current (mA Max)
TC901	X	1	15	50	800	5V → 32V or ±15V	0.6
TC911A	X	1	15	70	1500	4.5V → 16V	0.6
TC911B	X	1	30	120	1500	4.5V → 16V	0.8
TC913A	X	2	15	90	1500	±3.3V → ±8.3V 6.5V → 16V	0.9
TC913B	X	2	30	120	1500	±3.3V → ±8.3V 6.5V → 16V	1.1
TC7650		1	5	400	2000	4.5V → 16V	3.5
TC7652		1	5	1000	400	5V → 16V	3.0

## LINEAR BUILDING BLOCKS

TelCom's family of Linear Building Blocks combine several low-power analog functions into low-profile packages for smaller, more efficient analog circuit solutions. All op amp and comparator inputs and outputs are rail-to-rail. Typical op amp/comparator input bias currents are under 100pA. Supply voltage range of all devices is 1.8V to 5.5V, and operation with single or dual supplies is supported.

Part #	Comparators Per Package	Op Amps Per Package	Supply Current (µA Max)	Reference Voltage (V)	Packages	EVAL Kit	Shutdown Control
TC1043*	TBD	TBD	TBD	TBD	DIP-16, SOIC-16 (N)	TBD	X
TC1025*	2	0	10	1.2	DIP-8, MSOP-8, SO-8	TBD	
TC1027*	4	0	15	1.2	DIP-16, QSOP-16	TBD	
TC1028*	2	0	10	1.2	DIP-8, MSOP-8, SO-8	TBD	X
TC1029*	0	2	10	—	DIP-8, MSOP-8, SO-8	TBD	
TC1030*	0	4	12	—	DIP-14, QSOP-16	TBD	
TC1031*	1	0	6	1.2	SOT-23A-5	TBD	

**NOTES:** \*Availability Late 1998. Contact TelCom Semiconductor for details.



# Power Management

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## DC-TO-DC CONVERTERS

### Charge Pump Converters

TelCom's charge pump converters do not require inductors, saving associated cost, size, and EMI. Using as few as two inexpensive external capacitors, these devices feature wide input voltage ranges and high operating efficiencies. All devices are available in both commercial ( $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ) and industrial ( $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ) temperature ranges.

Part #	Output Voltage	Input Voltage Range (V)	Quiescent Supply Current** (Max $\mu\text{A}$ @ $25^{\circ}\text{C}$ )	Output Current (typ. mA)	EVAL Kit	Package Options	Features
TC660	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 5.5	500	100	TC7660EV	DIP-8, SO-8	100mA upgrade to TC7660
TC682	$V_{\text{OUT}} = -2V_{\text{IN}}$	2.4 → 5.5	300	-5	TC7660EV	DIP-8, SO-8	Generates -6V from +3V or -10V from +5V
TC962	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	3 → 18	200	80	TC7660EV	DIP-8, SO-8 (W)	
TC1044S	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 12	160	20	TC7660EV	DIP-8, SO-8	60kHz oscillator boost mode
TC1121	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 5.5	500	100	TC7660EV	DIP-8, MSOP-8, SO-8	100mA output, MSOP package, low power shutdown mode
TC1142*	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TC7660	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 10	180	20	TC7660EV	DIP-8, SO-8	
TC7660H	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 10	1000	20	TC7660EV	DIP-8, SO-8	120kHz oscillator
TC7660S	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 12	160	20	TC7660EV	DIP-8, SO-8	
TC7662A	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	3 → 18	200	40	TC7660EV	DIP-8	
TC7662B	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 15	160	20	TC7660EV	DIP-8, SO-8	
TCM680	$V_{\text{OUT}} = \pm 2V_{\text{IN}}$	1.5 → 5.5	1000	$\pm 10$	TC7660EV	DIP-8, SO-8	Generates $\pm 6V$ from +3V or $\pm 10V$ from +5V
TCM828	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 5.5	90	25		SOT-23A-5	SOT-23-5 package. 12kHz oscillator
TCM829	$V_{\text{OUT}} = -V_{\text{IN}}$ or $V_{\text{OUT}} = 2V_{\text{IN}}$	1.5 → 5.5	260	25		SOT-23A-5	SOT-23-5 package. 35kHz oscillator
TCM850	$V_{\text{OUT}} = -4.1V$ or Adjustable	5 → 10	2000	5	TCM850EV	SO-8	Regulated GaAs FET Supply, low noise, 1 $\mu\text{A}$ shutdown
TCM851	$V_{\text{OUT}} = -4.1V$ or Adjustable	5 → 10	2000	5	TCM850EV	SO-8	Regulated GaAs FET Supply, low noise, 1 $\mu\text{A}$ shutdown
TCM852	$V_{\text{OUT}} = -4.1V$ or Adjustable	5 → 10	2000	5	TCM850EV	SO-8	Regulated GaAs FET Supply, low noise, 1 $\mu\text{A}$ shutdown
TCM853	$V_{\text{OUT}} = -4.1V$ or Adjustable	5 → 10	2000	5	TCM850EV	SO-8	Regulated GaAs FET Supply, low noise, 1 $\mu\text{A}$ shutdown

**NOTES:** \*\* Measured at  $V_{\text{DD}} = 5.0\text{V}$  at  $25^{\circ}\text{C}$  and no load.

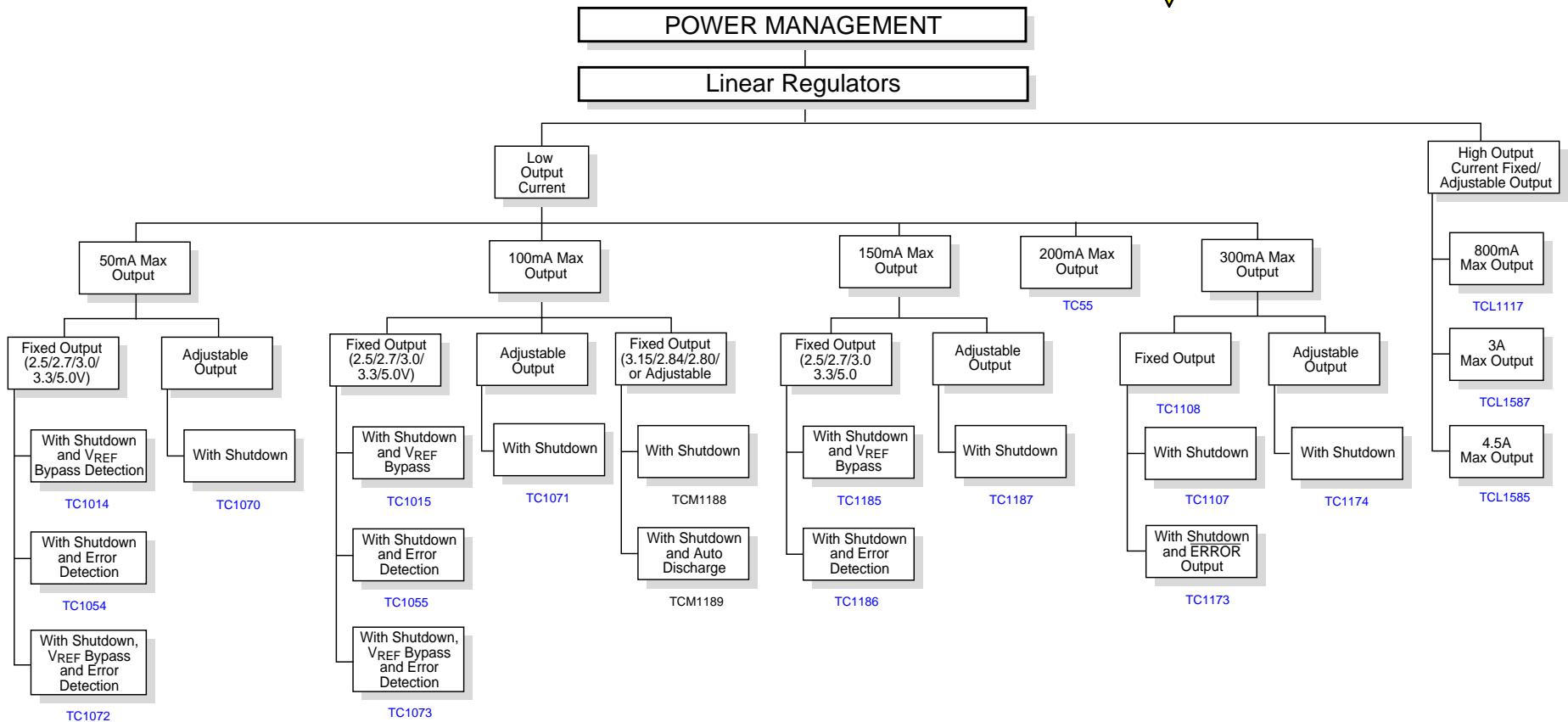
\* Contact factory for availability

## PWM CONTROLLERS

TelCom's BiCMOS and CMOS PWMs are lower power replacements for industry standard converters. These devices feature wider operating frequency range, lower supply current, and better operation over-temperature than their bipolar counterparts.

Part #	Current/Voltage Mode	Input Voltage Range (V)	Quiescent Current (mA)	Max Freq. (kHz)
TC170	Current	8 → 16	3.8	200
TC18/28/38C43	Current	8 → 15	2.0	500
TC18/28/38C46	Current	8 → 18	2.5	500
TC25/35C25	Voltage	8 → 18	3.0	1000

# Power Management



## LINEAR REGULATORS

## Low Output Current (&lt;500mA) Linear Regulators

TelCom's CMOS LDO family supercedes a wide variety of popular bipolar regulators, delivering superior performance at lower supply current levels. They have the highest ripple rejection (54db typical) of any comparable CMOS LDO available. Additional functions (such as an out-of-regulation [ERROR] output and shutdown control input) simplify system power management.

Part #	Fixed/ Adjustable	Output Voltages (V)	Max Output Current (mA)	Max Input Voltage (V)	Active Supply Current (Typ $\mu$ A)	SHDN Current (Max $\mu$ A)	$V_{DROPOUT}$ @ Max $I_{OUT}$ (Typ mV)	Output Voltage Accuracy (Typ %)	EVAL Kit	Package Options	Features
TC55	Fixed	2.5, 2.7, 3.0, 3.3, 5.0 (Custom: 2.1V to 6.0V in 0.1V steps)	250	12	3	—	300	$\pm 0.5$	TC1015EV*	SOT-23A-3, SOT-89-3, TO-92	Optional $\pm 1\%$ Tolerance
TC1014	Fixed	2.5, 2.7, 2.85, 3.0, 3.3, 5.0**	50	6.5	50	0.5	85	$\pm 0.5$	TC1015EV*	SOT-23A-5	Shutdown, Reference Bypass Inputs
TC1015	Fixed	2.5, 2.7, 2.85, 3.0, 3.3, 5.0**	100	6.5	50	0.5	180	$\pm 0.5$	TC1015EV*	SOT-23A-5	Shutdown, Reference Bypass Inputs
TC1054	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	50	6.5	50	0.5	85	$\pm 0.5$	TC1015EV*	SOT-23A-5	Shutdown Input, <u>ERROR</u> Output
TC1055	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	100	6.5	50	0.5	180	$\pm 0.5$	TC1015EV*	SOT-23A-5	Shutdown Input, <u>ERROR</u> Output
TC1070	Adjustable	$2.2 \rightarrow V_{IN}$	50	6.5	50	0.5	85	—	TC1015EV*	SOT-23A-5	Shutdown Input
TC1071	Adjustable	$2.2 \rightarrow V_{IN}$	100	6.5	50	0.5	180	—	TC1015EV*	SOT-23A-5	Shutdown Input
TC1072	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	50	6.5	50	0.5	85	$\pm 0.5$	TC1015EV*	SOT-23A-6	Shutdown, Reference Bypass Inputs, Error Output
TC1073	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	100	6.5	50	0.5	180	$\pm 0.5$	TC1015EV*	SOT-23A-6	Shutdown, Reference Bypass Inputs, Error Output
TC1107	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	300	6.5	50	0.5	175	$\pm 0.5$	TC1015EV*	MSOP-8, SO-8	Shutdown Input
TC1108	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	300	6.5	50	—	175	$\pm 0.5$	TC1015EV*	SOT-223	
TC1173*	Fixed	2.5, 2.7, 3.0, 3.3, 5.0**	300	6.5	50	0.5	175	$\pm 0.5$	TC1015EV*	MSOP-8, SO-8	Shutdown Input, Reference Bypass Inputs, <u>ERROR</u> Output
TC1174*	Adjustable	$2.2 \rightarrow V_{IN}$	300	6.5	50	0.5	175	—	TC1015EV*	MSOP-8, SO-8	Shutdown Input, Reference Bypass Inputs, <u>ERROR</u> Output
TC1185*	Fixed	2.5, 2.7, 3.0, 3.3, 5.0	150	6.5	50	0.5	270	$\pm 0.5$	TC1015EV*	SOT-23A-5	Shutdown Reference Bypass Inputs
TC1186*	Fixed	2.5, 2.7, 3.0, 3.3, 5.0	150	6.5	50	0.5	270	$\pm 0.5$	TC1015EV*	SOT-23A-5	Shutdown Input, <u>ERROR</u> Output
TC1187*	Adjustable	2.5, 2.7, 3.0, 3.3, 5.0	150	6.5	50	0.5	270	$\pm 0.5$	TC1015EV*	SOT-23A-5	Adjustable CMOS LDO with Shutdown
TCM1188*	Fixed or Adj.	3.15, 2.84, 2.80	100	5.5	50	0.5	120	2.8 - 3.15	—	SOT-23A-5	Low Dropout Linear Regulators
TCM1189*	Fixed or Adj.	3.15, 2.84, 2.80	100	5.5	50	0.5	120	2.8 - 3.15	—	SOT-23A-5	Low Dropout Linear Regulators

NOTES: \*Contact factory for availability.

