

Analog, Mixed Signal and Power Management

Quarter 1, 2010
SG1002Q12010 Rev 0

Analog, Mixed Signal and Power Management

- Power Actuation
- Network Transceivers
- Signal Conditioning
- System Basis Chip
- Embedded MCU plus Power
- Audio and Video
- Power Management
 - Linear Regulator
 - Switching Regulator
 - LED Drivers
 - Battery Management
 - Power Management and User Interface IC
 - Power over Ethernet

Access and Remote Control



FREESCALE SEMICONDUCTOR ANALOG AND MIXED SIGNAL PRODUCTS

The product categories range from Power Actuation and Network Transceivers to Signal Conditioning and Embedded MCU + Power. Power Actuation covers a broad range of load control and drivers, including motor control.

SMARTMOS™—Freescale Semiconductor SMARTMOS technology allows designers to interface high-precision components with the harsh automotive environment.

Cost-Effective—Ideally suited for rugged automotive applications, SMARTMOS solutions offer a cost-effective blend of analog, digital, and robust power silicon that enables integrated, mixed-signal, power control ICs.

Functionality—SMARTMOS solutions implement traditional analog functions with smaller die size, and a modular process produces components with the minimum number of process steps for each circuit, minimizing overhead.

Benefits—Freescale Semiconductor SMARTMOS technology brings a wide range of benefits to today's designs, including component reductions, power capability, durability, efficiency, precision, high-performance analog, and robustness.

Packaging - Freescale device may be offered in EPP and RoHS compliant packages; view the external web for specifics.

For additional information, visit:

Documentation, Tool, and Product Libraries

www.freescale.com

www.freescale.com/analog

www.freescale.com/powermanagement

ANALOG AND MIXED SIGNAL PRODUCTS

Power Actuation — Low-Side Switches (Solid State Intelligent Switches)

| Product | Description | No of Outputs | High-Side or Low-Side | Continuous Current Each Output (A) | R _{DS(on)} (mΩ) of Each Output | Current Limitation (A) | Current Limitation Standby Max (μA) | Control ¹ | Status/Fault Reporting | Protection Features | Packaging | Status |
|---------|--|---------------|-----------------------|------------------------------------|---|------------------------|-------------------------------------|----------------------|------------------------|--|---|---------------------------|
| MC33800 | Engine Control IC, with Eight Low-Side Switches, Two Constant Current Low-Side Switches and Six MOSFET gate pre-drivers | 8 | L | 8 @ 0.35 | 2 @ 700 6 @ 1000 | 2 @ 6.0 6 @ 2.0 | 30 | Parallel, SPI | SPI | Open Load detect, Overcurrent protect, Overvoltage protect, Short Load detect, Undervoltage protect, Thermal protect | 54-pin SOICW Exposed Pad | Production EVB |
| MC33810 | Engine Control Integrated Circuit capable of driving a combination of four Low-Side loads and four MOSFETs or IGBT gates | 4 | L | 1.0 | 100 | 6.0 | 30 | Parallel, SPI | SPI Status Flags | Shorted Load detect, Thermal protect | 32-pin SOICW Exposed Pad | Production EVB |
| MC33812 | Engine control power IC, with three Low-Side drivers, one pre-driver, +5V pre-regulator, ISO-9141 physical interface and MCU watchdog circuit. | 3 | L | 2L @ 4.0 1L @ 1.5 | 2 @ 200 1 @ 1000 | 2 @ 6.0 1 @ 2.0 | 2 @ 1000 1 @ 20 | Parallel | Parallel | Overcurrent, Outputs Short to Battery, Overtemperature protect | 32-pin SOICW Exposed Pad | Production EVB Ref. Dsgn. |
| MC33879 | (1.0 Ω R _{DS(on)}) Configurable Eight Output SPI Controlled Switch | 8 | H/L | 0.35 | 550 | 1.2 | 25 | SPI w/ 2 PWM | SPI | Short Circuit, Current Limit, Temp Sense | 32-pin SOICW Exposed Pad | Production EVB |
| MC33882 | (0.8 Ω RDS(on)) Smart Six Output Switch with SPI and Parallel Input Control | 8 | L | 1.0 | 375 | 3.0 | 10 | SPI | SPI | Short Circuit, Current Limit, Temp Sense | 30-pin HSOP, 32-pin SOICW w/Exposed Pad, 32-pin QFN w/Exposed Pad | Production |
| MC33996 | 16 Output Hardware Low-Side Switch with 24-Bit Serial Input Control | 16 | L | 0.5 | 450 | 1.0 to 2.5 | 50 | SPI | SPI | Short Circuit, Current Limit, Temp Sense, Open Load | 32-pin SOICW | Production EVB |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