\*\*Custom voltages available. Contact factory for information.

# Power Management

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## High Output Current (>500mA) Linear Regulators

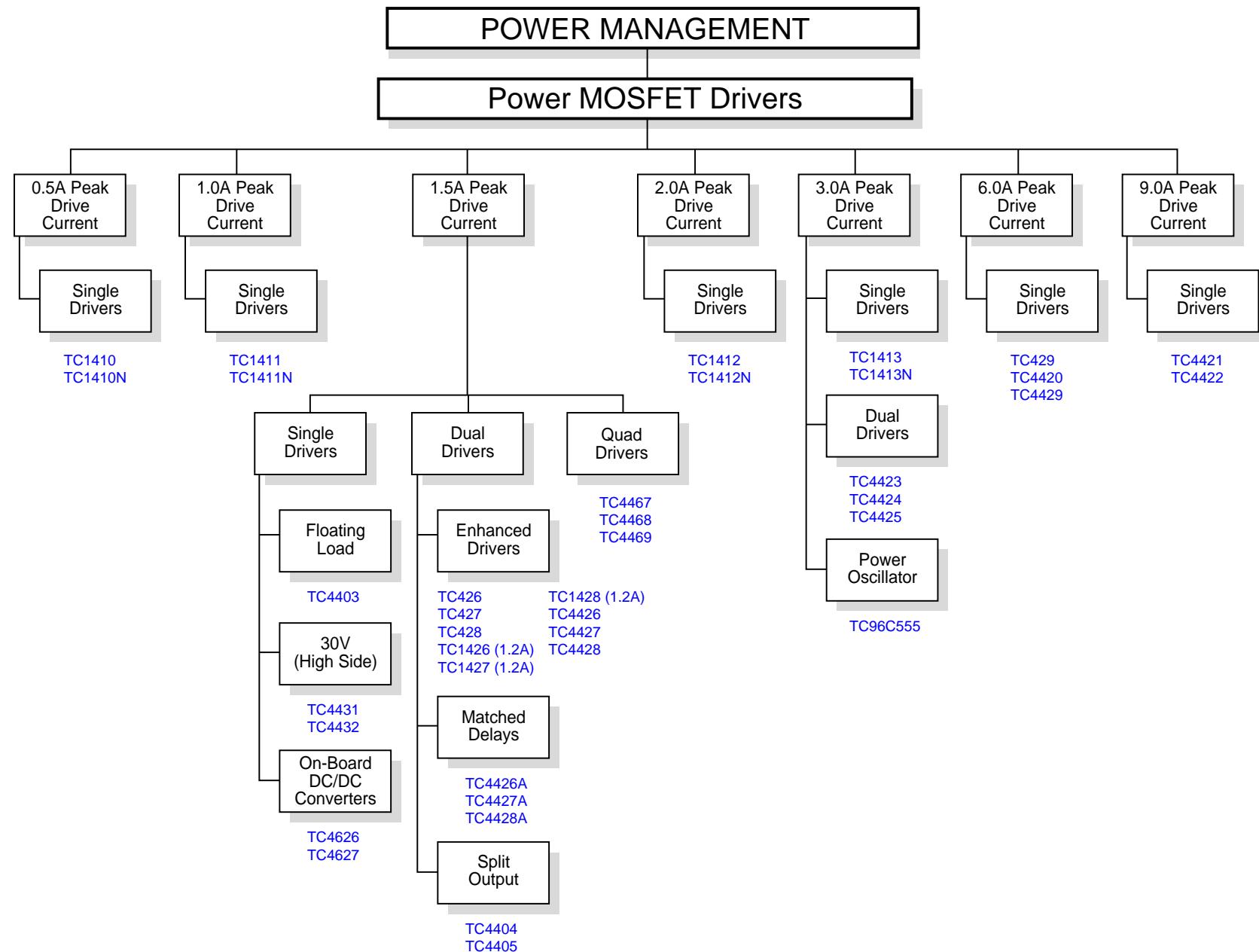
TelCom's high current bipolar regulators are designed specifically for Pentium™ and Pentium Pro™ CPU supplies and system GTL bus terminators. All devices feature fast transient response, low dropout voltage, and are available in both fixed and adjustable voltage options. All devices have built-in short circuit and over-temperature protection.

Part #	Output Voltages (V)	Max Output Current (A)	Max Input Voltage (V)	Active Supply Current (Max mA)	V <sub>DROPOUT</sub> @ Max I <sub>OUT</sub> (V)	Line Reg. (Max %)	Load Reg. (Max %)	Output Voltage Accuracy (%)	EVAL Kit	Package Option
TCL1117	2.85, 3.3, 5.0, Adj.	0.800	15*	10	1.2	0.2	0.4	±1	TCL1585EV***	DDPAK-3, SOT-223-3
TCL1585	3.3, Adj.	4.6	7	13	1.4	0.2	0.3	±2	TCL1585EV***	DDPAK-3, TO-220-3
TCL1587	1.5, 3.3, Adj.	3	7	13	1.3	0.2	0.3	±2**	TCL1585EV***	DDPAK-3, TO-220-3

**NOTES:** \* Maximum input voltage for TCL1117-2.85V is 10V.

\*\* Output accuracy values shown are for 3.3V versions. Output accuracy for 1.5V versions is ±10%. Output accuracy spec does not apply to adjustable versions.

\*\*\* Contact factory for availability.



# Power Management

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## POWER MOSFET DRIVERS

Driving MOSFETs has never been easier, nor more efficient! TelCom's Power MOSFET Drivers provide high slew rate, rail-to-rail output signal drive from TTL level-compatible input signals. Unlike discrete driver circuits, TelCom's integrated drivers deliver consistent results in less board space ... and a lower installed cost! Unlike many competitive devices, TelCom's drivers are virtually latch-up proof: they can absorb as much as 0.5A of reverse current into their output without damage or upset. These drivers are available in a wide range of peak output currents and topologies.

Part #	Configuration	Peak Output Current (A)	Output Resistance $R_H/R_L$ (Max $\Omega$ @ 25°C)	Max Supply Voltage (V)	Input/Output Delay ( $t_{D1}, t_{D2}$ ) <sup>*</sup> (nsec)	Package Options
TC96C555	Power Oscillator	3	5/5	18	180/140	DIP-8, SO-8 (W)
TC426	Dual, Inverting	1.5	15/10	18	50/75	DIP-8, SO-8
TC427	Dual, Non-Inverting	1.5	15/10	18	50/75	DIP-8, SO-8
TC428	Dual, Inverting and Non-Inverting	1.5	15/10	18	50/75	DIP-8, SO-8
TC429	Single, Inverting	6	2.5/2.5	18	53/60	DIP-8
TC1410	Single, Inverting	0.5	22/22	16	30/30	DIP-8, SO-8
TC1410N	Single, Non-Inverting	0.5	22/22	16	30/30	DIP-8, SO-8
TC1411	Single, Inverting	1	11/11	16	30/30	DIP-8, SO-8
TC1411N	Single, Non-Inverting	1	11/11	16	30/30	DIP-8, SO-8
TC1412	Single, Inverting	2	6/6	16	35/35	DIP-8, SO-8
TC1412N	Single, Non-Inverting	2	6/6	16	35/35	DIP-8, SO-8
TC1413	Single, Inverting	3	4/4	16	35/35	DIP-8, SO-8
TC1413N	Single, Non-Inverting	3	4/4	16	35/35	DIP-8, SO-8
TC1426	Dual, Inverting	1.2	18/18	16	75/75	DIP-8, SO-8
TC1427	Dual, Non-Inverting	1.2	18/18	16	75/75	DIP-8, SO-8
TC1428	Dual, Inverting and Non-Inverting	1.2	18/18	16	75/75	DIP-8, SO-8
TC4403	Single, Non-Inverting Floating Load Driver	3	5/5	18	33/38	DIP-8
TC4404	Dual, Inverting	1.5	10/10	18	15/32	DIP-8, SO-8
TC4405	Dual, Non-Inverting	1.5	10/10	18	15/32	DIP-8, SO-8
TC4420	Single, Non-Inverting	6	2.8/2.5	18	55/55	DIP-8, SO-8, TO-220-5
TC4421	Single, Inverting	9	1.4(typ)/1.7	18	30/33	DIP-8, TO-220-5
TC4422	Single, Non-Inverting	9	1.4(typ)/1.7	18	30/33	DIP-8, TO-220-5
TC4423	Dual, Inverting	3	5/5	18	33/38	DIP-8, SO-16 (W)
TC4424	Dual, Non-Inverting	3	5/5	18	33/38	DIP-8, SO-16 (W)
TC4425	Dual, Inverting and Non-Inverting	3	5/5	18	33/38	DIP-8, SO-16 (W)
TC4426	Dual, Inverting	1.5	10/10	18	20/40	DIP-8, SO-8
TC4426A	Dual, Inverting	1.5	9/9	18	30/30	DIP-8, SO-8

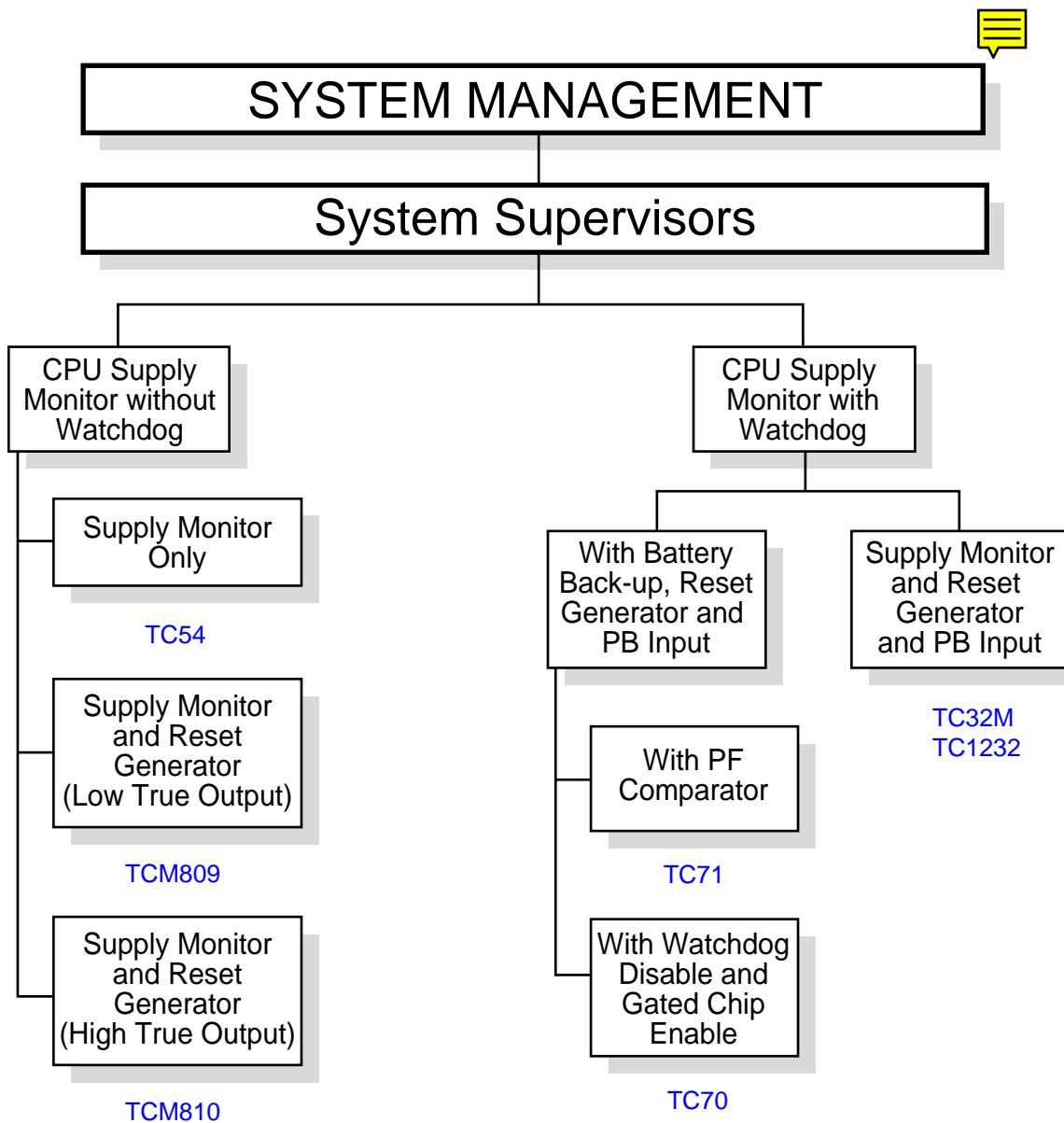
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## POWER MOSFET DRIVERS (CONT.)

Part #	Configuration	Peak Output Current (A)	Output Resistance $R_H/R_L$ (Max $\Omega$ @ 25°C)	Max Supply Voltage (V)	Input/Output Delay ( $t_{D1}, t_{D2}$ ) <sup>*</sup> (nsec)	Package Options
TC4427	Dual, Non-Inverting	1.5	10/10	18	20/40	DIP-8, SO-8
TC4427A	Dual, Non-Inverting	1.5	9/9	18	30/30	DIP-8, SO-8
TC4428	Dual, Inverting and Non-Inverting	1.5	10/10	18	20/40	DIP-8, SO-8
TC4428A	Dual, Inverting and Non-Inverting	1.5	9/9	18	30/30	DIP-8, SO-8
TC4429	Single, Inverting	6	2.8/2.5	18	55/55	DIP-8, SO-8, TO-220-5
TC4431	Single, Inverting	1.5	10/10	30	62/78	DIP-8, SO-8
TC4432	Single, Non-Inverting	1.5	10/10	30	62/78	DIP-8, SO-8
TC4467	Quad, Inverting	1.2	15/15	18	40/40	DIP-14, SO-16 (W)
TC4468	Quad, Non-Inverting	1.2	15/15	18	40/40	DIP-14, SO-16 (W)
TC4469	Quad, Non-Inverting	1.2	15/15	18	40/40	DIP-14, SO-16 (W)
TC4626	Single, Inverting	1.5	15/10	6	35/45	DIP-8, SO-16 (W)
TC4627	Single, Non-Inverting	1.5	15/10	6	35/45	DIP-8, SO-16 (W)

NOTES: \*  $t_{D1}$  = delay time from input low-to-high transition to output transition.  $t_{D2}$  = delay time from input high-to-low transition to output transition.

# System Management



## SYSTEM SUPERVISORS

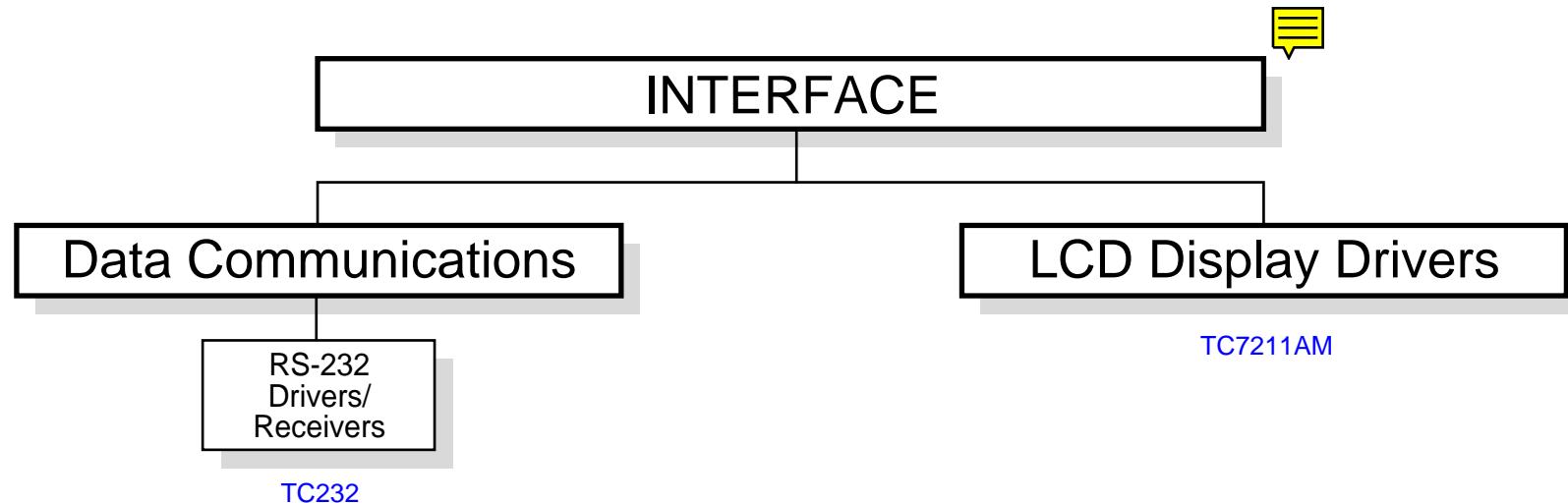
TelCom's cost-effective system supervisors safeguard processor sanity and provide other critical system monitoring functions such as battery back-up control for CMOS SRAM and RTC's.

Part #	Nominal Reset Threshold (V)	Min Reset Pulse Width (msec)	Supply Monitor	Active LOW Reset	Output Valid to 1.0V	Watchdog Time-out Period (Typ. msec)	Supply Current (Typ. mA)	PB Reset	Watch-dog	WD Disable	PF Comparator	Battery Switch-over	Gated Chip Enable	Write Protect Output	Pkgs.
TC32M	4.50	500	X	X	X	700	0.05	X	X						SOT-223, TO-92
TC54*	*	—	X	X	X										SOT-23A-3 SOT-89-3, TO-92
TC70	4.49	500	X	X	X	700	2	X	X	X		X	X		DIP-8, SO-8
TC71	4.49	500	X	X	X	700	2	X	X		X	X		X	DIP-8, SO-8
TC1232	4.37/4.62	250	X	X	X	150/600/1200	0.05	X	X						DIP-8, SO-8 SO-16 (W)
TCM809	4.65/4.40/3.08/2.93/2.63	140	X	X	X		0.02								SOT-23B-3
TCM810	4.65/4.40/3.08/2.93/2.63	140	X		X		0.02								SOT-23B-3

NOTES: \* The TC54V is available in trip point voltages from 2.1V to 6.0V in 100mV increments.

# Interface

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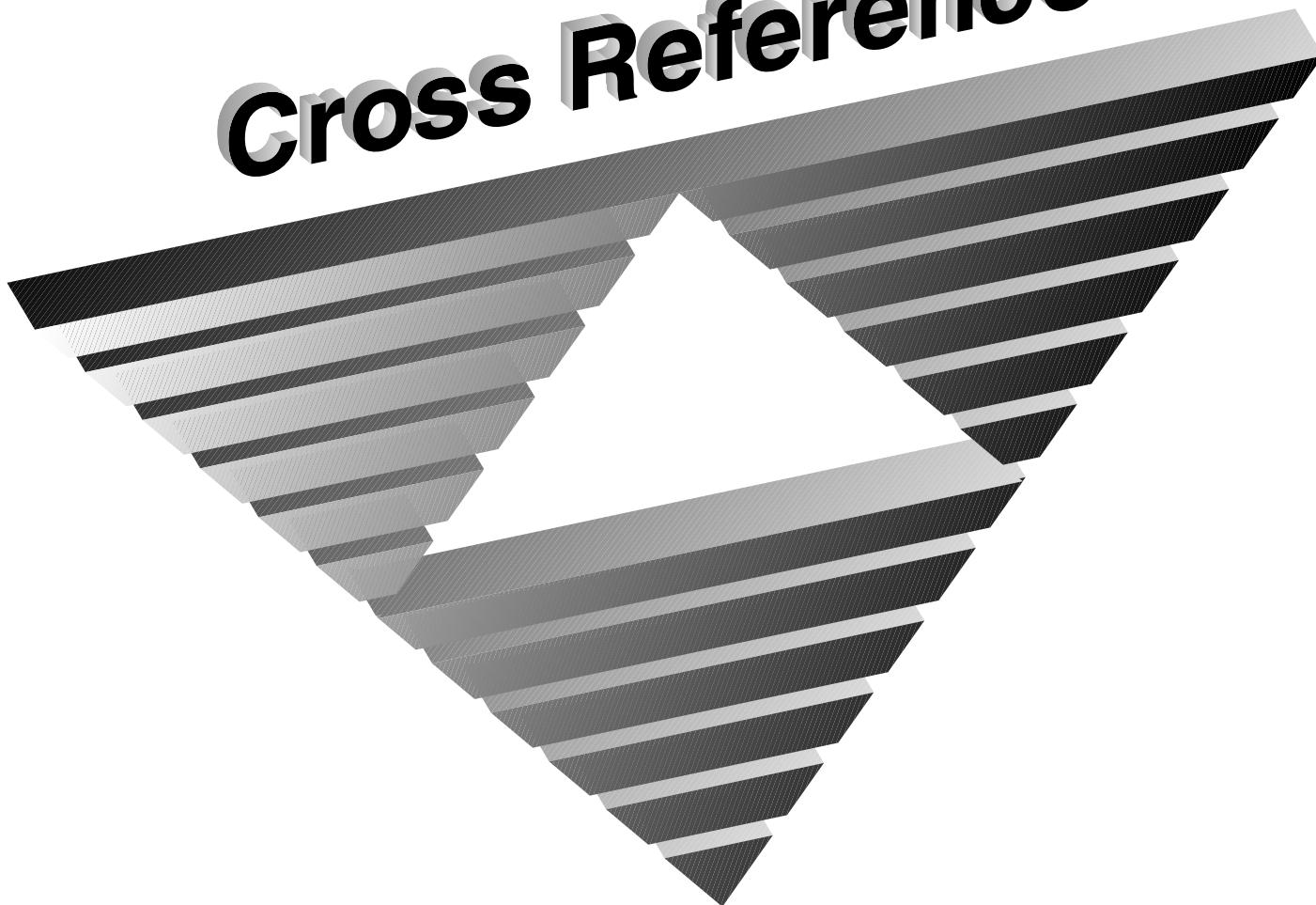
## DATA COMMUNICATIONS

Part #	External Capacitors	Receive Channels	Transmit Channels	Power Supply Voltage (V)	Supply Current (mA)	Low Power Shutdown	Package
TC232	4	2	2	+5	5	No	DIP-16, SO-16 (W)

## LCD DISPLAY DRIVERS

Part #	Power Supply Voltage (V)	Input Data Format	Digits (No.)	Display Type	Segments (No.)	Backplane Driver	Package
TC7211AM	+5	Binary, BCD	4	LCD	7	On-Chip	DIP-40