ANALOG AND MIXED SIGNAL PRODUCT (continued)

Power Actuation — High-Side Switches (Solid State Intelligent Switches)

| Product | Description | No of Outputs | High-Side or Low-Side | Continuous Current Each Output (A) | R _{DS(on)} (mΩ) of Each Output | Current Limitation (A) | Current Limitation Standby Max (μA) | Control ¹ | Status/Fault Reporting | Protection Features | Packaging | Status |
|------------|---|---------------|-----------------------|------------------------------------|---|------------------------|-------------------------------------|----------------------|--|--|--------------------------|----------------|
| MC10XS3412 | Quad High-Side Switch (2 x 10 mΩ, 2 x 12 mΩ), with PWM, Protection, Diagnostics and SPI Control | 4 | H | 6.0 | 2 x 10, 2 x 12 | 30 | 5.0 | SPI and Parallel | SPI | Fail Safe Mode, Overcurrent Shutdown, Overtemperature, Short Circuit | 24-pin PQFN | Production EVB |
| MC10XS3435 | Quad High-Side Switch (2 x 12 mΩ, 2 x 35 mΩ), with PWM, Protection, Diagnostics and SPI Control | 4 | H | 6.0 | 2 x 10, 2 x 35 | 30 | 5.0 | SPI and Parallel | SPI | Fail Safe Mode, Overcurrent Shutdown, Overtemperature, Short Circuit | 24-pin PQFN | Production EVB |
| MC15XS3400 | Quad High-Side Switch (4 x 15 mΩ), with PWM, Protection, Diagnostics and SPI Control | 4 | H | 6.0 | 15 | 30 | 5.0 | SPI and Parallel | SPI | Fail Safe Mode, Overcurrent Shutdown, Overtemperature, Short Circuit | 24-pin PQFN | Production EVB |
| MC33879 | (1.0 Ω R _{DS(on)}) Configurable Eight Output SPI Controlled Switch | 8 | H/L | 0.35 | 550 | 1.2 | 25 | SPI w/ 2 PWM | SPI | Short Circuit, Current Limit, Temp Sense | 32-pin SOICW Exposed Pad | Production EVB |
| MC33981 | Single High-Side Switch (4.0 mΩ), with PWM, Protection and Diagnostics | 1 | H | 40.0 | 4 | 100 | 5.0 | Parallel | Status Pin, Current Monitor, Temperature | Overcurrent, Overtemperature, Short Circuit, Undervoltage Lock Out | 16-pin PQFN | Production |
| MC33982 | Self Protected 2 mΩ Switch with Diagnostic and Protection | 1 | H | 30.0 | 2 | 100 or 150 Selectable | 5.0 | SPI and Parallel | SPI | Temp Sense, Over/Undervoltage, Shutdown, Overcurrent, Reverse Polarity, Current Recopy | 16-pin PQFN | Production |
| MC33984 | Self Protected 4 mΩ Switch with Diagnostic and Protection | 2 | H | 15.0 | 4 | 75 or 100 Selectable | 5.0 | SPI and Parallel | SPI | Temp Sense, Over/Undervoltage, Shutdown, Overcurrent, Reverse Polarity, Current Recopy | 16-pin PQFN | Production EVB |
| MC33988 | Self Protected 8 mΩ Switch with Diagnostic and Protection | 2 | H | 7.5 | 8 | 45 or 60 Selectable | 5.0 | SPI and Parallel | SPI | Temp Sense, Over/Undervoltage, Shutdown, Overcurrent, Reverse Polarity, Current Recopy | 16-pin PQFN | Production EVB |
| MC35XS3400 | Quad High-Side Switch (4 x 35 mΩ), with PWM, Protection, Diagnostics and SPI Control | 4 | H | 6.0 | 35 | 30 | 5.0 | SPI and Parallel | SPI | Fail Safe Mode, Overcurrent Shutdown, Overtemperature, Short Circuit | 24-pin PQFN | Production EVB |
| MM908E621 | See Embedded MCU + Power (page 9) | | | | | | | | | | | |
| MM908E622 | See Embedded MCU + Power (page 9) | | | | | | | | | | | |
| MM908E624 | See Embedded MCU + Power (page 9) | | | | | | | | | | | |
| MM908E625 | See Embedded MCU + Power (page 9) | | | | | | | | | | | |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