# Cross Reference



# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Analog Devices</b>			
AD232AN	TC232EPE	Direct	RS-232 Interface
AD232AR	TC232EOE	Direct	RS-232 Interface
AD232JN	TC232CPE	Direct	RS-232 Interface
AD232JR	TC232COE	Direct	RS-232 Interface
AD232SQ	TC232MJE	Direct	RS-232 Interface
AD589JH	TC04BCZM	Functional	1.2V Voltage Reference
AD589JR	TC04BCOA	Functional	1.2V Voltage Reference
AD589KH	TC04BCZM	Functional	1.2V Voltage Reference
AD589SH	TC04BMRM	Functional	1.2V Voltage Reference
TMP35FT9	TC03VZB	Direct	Temperature-to-Voltage converter
TMP35GRT	TC03VNB	Functional	Temperature-to-Voltage converter
TMP35GT9	TC03VZB	Direct	Temperature-to-Voltage converter
TMP36FT9	TC02VZB	Direct	Temperature-to-Voltage converter
TMP36GRT	TC02VNB	Functional	Temperature-to-Voltage converter
TMP36GT9	TC02VZB	Direct	Temperature-to-Voltage converter
<b>Cherry Semiconductor</b>			
CS1843AJ	TC18C43MJA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
CS2843AJ	TC28C43IOE	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
CS3843AD	TC38C43COE	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
CS3843N	TC38C43CPA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
<b>Dallas Semiconductor</b>			
DS232	TC232CPE	Direct	RS-232 Interface
DS1228	TC232CPE	Direct	RS-232 Interface
DS1232LP	TC1232CPA	Direct	Voltage Reset Monitor
DS1232LPS-2	TC1232COA	Functional	Supply Voltage Monitor, <u>RESET</u> Generator, Watchdog Timer, PB Input
DS1288S	TC232COE	Direct	RS-232 Interface
DS1621S	TCN75MUA	Functional	2 Wire Serial Temperature Sensor
DS1810-5	TCM809LECB	Functional	3 Pin Processor Supply Monitor <u>RESET</u> Generator
DS1810-10	TCM809MECB	Functional	3 Pin Processor Supply Monitor <u>RESET</u> Generator
DS1810-15	TCM809JECB	Functional	3 Pin Processor Supply Monitor <u>RESET</u> Generator
DS1812-5	TCM810LECB	Functional	3 Pin Processor Supply Monitor <u>RESET</u> Generator

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Dallas Semiconductor (Continued)</b>			
DS1812-10	TCM810MECB	Functional	3 Pin Processor Supply Monitor <del>RESET</del> Generator
DS1815-10	TCM810SECB	Functional	3 Pin Processor Supply Monitor <del>RESET</del> Generator
DS1815-20	TCM810RECB	Functional	3 Pin Processor Supply Monitor <del>RESET</del> Generator
DS1817-10	TCM809SECB	Functional	3 Pin Processor Supply Monitor <del>RESET</del> Generator
DS1817-20	TCM809RECB	Functional	3 Pin Processor Supply Monitor <del>RESET</del> Generator
<b>Datel</b>			
ADC-7109	TC7109CPL	Direct	12-Bit Plus Sign ADC
AM-7650-1	TC7650CPA	Direct	Low-Vos Op Amp
VFQ-1C	TC9400CPD	Direct	VF/FV Converter (0.05% Linearity)
VFQ-2C	TC9401CPD	Direct	VF/FV Co1nverter (0.01% Linearity)
VFQ-3C	TC9402CPD	Direct	VF/FV Converter (0.25% Linearity)
VI-7660-1	TC7660CPA	Direct	DC-to DC Converter
<b>Harris/Intersil</b>			
ICL232CBE	TC232COE	Direct	RS-232 Interface
ICL232CBET	TC232COET/R	Direct	RS-232 Interface
ICL232CPE	TC232CPE	Direct	RS-232 Interface
ICL232IBE	TC232EOE	Direct	RS-232 Interface
ICL232IJE	TC232IJE	Direct	RS-232 Interface
ICL232MJE	TC232MJE	Direct	RS-232 Interface
ICL7106CJL	TC7106CPL	Functional	3-1/2 Digit ADC, LCD: Not Available in CerDIP Package
ICL7106CM44	TC7106CKW	Direct	3-1/2 Digit ADC, LCD
ICL7106CPL	TC7106CPL	Direct	3-1/2 Digit ADC, LCD
ICL7106RCPL	TC7106RCPL	Direct	3-1/2 Digit ADC, LCD
ICL7107CJL	TC7107CPL	Functional	3-1/2 Digit ADC, LED: Not Available in CerDIP Package
ICL7107CM44	TC7107CKW	Direct	3-1/2 Digit ADC, LED
ICL7107CPL	TC7107CPL	Direct	3-1/2 Digit ADC, LED
ICL7107CM44	TC7107CKW	Direct	3-1/2 Digit ADC, LED
ICL7107CPL	TC7107CPL	Direct	3-1/2 Digit ADC, LED
ICL7107RCPL	TC7107RCPL	Direct	3-1/2 Digit ADC, LED
ICL7109ACPL	TC7109ACPL	Direct	12-Bit Plus Sign Fast-Recovery ADC

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Harris/Intersil (Continued)</b>			
ICL7109CPL	TC7109CPL	Direct	12-Bit Plus Sign ADC
ICL7109IJL	TC7109IJL	Direct	12-Bit Plus Sign ADC
ICL7109MJL	TC7109IJL	Functional	12-Bit Plus Sign ADC: Not Available in MIL Temperature Range
ICL7109MJL	TC7109IJL	Functional	12-Bit Plus Sign ADC: Not Available in MIL Temperature Range
ICL7116CM44	TC7116CKW	Direct	3-1/2 Digit ADC with Display Hold, LCD
ICL7116CPL	TC7116CPL	Direct	3-1/2 Digit ADC with Display Hold, LCD
ICL7116RCPL	TC7116RCPL	Direct	3-1/2 Digit ADC with Display Hold, LCD
ICL7117CPL	TC7117CPL	Direct	3-1/2 Digit ADC with Display Hold, LED
ICL7117RCPL	TC7117RCPL	Direct	3-1/2 Digit ADC with Display Hold, LED
ICL7126CPL	TC7126CPL	Direct	Low-Power 3-1/2 Digit ADC, LCD
ICL7126RCPL	TC7126RCPL	Direct	Low-Power 3-1/2 Digit ADC, LCD
ICL7129CM44	TC7129CKW	Direct	4-1/2 Digit ADC, LCD
ICL7129CM44T	TC7129CKWT/R	Direct	4-1/2 Digit ADC, LCD
ICL7129CPL	TC7129CPL	Direct	4-1/2 Digit ADC, LCD
ICL7129RCPL	TC7129RCPL	Direct	4-1/2 Digit ADC, LCD
ICL7135CJI	TC7135CPI	Functional	4-1/2 Digit ADC with Multiplexed BCD Output: Not Available in CerDIP Pkg.
ICL7135CJI	TC835CPI (Upgrade)	Functional	4-1/2 Digit ADC with Multiplexed BCD Output: Not Available in CerDIP Pkg.
ICL7135CPI	TC7135CPI	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
ICL7135CPI	TC835CPI (Upgrade)	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
ICL7136CM44	TC7136CKW	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7136CM44T	TC7136CKWT/R	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7136CPL	TC7136CPL	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7136RCPL	TC7136RCPL	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7650CPD	TC7650CPD	Direct	Low-V <sub>OS</sub> Op Amp
ICL7650IJD	TC7650IJD	Direct	Low-V <sub>OS</sub> Op Amp
ICL7652CPD	TC7652CPD	Direct	Low-V <sub>OS</sub> Op Amp
ICL7660CBA	TC7660COA	Direct	DC-to-DC Converter
ICL7660CPA	TC7660CPA	Direct	DC-to-DC Converter

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Harris/Intersil (Continued)</b>			
ICL7660SCBA	TC7660SCOA	Direct	DC-to-DC Converter
ICL7660SCPA	TC7660SCPA	Direct	DC-to-DC with Boost Pin
ICL7660SCPA	TC7660SCPA	Direct	DC-to-DC Converter
ICL7660SIBA	TC7660SEO A	Functional	DC-to-DC Converter
ICL7660SIPA	TC7660SEPA	Functional	DC-to-DC Converter
ICL7662CPA	TC7662ACPA	Direct	High-Voltage DC-to-DC Converter
ICL7667CBA	TC426COA	Direct	Dual-Inverting Power MOSFET Driver
ICL7667CJA	TC426IJA	Direct	Dual-Inverting Power MOSFET Driver
ICL7667CPA	TC426CPA	Direct	Dual-Inverting Power MOSFET Driver
ICL7667MJA	TC426MJA	Direct	Dual-Inverting Power MOSFET Driver
ICM7211AMIPL	TC7211AMIPL	Direct	$\mu$ P 4-Digit LCD Driver
<b>Linear Technology</b>			
LM185H-1.2	TC04AMRM	Functional	1.2V, 50ppm Reference
LM185H-2.5	TC05AMRM	Functional	2.5V, 50ppm Reference
LM385BZ-1.2	LM385BCZB-1.2	Direct	1.2V, 50ppm Reference
LM385BZ-2.5	LM385BCZB-2.5	Direct	2.5V, 50ppm Reference
LM385H-1.2	LM385BCZB-1.2	Direct	1.2V, 50ppm Reference
LM385H-2.5	LM385BCZB-2.5	Direct	2.5V, 50ppm Reference
LM385Z-1.2	LM385EZB-1.2	Direct	1.2V, 50ppm Reference
LM385Z-2.5	LM385EZB-2.5	Direct	2.5V, 50ppm Reference
LT1026CN	TCM680COA	Functional	+5V to $\pm$ 10V Converter
LT1081CJ	TC232IJE	Direct	RS-232 Interface
LT1081CN	TC232CPE	Direct	RS-232 Interface
LT1081CS	TC232COE	Direct	RS-232 Interface
LT1081MJ	TC232MJE	Direct	RS-232 Interface
LT1085CM	TCL1587CEB	Direct	3A Low Dropout, Fast Response Regulator
LT1585CT	TCL1587CAB	Direct	3A Low Dropout, Fast Response Regulator

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Linear Technology (Continued)</b>			
LT1117CM	TCL1117CEB	Direct	800mA Low Dropout Regulator
LT1117CM-2.85	TCL1117-2.85CEB	Direct	800mA Low Dropout Regulator
LT1117CM-3.3	TCL1117-3.3CEB	Direct	800mA Low Dropout Regulator
LT1117CM-5	TCL1117-5.0CEB	Direct	800mA Low Dropout Regulator
LT1117CST	TCL1117CDB	Direct	800mA Low Dropout Regulator
LT1117CST-2.85	TCL1117-2.85CDB	Direct	800mA Low Drop Regulator
LT1117CST-3.3	TCL1117-3.3CDB	Direct	800mA Low Drop Regulator
LT1117CST-5	TCL1117-5.0CDB	Direct	800mA Low Drop Regulator
LT1580CT	TCL1580CAT	Direct	7A Very Low Dropout Regulator
LT1580CT7-2.5	TCL1580-2.5CAK	Direct	7A Very Low Dropout Regulator
LT1585CM	TCL1585CEB	Direct	4.6A Low Dropout, Fast Response Regulator
LT1585CM-3.3	TCL1585-3.3CEB	Direct	4.6A Low Dropout, Fast Response Regulator
LT1585CT	TCL1585CAB	Direct	4.6A Low Dropout, Fast Response Regulator
LT1585CT-3.3	TCL1585-3.3CAB	Direct	4.6A Low Dropout, Fast Response Regulator
LT1587CM	TCL1587CEB	Direct	3A Low Dropout, Fast Response Regulator
LT1587CM-1.5	TCL1587-1.5CEB	Direct	3A Low Dropout, Fast Response Regulator
LT1587CM-3.3	TCL1587-3.3CEB	Direct	3A Low Dropout, Fast Response Regulator
LT1587CT	TCL1587CAB	Direct	3A Low Dropout, Fast Response Regulator
LT1587CT-1.5	TCL1587-1.5CAB	Direct	3A Low Dropout, Fast Response Regulator
LT1587CT-3.3	TCL1587-3.3CAB	Direct	3A Low Dropout, Fast Response Regulator
LTC690CN8	TC71CPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC690CS8	TC71COA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC690IN8	TC71EPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC690IS8	TC71EOA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC692CN8	TC71CPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC692CS8	TC71COA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC692IN8	TC71EPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC692IS8	TC71EOA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Linear Technology (Continued)</b>			
LTC694CN8	TC71CPA	Functional	µP Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC694IN8	TC71EPA	Functional	µP Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
LTC1044CN8	TC1044SCPA	Direct	DC-to-DC Converter
LTC1044CS8	TC7660SCOA	Direct	DC-to-DC Converter
LTC1044MJ8	TC1044SCOA	Functional	DC-to-DC Converter
LTC1049N8/S8	TC911CPA/COA	Functional	Low-V <sub>OS</sub> Op Amp
LTC1050N8/S8	TC911CPA/COA	Functional	Low-V <sub>OS</sub> Op Amp
LTC1051N8/S8	TC913CPA/COA	Functional	Low-V <sub>OS</sub> Dual Op Amp
LTC1052CJ	TC7652IJD	Direct	Low Noise Chopper/Amplifier
LTC1052CJ8	TC7652IJA	Direct	Low Noise Chopper/Amplifier
LTC1052CPD	TC7652CPD	Direct	Low Noise Chopper/Amplifier
LTC0152CN8	TC7652CPA	Direct	Low Noise Chopper/Amplifier
LTC1054CN	TC962CPA	Functional	High Output Power DC-to-DC Converter
LTC1054MJ	TC962MJA	Functional	High Output Power DC-to-DC Converter
LTC1150N8	TC901CPA	Functional	Low-V <sub>OS</sub> Op Amp, ±15V Supply
LTC1150S8	TC901COA	Functional	Low-V <sub>OS</sub> Op Amp, ±15V Supply
UC1846J	TC18C46MJE	Functional	Current-Mode CMOS SMPS Controller
UC3846J	TC38C46COE	Functional	Current-Mode CMOS SMPS Controller
UC3846N	TC170CPE	Functional	Current-Mode CMOS SMPS Controller
<b>Linfinity Micro Electronics</b>			
LX8585-00CDD	TCL1585CEB	Direct	4.6A Low Dropout, Fast Response Regulator
LX8585-00CP	TCL1585CAB	Direct	4.6A Low Dropout, Fast Response Regulator
LX8587-00CDD	TCL1587CAB	Direct	3A Low Dropout, Fast Response Regulator
LX8587-00CP	TCL1587CAB	Direct	3A Low Dropout, Fast Response Regulator
LX8587A-00CDD	TCL1587CEB	Direct	3A Low Dropout, Fast Response Regulator
LX8587A-00CP	TCL1587CEB	Direct	3A Low Dropout, Fast Response Regulator
SG1626Y	TC426MJA	Functional	Dual-Inverting Power MOSFET Driver
SG1846J	TC18C46MJE	Functional	Current-Mode CMOS SMPS Controller

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Linfinity Micro Electronics (Continued)</b>			
SG2525J	TC25C25EPE	Functional	Voltage-Mode PWM Controller
SG2626M	TC426IJA	Functional	Dual-Inverting Power MOSFET Driver
SG2846J	TC28C46EPE	Functional	Current-Mode CMOS SMPS Controller
SG3525J	TC35C25CPE	Functional	Voltage-Mode PWM Controller
SG3626M	TC426CPA	Functional	Dual-Inverting Power MOSFET Driver
SG3843N	TC38C43CPA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
SG3846DW	TC38C46COE	Functional	Current-Mode CMOS SMPS Controller
SG3846N	TC38C46CPE	Functional	Current-Mode CMOS SMPS Controller
<b>Maxim</b>			
ICL7106CJL	TC7106CPL	Direct	3-1/2 Digit ADC, LCD: Not Available in CerDIP Package
ICL7106CPL	TC7106CPL	Direct	3-1/2 Digit ADC, LCD
ICL7106CQH	TC7106CLW	Direct	3-1/2 Digit ADC, LCD
ICL7106RCPL	TC7106RCPL	Direct	3-1/2 Digit ADC, LCD
ICL7107CJL	TC7107CPL	Functional	3-1/2 Digit ADC, LED: Not Available in CerDIP Package
ICL7107CPL	TC7107CPL	Direct	3-1/2 Digit ADC, LED
ICL7107CQH	TC7107CLW	Direct	3-1/2 Digit ADC, LED
ICL7107RCPL	TC7107RCPL	Direct	3-1/2 Digit ADC, LED
ICL7109ACPL	TC7109ACPL	Direct	12-Bit Plus Sign ADC
ICL7109CPL	TC7109CPL	Direct	12-Bit Plus Sign ADC
ICL7109CQH	TC7109CLW	Direct	12-Bit Plus Sign ADC
ICL7109IJL	TC7109IJL	Direct	12-Bit Plus Sign ADC
ICL7109MJL	TC7109IJL	Functional	12-Bit Plus Sign ADC: Not Available in CerDIP Package
ICL7116CJL	TC7116CPL	Functional	3-1/2 Digit ADC with Display Hold, LCD: Not Available in CerDIP Package
ICL7116CPL	TC7116CPL	Direct	3-1/2 Digit ADC with Display Hold, LCD
ICL7116CQH	TC7116CLW	Direct	3-1/2 Digit ADC with Display Hold, LCD
ICL7116RCPL	TC7116RCPL	Direct	3-1/2 Digit ADC with Display Hold, LCD
ICL7117CJL	TC7117CPL	Functional	3-1/2 Digit ADC with Display Hold, LED: Not Available in CerDIP Package

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Maxim (Continued)</b>			
ICL7117CPL	TC7117CPL	Direct	3-1/2 Digit ADC with Display Hold, LED
ICL7117CQH	TC7117CLW	Direct	3-1/2 Digit ADC with Display Hold, LED
ICL7117RCPL	TC7117RCPL	Direct	3-1/2 Digit ADC with Display Hold, LED
ICL7126CJL	TC7126CPL	Functional	Low-Power 3-1/2 Digit ADC, LCD: Not Available in CerDIP Package
ICL7126CPL	TC7126CPL	Direct	Low-Power 3-1/2 Digit ADC, LCD
ICL7126CQH	TC7126CLW	Direct	Low-Power 3-1/2 Digit ADC, LCD
ICL7126IPL	TC7126CPL	Functional	Low-Power 3-1/2 Digit ADC, LCD: Not Available in CerDIP Package
ICL7126RCPL	TC7126RCPL	Direct	Low-Power 3-1/2 Digit ADC, LCD
ICL7129ACQH	TC7129CLW	Direct	4-1/2 Digit ADC, LCD
ICL7129CPL	TC7129CPL	Direct	4-1/2 Digit ADC, LCD
ICL7135CJI	TC7135CPI	Functional	4-1/2 Digit ADC with Multiplexed BCD Output: Not Available in CerDIP Package
ICL7135CJI	TC835CPI (Upgrade)	Functional	4-1/2 Digit ADC with Multiplexed BCD Output: Not Available in CerDIP Package
ICL7135CPI	TC7135CPI	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
ICL7135CPI	TC835CPI (Upgrade)	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
ICL7135CQI	TC7135CLI	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
ICL7135CQI	TC835CLI (Upgrade)	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
ICL7136CJL	TC7136CPL	Functional	Fast-Recovery 3-1/2 Digit ADC, LCD: Not Available in CerDIP Package
ICL7136CMH	TC7136CKW	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7136CPL	TC7136CPL	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7136CQH	TC7136CLW	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7136RCPL	TC7136RCPL	Direct	Fast-Recovery 3-1/2 Digit ADC, LCD
ICL7650BCPD	TC7650CPD	Functional	Low-Vos Op Amp
ICL7650BIJD	TC7650IJD	Functional	Low-Vos Op Amp
ICL7650CPD	TC7650CPD	Direct	Low-Vos Op Amp
ICL7650IJD	TC7650IJD	Direct	Low-Vos Op Amp
ICL7652CPA	TC7652ZCPA	Direct	Low Noise Chopper-Stabilized Amplifier
ICL7652CPD	TC7652CPD	Direct	Low-Vos Op Amp
ICL7652IJA	TC7652ZIJA	Direct	Low Noise Chopper-Stabilized Amplifier

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Maxim (Continued)</b>			
ICL7652IJD	TC7652IJD	Direct	Low-VOS Op Amp
ICL7660CBA	TC7660COA	Direct	DC-to-DC Converter
ICL7660CPA	TC7660CPA	Direct	DC-to-DC Converter
ICL7660CSA	TC7660COA	Direct	DC-to-DC Converter
ICL7660EPA	TC7660EOA	Direct	DC-to-DC Converter
ICL7660IJA	TC7660IJA	Direct	DC-to-DC Converter
ICL7660MJA	TC7660MJA	Direct	DC-to-DC Converter
ICL7662CPA	TC7662ACPA	Direct	High Voltage DC-to-DC Converter
ICM7211AMIPL	TC7211AMIPL	Direct	µP 4-Digit LCD Driver
MAX132	TC530CPJ	Functional	±17 Bit Dual Slope A/D Converter with Serial Port
MAX232CPE	TC232CPE	Direct	RS-232 Interface
MAX232CWE	TC232COE	Direct	RS-232 Interface
MAX232EPE	TC232EPE	Direct	RS-232 Interface
MAX232EWE	TC232EOE	Direct	RS-232 Interface
MAX232MJE	TC232MJE	Direct	RS-232 Interface
MAX626CPA	TC4426ACPA	Functional	Improved Speed and IDD
MAX626CPA	TC4426CPA	Direct	1.5A Dual Output Power Driver
MAX626CSA	TC4426ACOA	Functional	Improved Speed and IDD
MAX626CSA	TC4426COA	Direct	1.5A Dual Output Power Driver
MAX626MJA	TC4426MJA	Direct	1.5A Dual Output Power Driver
MAX627CPA	TC4427ACPA	Functional	Improved Speed and IDD
MAX627CPA	TC4427CPA	Direct	1.5A Dual Output Power Driver
MAX627CSA	TC4427ACOA	Functional	Improved Speed and IDD
MAX627CSA	TC4427COA	Direct	1.5A Dual Output Power Driver
MAX627MJA	TC4427MJA	Direct	1.5A Dual Output Power Driver
MAX628CPA	TC4428ACPA	Functional	Improved Speed and IDD
MAX628CPA	TC4428CPA	Direct	1.5A Dual Output Power Driver
MAX628CSA	TC4428ACOA	Functional	Improved Speed and IDD

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Maxim (Continued)</b>			
MAX628CSA	TC4428COA	Direct	1.5A Dual Output Power Driver
MAX628MJA	TC4428MJA	Direct	1.5A Dual Output Power Driver
MAX660CPA	TC660CPA	Direct	100mA Charge Pump DC-to-DC Voltage Converter
MAX660CSA	TC660COA	Direct	100mA Charge Pump DC-to-DC Voltage Converter
MAX660EPA	TC660EPA	Direct	100mA Charge Pump DC-to-DC Voltage Converter
MAX660ESA	TC660EOA	Direct	100mA Charge Pump DC-to-DC Voltage Converter
MAX680CPA	TCM680CPA	Direct	±5V to ±10V Voltage Converter
MAX680CSA	TCM680COA	Direct	±5V to ±10V Voltage Converter
MAX680EPA	TCM680EPA	Direct	±5V to ±10V Voltage Converter
MAX680ESA	TCM680EOA	Direct	±5V to ±10V Voltage Converter
MAX690ACPA	TC71CPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX690ACSA	TC71COA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX690AEPA	TC71EPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX690AES	TC71EOA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX690CPA	TC71CPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX690EPA	TC71EPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX692ACPA	TC71CPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX692ACSA	TC71COA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX692AEPA	TC71EPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX692AES	TC71EOA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX692CPA	TC71CPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX692EPA	TC71EPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX694CPA	TC71CPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX694EPA	TC71EPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX709	TC54VC	Functional	Voltage Detector
MAX805LCPA	TC71CPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX805LCSA	TC71COA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover
MAX805LEPA	TC71EPA	Functional	µP Supervisor: Vcc Monitor RESET Generator, PF Comp., Batt. Switchover

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Maxim (Continued)</b>			
MAX805LESA	TC71EOA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
MAX809JEUR-T	TCM809JENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX809LEUR-T	TCM809LENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX809MEUR-T	TCM809MENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX809REUR-T	TCM809RENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX809SEUR-T	TCM809SENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX809TEUR-T	TCM809TENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX810LEUR-T	TCM810LENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX810MEUR-T	TCM810MENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX810REUR-T	TCM810RENB	Direct	3 Pin Processor Supply Monitor RESET Generator (Active LOW Output)
MAX810TEUR-T	TCM810TENB	Direct	3 Pin processor Supply Monitor RESET Generator (Active LOW output)
MAX817LCPA	TC71CPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
MAX817LCSA	TC71COA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
MAX817LEPA	TC71EPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
MAX817LESA	TC71EOA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF Comp., Batt. Switchover
MAX818LCPA	TC70CPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF, Watchdog/Disable, Batt. Switchover
MAX818LCSA	TC70COA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF, Watchdog/Disable, Batt. Switchover
MAX818LEPA	TC70EPA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF, Watchdog/Disable, Batt. Switchover
MAX818LESA	TC70EOA	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, PF, Watchdog/Disable, Batt. Switchover
MAX823LEUK	TC32MEZB	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, Watchdog
MAX823MEUK	TC32MEZB	Functional	$\mu$ P Supervisor: V <sub>CC</sub> Monitor RESET Generator, Watchdog
MAX828EUK	TCM828ECT	Direct	Charge Pump in SOT-23A-5 Package
MAX829EUK	TCM829ECT	Direct	Charge Pump in SOT-23A-5 Package
MAX850CSA	TCM850COA	Direct	Regulated GaAs FET Bias Supply
MAX850ESA	TCM850EOA	Direct	Regulated GaAs FET Bias Supply
MAX851CSA	TCM851COA	Direct	Regulated GaAs FET Bias Supply
MAX851ESA	TCM851EOA	Direct	Regulated GaAs FET Bias Supply

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Maxim (Continued)</b>			
MAX852CSA	TCM852COA	Direct	Regulated GaAs FET Bias Supply
MAX852ESA	TCM852EOA	Direct	Regulated GaAs FET Bias Supply
MAX853CSA	TCM853COA	Direct	Regulated GaAs FET Bias Supply
MAX853ESA	TCM853EOA	Direct	Regulated GaAs FET Bias Supply
MAX860CSA	TC1121COA	Functional	50mA Charge Pump with SHUTDOWN
MAX860CUA	TC1121CUA	Functional	50mA Charge Pump with SHUTDOWN
MAX860ESA	TC1121ESA	Functional	50mA Charge Pump with SHUTDOWN
MAX860EUA	TC1121EUA	Functional	50mA Charge Pump with SHUTDOWN
MAX861CSA	TC1121COA	Functional	50mA Charge Pump with SHUTDOWN
MAX861CUA	TC1121CUA	Functional	50mA Charge Pump with SHUTDOWN
MAX861ESA	TC1121ESA	Functional	50mA Charge Pump with SHUTDOWN
MAX861EUA	TC1121EUA	Functional	50mA Charge Pump with SHUTDOWN
MAX1232CPA	TC1232CPA	Direct	Voltage Reset Monitor
MAX1232CSA	TC1232COA	Direct	Voltage Reset Monitor
MAX1232EPA	TC1232EPA	Direct	Voltage Reset Monitor
MAX1232ESA	TC1232EOA	Direct	Voltage Reset Monitor
MAX4420CPA	TC4420CPA	Direct	6A Power Driver
MAX4420CSA	TC4420COA	Direct	6A Power Driver
MAX4429CPA	TC4429CPA	Direct	6A Power Driver
MAX4429CSA	TC4429COA	Direct	6A Power Driver
MAX7129ACJL	TC7129CPL	Functional	4-1/2 Digit LCD Drive ADC: Not Available in CerDIP Package
MAX7129ACPL	TC7129CPL	Direct	4-1/2 Digit LCD Drive ADC
MAX7129ACQ	TC7129CLW	Direct	4-1/2 Digit LCD Drive ADC
MAX7129ARCPL	TC7129RCPL	Direct	4-1/2 Digit LCD Drive ADC
MAX8863REUK-T	TC1015ECT	Functional	100mA Low Dropout Regulator with SHUTDOWN
MAX8863SEUK-T	TC1015ECT	Functional	100mA Low Dropout Regulator with SHUTDOWN
MAX8863TEUK-T	TC1015ECT	Functional	100mA Low Dropout Regulator with SHUTDOWN

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Maxim (Continued)</b>			
MAX8864REUK-T	TC1015ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MAX8864SEUK-T	TC1015ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MAX8864TEUK-T	TC1015ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
TSC426CBA	TC426COA	Direct	1.5A Dual Output Power Driver
TSC426CPA	TC426CPA	Direct	1.5A Dual Output Power Driver
TSC426IJA	TC426IJA	Direct	1.5A Dual Output Power Driver
TSC426MJA	TC426MJA	Direct	1.5A Dual Output Power Driver
TSC427CBA	TC427COA	Direct	1.5A Dual Output Power Driver
TSC427CPA	TC427CPA	Direct	1.5A Dual Output Power Driver
TSC427IJA	TC427IJA	Direct	1.5A Dual Output Power Driver
TSC427MJA	TC427MJA	Direct	1.5A Dual Output Power Driver
TSC428CBA	TC428COA	Direct	1.5A Dual Output Power Driver
TSC428CPA	TC428CPA	Direct	1.5A Dual Output Power Driver
TSC428IJA	TC428IJA	Direct	1.5A Dual Output Power Driver
TSC428MJA	TC428MJA	Direct	1.5A Dual Output Power Driver
<b>Micrel</b>			
LM4040CIM-2.5	TCN4040C-2.5EOA	Direct	2.5V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4040CIM-2.5	TCN4040D-2.5EOA	Direct	2.5V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4040CIM3-2.5	TCN4040C-2.5ENB	Direct	2.5V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4040CIM3-2.5	TCN4040D-2.5ENB	Direct	2.5V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4040CIZ-2.5	TCN4040C-2.5EZB	Direct	2.5V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4040CIZ-2.5	TCN4040D-2.5EZB	Direct	2.5V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4040EIM3-2.5	TCN4040E-2.5ENB	Direct	2.5V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM4040EIZ-2.5	TCN4040E-2.5EOA	Direct	2.5V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM4041CIM-ADJ	TCN4041C-ADJEOA	Direct	Adjustable Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIM-1.2	TCN4041C-1.2EOA	Direct	1.2V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIM3-ADJ	TCN4041C-ADJENB	Direct	Adjustable Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Micrel (Continued)</b>			
LM4041CIM3-1.2	TCN4041C-1.2ENB	Direct	1.2V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIZ-ADJ	TCN4041C-ADJEZB	Direct	Adjustable Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIZ-1.2	TCN4041C-1.2EZB	Direct	1.2V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041DIM-ADJ	TCN4041D-ADJE0A	Direct	Adjustable Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIM-1.2	TCN4041D-1.2EOA	Direct	1.2V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIM3-ADJ	TCN4041D-ADJENB	Direct	Adjustable Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIM3-1.2	TCN4041D-1.2ENB	Direct	1.2V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIZ-ADJ	TCN4041D-ADJEZB	Direct	Adjustable Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIZ-1.2	TCN4041E-1.2EOA	Direct	1.2V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041EIM3-1.2	TCN4041E-1.2ENB	Direct	1.2V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM4041EIZ-1.2	TCN4041E-1.2EZB	Direct	1.2V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
MIC426AJ	TC426MJA	Direct	1.5A Dual Output Power Driver
MIC426BJ	TC426IJA	Direct	1.5A Dual Output Power Driver
MIC426BM	TC426EOA	Direct	1.5A Dual Output Power Driver
MIC426CM	TC426COA	Direct	1.5A Dual Output Power Driver
MIC426CN	TC426CPA	Direct	1.5A Dual Output Power Driver
MIC427AJ	TC427MJA	Direct	1.5A Dual Output Power Driver
MIC427BJ	TC427IJA	Direct	1.5A Dual Output Power Driver
MIC427BM	TC427EOA	Direct	1.5A Dual Output Power Driver
MIC427CM	TC427COA	Direct	1.5A Dual Output Power Driver
MIC427CN	TC427CPA	Direct	1.5A Dual Output Power Driver
MIC428AJ	TC428MJA	Direct	1.5A Dual Output Power Driver
MIC428BJ	TC428IJA	Direct	1.5A Dual Output Power Driver
MIC428BM	TC428EOA	Direct	1.5A Dual Output Power Driver
MIC428CM	TC428COA	Direct	1.5A Dual Output Power Driver
MIC428CN	TC428CPA	Direct	1.5A Dual Output Power Driver
MIC1426CM	TC1426COA	Direct	1.2A Dual Output Power Driver
MIC1426CN	TC1426CPA	Direct	1.2A Dual Output Power Driver

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Micrel (Continued)</b>			
MIC1427CM	TC1427COA	Direct	1.2A Dual Output Power Driver
MIC1427CN	TC1427CPA	Direct	1.2A Dual Output Power Driver
MIC1428CM	TC1428COA	Direct	1.2A Dual Output Power Driver
MIC1428CN	TC1428CPA	Direct	1.2A Dual Output Power Driver
MIC4420AJ	TC4420MJA	Direct	6A Power Driver
MIC4420BJ	TC4420IJA	Direct	6A Power Driver
MIC4420CT	TC4420CAT	Direct	6A Power Driver
MIC4421AJ	TC4421MJA	Direct	9A Power Driver
MIC4421BN	TC4421EPA	Direct	9A Power Driver
MIC4421CN	TC4421CPA	Direct	9A Power Driver
MIC4421CT	TC4421CAT	Direct	9A Power Driver
MIC4422AJ	TC4422MJA	Direct	9A Power Driver
MIC4422BN	TC4422EPA	Direct	9A Power Driver
MIC4422CN	TC4422CPA	Direct	9A Power Driver
MIC4422CT	TC4422CAT	Direct	9A Power Driver
MIC4423AJ	TC4423MJA	Direct	3A Dual Output Power Driver
MIC4423BJ	TC4423IJA	Direct	3A Dual Output Power Driver
MIC4423BN	TC4423EPA	Direct	3A Dual Output Power Driver
MIC4423BWM	TC4423EOE	Direct	3A Dual Output Power Driver
MIC4423CN	TC4423CPA	Direct	3A Dual Output Power Driver
MIC4423CWM	TC4423COE	Direct	3A Dual Output Power Driver
MIC4424AJ	TC4424MJA	Direct	3A Dual Output Power Driver
MIC4424BJ	TC4424IJA	Direct	3A Dual Output Power Driver
MIC4424BN	TC4424EPA	Direct	3A Dual Output Power Driver
MIC4424BWM	TC4424EOE	Direct	3A Dual Output Power Driver
MIC4424CN	TC4424CPA	Direct	3A Dual Output Power Driver
MIC4424CWM	TC4424COE	Direct	3A Dual Output Power Driver
MIC4425AJ	TC4425MJA	Direct	3A Dual Output Power Driver

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Micrel (Continued)</b>			
MIC4425BJ	TC4425IJA	Direct	3A Dual Output Power Driver
MIC4425BN	TC4425EPA	Direct	3A Dual Output Power Driver
MIC4425BWM	TC4425EOE	Direct	3A Dual Output Power Driver
MIC4425CN	TC4425CPA	Direct	3A Dual Output Power Driver
MIC4425CWM	TC4425COE	Direct	3A Dual Output Power Driver
MIC4426AJ	TC4426MJA	Direct	1.5A Dual Output Power Driver
MIC4426BJ	TC4426IJA	Direct	1.5A Dual Output Power Driver
MIC4426BM	TC4426EOA	Direct	1.5A Dual Output Power Driver
MIC4426BN	TC4426EPA	Direct	1.5A Dual Output Power Driver
MIC4426CM	TC4426COA	Direct	1.5A Dual Output Power Driver
MIC4426CN	TC4426CPA	Direct	1.5A Dual Output Power Driver
MIC4427AJ	TC4427MJA	Direct	1.5A Dual Output Power Driver
MIC4427BJ	TC4427IJA	Direct	1.5A Dual Output Power Driver
MIC4427BM	TC4427EOA	Direct	1.5A Dual Output Power Driver
MIC4427BN	TC4427EPA	Direct	1.5A Dual Output Power Driver
MIC4427CM	TC4427COA	Direct	1.5A Dual Output Power Driver
MIC4427CN	TC4427CPA	Direct	1.5A Dual Output Power Driver
MIC4428AJ	TC4428MJA	Direct	1.5A Dual Output Power Driver
MIC4428BJ	TC4428IJA	Direct	1.5A Dual Output Power Driver
MIC4428BM	TC4428EOA	Direct	1.5A Dual Output Power Driver
MIC4428BN	TC4428EPA	Direct	1.5A Dual Output Power Driver
MIC4428CM	TC4428COA	Direct	1.5A Dual Output Power Driver
MIC4428CN	TC4428CPA	Direct	1.5A Dual Output Power Driver
MIC4429AJ	TC4429MJA	Direct	6A Power Driver
MIC4429BJ	TC4429IJA	Direct	6A Power Driver
MIC4429BM	TC4429EOA	Direct	6A Power Driver
MIC4429BN	TC4429EPA	Direct	6A Power Driver
MIC4429CM	TC4429COA	Direct	6A Power Driver

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Micrel (Continued)</b>			
MIC4429CN	TC4429CPA	Direct	6A Power Driver
MIC4429CT	TC4429CAT	Direct	6A Power Driver
MIC4467AJ	TC4467MJD	Direct	1.2A Quad Output Power Driver
MIC4467BJ	TC4467EJD	Direct	1.2A Quad Output Power Driver
MIC4467BN	TC4467EPD	Direct	1.2A Quad Output Power Driver
MIC4467CN	TC4467CPD	Direct	1.2A Quad Output Power Driver
MIC4467CWM	TC4467COE	Direct	1.2A Quad Output Power Driver
MIC4468AJ	TC4468MJD	Direct	1.2A Quad Output Power Driver
MIC4468BJ	TC4468EJD	Direct	1.2A Quad Output Power Driver
MIC4468CN	TC4468CPD	Direct	1.2A Quad Output Power Driver
MIC4468CWM	TC4468COE	Direct	1.2A Quad Output Power Driver
MIC4469AJ	TC4469MJD	Direct	1.2A Quad Output Power Driver
MIC4469BJ	TC4469EJD	Direct	1.2A Quad Output Power Driver
MIC4469CN	TC4469CPD	Direct	1.2A Quad Output Power Driver
MIC4469CWM	TC4469COE	Direct	1.2A Quad Output Power Driver
MIC5200-3.0BM	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5200-3.0BS	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5200-3.3BM	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5200-3.3BS	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5200-5.0BM	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5200-5.0BS	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5203-3.0BM4	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5203-3.3BM4	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5203-5.0BM4	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5205-3.0BM5	TC1085-3.0ECT	Functional	150mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5205-3.3BM5	TC1085-3.3ECT	Functional	150mA Low Dropout Regulator with <u>SHUTDOWN</u>
MIC5205-4.0BM5	TC1085-4.0ECT	Functional	150mA Low Dropout Regulator with <u>SHUTDOWN</u>

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Micrel (Continued)</b>			
MIC5205-5.0BM5	TC1085-5.0ECT	Functional	150mA Low Dropout Regulator with SHUTDOWN
MIC5205BM5	TC1085ECT	Functional	150mA Low Dropout Regulator with SHUTDOWN
MIC5206-3.0BM5	TC1055-3.0ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC5206-3.0BMM	TC1055-3.0ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC5206-3.3BM5	TC1055-3.3ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC5206-3.3BMM	TC1055-3.3ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC5206-4.0BM5	TC1055-4.0ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC5206-4.0BMM	TC1055-4.0ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC5206-5.0BM5	TC1055-5.0ECT	Functional	100mA Low Dropout Regulator with ERROR Output, SHUTDOWN
MIC29300-3.3BT	TCL1587-3.3CAB	Functional	3A Low Dropout, Fast Response Regulator
MIC29300-3.3BU	TCL1587-3.3CEB	Functional	3A Low Dropout, Fast Response Regulator
MIC29310-3.3BT	TCL1587-3.3CAB	Functional	3A Low Dropout, Fast Response Regulator
<b>Micropower/EXAR</b>			
MP5010GN	TC9491BCZM	Direct	1.2V, 100ppm Reference
MP5010JT	TC9491BM	Direct	1.2V, 100ppm Reference
MP5010KT	TC9491AM	Direct	1.2V, 50ppm Reference
MP5010MN	TC9491ACZM	Direct	1.2V, 50ppm Reference
<b>Motorola</b>			
MC14433P	TC14433EPG	Direct	3-1/2 Digit ADC with Multiplexed BCD Output
MC33064P-5	TC54VN4502EVB	Functional	Voltage Detector
MC33164P-3	TC54VN2702EVB	Functional	Voltage Detector
MC33164P-5	TC54VN4302EVB	Functional	Voltage Detector
MC34064P-5	TC54VN4502EVB	Functional	Voltage Detector
MC34164P-3	TC54VN2702EVB	Functional	Voltage Detector
MC34164P-5	TC54VN4302EVB	Functional	Voltage Detector
MMH0026CP1	TC426CPA	Functional	Dual Inverting Power MOSFET Driver
MMH0026CU	TC426IJA	Functional	Dual Inverting Power MOSFET Driver

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Motorola (Continued)</b>			
SG2525AN	TC25C25EPE	Functional	Voltage Mode PWM Controller
SG3525AN	TC35C25CPE	Functional	Voltage Mode PWM Controller
UC2843AD	TC28C43EOE	Functional	Current Mode PWM Controller
UC2843AJ	TC28C43EJA	Functional	Current Mode PWM Controller
UC2843AN	TC28C43EPA	Functional	Current Mode PWM Controller
UC3843AD	TC38C43COE	Functional	Current Mode PWM Controller
UC3843AN	TC38C43CPA	Functional	Current Mode PWM Controller
<b>National Semiconductor</b>			
DS0026CJ-8	TC426IJA	Functional	Dual Inverting Power MOSFET Driver
DS0026CN-8	TC426CPA	Functional	Dual Inverting Power MOSFET Driver
DS0026J-8	TC426MJA	Functional	Dual Inverting Power MOSFET Driver
DS14C232CN	TC232CPE	Direct	RS-232 Interface
LM185H-1.2	TC04AMRM	Functional	1.2V, 100PPM Reference
LM185H-2.5	TC05AMRM	Functional	2.5V, 100PPM Reference
LM231	TC9401	Functional	VF/FV Converter (0.01%)
LM231A	TC9401	Functional	VF/FV Converter (0.01%)
LM35CAZ	TC03VZB	Functional	Temperature-to-Voltage Converter
LM35CZ	TC03VZB	Functional	Temperature-to-Voltage Converter
LM35DZ	TC03VZB	Functional	Temperature-to-Voltage Converter
LM285M-1.2	LM285BEOA-1.2	Direct	1.2V Micropower Voltage Reference, 1%, 100ppm
LM285M-2.5	LM285BEOA-2.5	Direct	2.5V Micropower Voltage Reference, 1%, 100ppm
LM285Z-1.2	LM285BEZB-1.2	Direct	1.2V Micropower Voltage Reference, 1%, 100ppm
LM285Z-2.5	LM285BEZB-2.5	Direct	2.5V Micropower Voltage Reference, 1%, 100ppm
LM331	TC9401	Functional	VF/FV Converter (0.01%)
LM331A	TC9401	Functional	VF/FV Converter (0.01%)
LM385Z-1.2	LM385BCZB-1.2	Direct	1.2V Micropower Voltage Reference, 1%, 100ppm

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>National Semiconductor (Continued)</b>			
LM385Z-1.2	LM385B-1.2	Direct	1.2V, 100ppm Reference
LM385Z-2.5	LM385BCZB-2.5	Direct	2.5V Micropower Voltage Reference, 1%, 100ppm
LM385Z-2.5	LM385B-2.5	Direct	2.5V, 100ppm Reference
LM4040CIM-2.5	TCN4040C-2.5EOA	Direct	2.5V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4040CIM-2.5	TCN4040D-2.5EOA	Direct	2.5V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4040CIM3-2.5	TCN4040C-2.5ENB	Direct	2.5V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4040CIM3-2.5	TCN4040D-2.5ENB	Direct	2.5V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4040CIZ-2.5	TCN4040C-2.5EZB	Direct	2.5V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4040CIZ-2.5	TCN4040D-2.5EZB	Direct	2.5V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4040EIM3-2.5	TCN4040E-2.5ENB	Direct	2.5V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM4040EIZ-2.5	TCN4040E-2.5EOA	Direct	2.5V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM4041CIM-ADJ	TCN4041C-ADJEAOA	Direct	Adjustable Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIM-1.2	TCN4041C-1.2EOA	Direct	1.2V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIM3-ADJ	TCN4041C-ADJENB	Direct	Adjustable Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIM3-1.2	TCN4041C-1.2ENB	Direct	1.2V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIZ-ADJ	TCN4041C-ADJEZB	Direct	Adjustable Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041CIZ-1.2	TCN4041C-1.2EZB	Direct	1.2V Micropower Voltage Reference, $\pm 0.5\%$ , 100ppm
LM4041DIM-ADJ	TCN4041D-ADJEAOA	Direct	Adjustable Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIM-1.2	TCN4041D-1.2EOA	Direct	1.2V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIM3-ADJ	TCN4041D-ADJENB	Direct	Adjustable Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIM3-1.2	TCN4041D-1.2ENB	Direct	1.2V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIZ-ADJ	TCN4041D-ADJEZB	Direct	Adjustable Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041DIZ-1.2	TCN4041E-1.2EOA	Direct	1.2V Micropower Voltage Reference, $\pm 1\%$ , 150ppm
LM4041EIM3-1.2	TCN4041E-1.2ENB	Direct	1.2V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM4041EIZ-1.2	TCN4041E-1.2EZB	Direct	1.2V Micropower Voltage Reference, $\pm 2\%$ , 150ppm
LM45BIM3	TC03VNB	Direct	Temperature-to-Voltage Converter
LM45BIM3X	TC03VNB	Direct	Temperature-to-Voltage Converter
LM45CIM3	TC1133VNB	Direct	Temperature-to-Voltage Converter

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>National Semiconductor (Continued)</b>			
LM45CIM3X	TC1133VNB	Direct	Temperature-to-Voltage Converter
LM50BIM3	TC02VNB	Direct	Temperature-to-Voltage Converter
LM50BIM3X	TC02VNB	Direct	Temperature-to-Voltage Converter
LM50CIM3	TC1132VNB	Direct	Temperature-to-Voltage Converter
LM50CIM3X	TC1132VNB	Direct	Temperature-to-Voltage Converter
LM75CIM-3	TCN75-3.3MOA	Direct	Two-wire, Serial temp Sensor
LM75CIM-5	TCN75-5.0MOA	Direct	Two-wire, Serial temp Sensor
LM75CIMX-3	TCN75-3.3MOA	Direct	Two-wire, Serial temp Sensor
LM75CIMX-5	TCN75-5.0MOA	Direct	Two-wire, Serial temp Sensor
LMC7660IN	TC7660EPA	Direct	DC-to-DC Converter
LMC7660MJ	TC7660MJA	Direct	DC-to-DC Converter
LP2980AIM5-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980AIM5-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980AIM5-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980AIM5X-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980AIM5X-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980AIM5X-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980IM5-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980IM5-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980IM5-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980IM5X-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980IM5X-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2980IM5X-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981AIM5-3.0	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981AIM5-3.3	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981AIM5-5.0	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981AIM5X-3.0	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>

# Cross Reference Guide

Company/Part #	TelCom Part #	Direct or Functional	Description
<b>National Semiconductor (Continued)</b>			
LP2981AIM5X-3.3	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981AIM5X-5.0	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981IM5-3.0	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981IM5-3.3	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981IM5-5.0	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981IM5X-3.0	TC1015-3.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981IM5X-3.3	TC1015-3.3ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2981IM5X-5.0	TC1015-5.0ECT	Functional	100mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982AIM5-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982AIM5-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982AIM5-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982AIM5X-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982AIM5X-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982AIM5X-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982IM5-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982IM5-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982IM5-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982IM5X-3.0	TC1014-3.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982IM5X-3.3	TC1014-3.3ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
LP2982IM5X-5.0	TC1014-5.0ECT	Functional	50mA Low Dropout Regulator with <u>SHUTDOWN</u>
<b>Seiko</b>			
S-8052ALY	TC54VC2702EZB	Direct	Voltage Detector
S-8052ALY-LH-X	TC54VC2702EMB	Direct	Voltage Detector
S-8052ANY-NH-X	TC54VN2702EMB	Direct	Voltage Detector
S-8053ALB-LI-X	TC54VC2902EMB	Direct	Voltage Detector
S-8053ANO	TC54VC3502EZB	Direct	Voltage Detector

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Seiko (Continued)</b>			
S-8053HLB	TC54VC3002EVB	Direct	Voltage Detector
S-8053HNB	TC54VN3002EVB	Direct	Voltage Detector
S-8054ALY	TC54VC5002EVB	Direct	Voltage Detector
S-80727AL	TC54VC2702EVB	Direct	Voltage Detector
S-809727AN-DQ	TC54VC2702EMB	Direct	Voltage Detector
<b>Semtech</b>			
EZ1117CM	TCL1117CEB	Direct	800mA Low Dropout Regulator
EZ1117CM-2.85	TCL1117CEB-2.85	Direct	800mA Low Dropout Regulator
EZ1117CM-3.3	TCL1117CEB-3.3	Direct	800mA Low Dropout Regulator
EZ1117CST	TCL1117CDB	Direct	800mA Low Dropout Regulator
EZ1117CST-2.85	TCL1117-2.85CDB	Direct	800mA Low Dropout Regulator
EZ1117CST-3.3	TCL1117-3.3CDB	Direct	800mA Low Dropout Regulator
EZ1585CT	TCL1585CAB	Direct	4.6A Low Dropout, Fast Response Regulator
EZ1585CT-3.3	TCL1585-3.3CAB	Direct	4.6A Low Dropout, Fast Response Regulator
EZ1587ACM	TCL1587CEB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587ACM-3.3	TCL1587-3.3CEB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587ACT	TCL1587CAB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587ACT-3.3	TCL1587-3.3CAB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587CM	TCL1587CEB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587CM-3.3	TCL1587-3.3CEB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587CT	TCL1587CAB	Direct	3A Low Dropout, Fast Response Regulator
EZ1587CT-3.3	TCL1587-3.3CAB	Direct	3A Low Dropout, Fast Response Regulator
EZ1588CM	TCL1587CEB	Functional	3A Low Dropout, Fast Response Regulator
EZ1588CM-3.3	TCL1587-3.3CEB	Functional	3A Low Dropout, Fast Response Regulator
EZ1588CT	TCL1587CAB	Functional	3A Low Dropout, Fast Response Regulator
EZ1588CT-3.3	TCL1587-3.3CAB	Functional	3A Low Dropout, Fast Response Regulator
<b>SGS</b>			
UC1843J	TC18C43MJA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC

# Cross Reference Guide

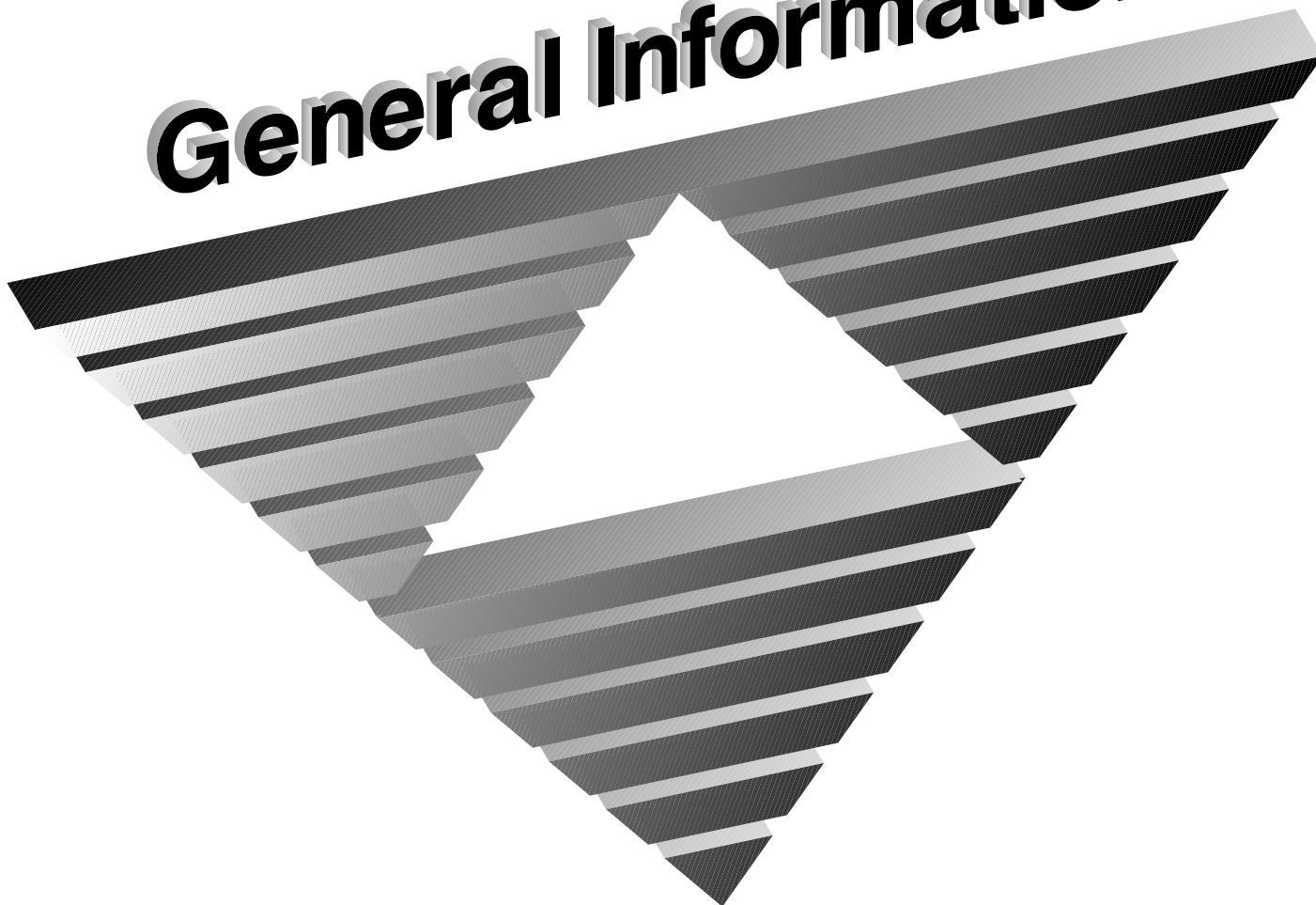
Company/Part #	TelCom Part #	Direct or Functional	Description
<b>SGS (Continued)</b>			
UC1846J	TC18C46MJE	Functional	Current Mode Push-Pull SMPS Controller
UC2843D	TC28C43IOE	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
UC3843D	TC38C43COE	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
UC3843N	TC38C43CPA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
UC3846J	TC38C46CPE	Functional	Current Mode Push-Pull SMPS Controller
<b>Siliconix</b>			
SI469AAP	TC4469MJD	Functional	1.2A Quad Power Driver
SI469ADJ	TC4469EPD	Functional	1.2A Quad Power Driver
SI7135CJ	TC7135CPI	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
SI7135CJ	TC835 (Upgrade)	Direct	4-1/2 Digit ADC with Multiplexed BCD Output
SI7135CK	TC7135CPI	Functional	4-1/2 Digit ADC w/Multiplexed BCD Output: Not Available in CerDIP Pkg.
SI7135CK	TC835CPI (Upgrade)	Functional	4-1/2 Digit ADC w/Multiplexed BCD Output: Not Available in CerDIP Pkg.
SI7660CJ	TC7660CPA	Direct	DC-to-DC Converter
SI7660DY	TC7660COA	Direct	DC-to-DC Converter
SI7661CJ	TC7662ACPA	Direct	High-Voltage DC-to-DC Converter
<b>Sipex</b>			
SP232CP	TC232CPE	Direct	RS-232 Interface
SP232CT	TC232COE	Direct	RS-232 Interface
SP232EP	TC232EPE	Direct	RS-232 Interface
SP232ET	TC232EOE	Direct	RS-232 Interface
SP232MD	TC232MJE	Direct	RS-232 Interface
<b>Unitrode</b>			
UC1843J	TC18C43MJA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
UC1846J	TC170MJE	Functional	Current Mode CMOS SMPS Controller
UC1846J	TC18C46MJE	Functional	Current Mode Push-Pull SMPS Controller
UC2843J	TC28C43IJA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC

# Cross Reference Guide

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Company/Part #	TelCom Part #	Direct or Functional	Description
<b>Unitrode (Continued)</b>			
UC2846J	TC170IJE	Functional	Current Mode CMOS SMPS Controller
UC2846J	TC28C46IJE	Functional	Current Mode Push-Pull SMPS Controller
UC3843D	TC38C43COE	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
UC3843N	TC38C43CPA	Functional	SMPS Controller: I-Mode, Single-Ended, 8V Start, 99% DC
UC3846N	TC170CPE	Functional	Current-Mode CMOS SMPS Controller
UC3846N	TC38C46CPE	Functional	Current-Mode Push-Pull SMPS Controller

# General Information



# Ordering Information

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## 1. Order Entry

Orders for products contained herein should be directed to the appropriate TelCom representative or distributor. Please contact TelCom Semiconductor, 1300 Terra Bella Avenue, Mountain View, California 94043, Phone: 1-800-888-9966 for a referral.

## 2. Ordering Information

Each item must be ordered using the complete part number exactly as listed on the data sheet.

## 3. Part Number Explanation:

**For all TelCom Semiconductor Voltage Detectors and Regulators:**

### ORDERING INFORMATION

PART CODE

TelCom Semiconductor Device \_\_\_\_\_

TC    XX    XX    XX    XX    X    X    X    XXX

Product Part Number \_\_\_\_\_

Variation / Option \_\_\_\_\_

Output Voltage, or Detect Voltage (if applicable) \_\_\_\_\_

Extra feature Code and/or Tolerance \_\_\_\_\_

Operating Temperature Range: \_\_\_\_\_

E: Extended Range (- 40°C to +85°C)

Package Type (see listing on page 114 and specific data sheet) \_\_\_\_\_

Number of package pins (see listing page 114 and specific data sheet) \_\_\_\_\_

Taping Direction: \_\_\_\_\_

713: Standard Taping, 723: Reversed Taping, No Suffix: TO-92 Bulk

# Ordering Information

For all Other TelCom Semiconductor Devices:

## ORDERING INFORMATION

PART CODE

XXX

TelCom Semiconductor Device

TC

XXXXXX

X

X

X

X

Product Part Number (2 to 6 characters, see specific data sheet)

Electrical Performance

Grade Option (if applicable)

A:    B:    Test selection criteria, see specific data sheet

R: Reverse pin layout

Operating Temperature Range:

C: Commercial Range (0°C to +70°C)

E: Extended Range (- 40°C to +85°C)

I: Industrial Range (- 25°C to +85°C)

M: Military Range (- 55°C to +125°C)

V: See data sheet for specific temperature range.

Package Type (see listing on page 114 and specific data sheet)

Number of Package Pins (see listing on page 114 and specific data sheet)

Taping Direction:

713: Standard Taping, 723: Reversed Taping, No Suffix: TO-92 Bulk

# Packaging Information

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PACKAGE TYPE			NUMBER OF LEADS	
Abbr.	Package	Description	Abbr.	Leads
A	TO-220-3 TO-220-5 TO-220-7	TO-220	A	8 (Narrow)
B	PFP	Plastic Flat Pack	B	3
C	SOT-23A-3 SOT-23A-5 SOT-23A-6	SOT-23A (EIAJ SC-59) SOT-23A (EIAJ SC-74A) SOT-23A (EIAJ SC-74)	C	4
D	SOT-223-3	SOT-223	D	14 (Narrow)
E	DDPAK-3 DDPAK-5 DDPAK-7	DDPAK DDPAK DDPAK	E	16 (Wide) SOIC
F			F	16 (Narrow) DIP
G			F	24 (Narrow)
H			G	24 (Wide)
I			H	6
J	CDIP	CerDIP	I	28 (Wide)
K	PQFP	Plastic Gullwing Quad Flat Package	J	28 (Narrow)
L	PLCC	Plastic Leaded Chip Carrier	K	7
M	SOT-89-3 SOT-89-5	SOT-89 SOT-89	L	40
N	SOT-23B-3	SOT-23B (JEDEC TO-236)	M	2
O	SOIC	Plastic 'SO' Surface Mount	N	18
P	PDIP	Plastic DIP	O	
Q	QSOP	Quarter SOP	P	
R			Q	
S	SSOP	Shrink SOP	R	16 (Narrow)
T			S	68
U	MSOP	Micro SOP	T	5
V			U	64
W			V	
X			W	
Y	CHIPS	Dice	X	
Z	TO-92-2 TO-92-3	TO-92 TO-92	Y	
			Z	44

## Worldwide Sales Offices

### Corporate Headquarters

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FAX: (650) 967-1590

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TEL: 49-89-89-56-500  
FAX: 49-89-89-56-5022

### Product Center

TelCom Semiconductor, Inc.  
Austin Product Center  
9101 Burnet Rd. Suite 214  
Austin, TX 78758  
TEL: (512) 873-7100  
FAX: (512) 873-8236

### Pacific Rim Headquarters

TelCom Semiconductor H.K. Ltd.  
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TEL: 852-2350-7380  
FAX: 852-2354-9957



<http://www.telcom-semi.com>