A change bar appears in the left margin to mark the location of new or revised information.

**Because of an order from the United States International Trade Commission, BGA-packaged product lines and part numbers indicated here currently are not available from Freescale for import or sale in the United States prior to September 2009: i.MX product families; MC13783 in 247 MAPBGA and MC13892 in 139, 186 MAPBGA packages.

ANALOG AND MIXED SIGNAL PRODUCT (continued)

Power Actuation — H-Bridges and Motor Drivers

| Product | Description | Main Characteristics | No of Outputs | R _{DS(on)} (mΩ) of Each Output | Peak Current Limitation (A) | Current Limitation Standby Max | Control ¹ | Status Reporting | Protection Features | Packaging | Status |
|-----------|--|--|---------------|---|-----------------------------|--------------------------------|----------------------|---------------------------------------|--|--|-----------------------|
| MC33186 | H-Bridge Driver (5.0 A) | 40 V/150 mΩ per FET | 2 | 150 | 6.5 | 20 mA | Parallel | 1 Status Pin (Overcurrent / Overtemp) | Short Circuit, Current Limit, Temp Sense | 20-pin HSOP | Production |
| MC33879 | (1.0 Ω R _{DS(on)}) Configurable Eight Output SPI Controlled Switch | (1.0 Ω R _{DS(on)}) Configurable Eight Output SPI Controlled Switch | 8 | 550 | 1.2 | 25 μA | SPI w/2 PWM | SPI | Short Circuit, Current Limit, Temp Sense | 32-pin SOICW Exposed Pad | Production EVB |
| MC33880 | Configurable Eight Output SPI Controlled Switch | (1.0 Ω R _{DS(on)}) Configurable Eight Output SPI Controlled Switch | 8 | 550 | 1.2 | 25 μA | SPI w/2 PWM | SPI | Short Circuit, Current Limit, Temp Sense | 32-pin SOICW | Production EVB |
| MC33886 | H-Bridge Driver (5.2 A) | 225 mΩ @ 150°C | 2 | 120 | 6.0 | 20 mA | Parallel | 1 Status Pin (Overcurrent / Overtemp) | Short Circuit, Current Limit, Temp Sense | 20-pin HSOP | Production EVB |
| MC33887 | H-Bridge Driver with Sleep Mode (5.2 A) | 130 mΩ @ 25°C, sleep mode, current sense | 2 | 130 | 6.0 | 25 μA | Parallel | 1 Status Pin (Overcurrent / Overtemp) | Short Circuit, Current Limit, Temp Sense | 20-pin HSOP 54-pin SOICW 36-pin PQFN | Production EVB |
| MC33899 | Programable H-Bridge Power IC | Designed to drive a DC motor in both forward and reverse shaft rotation under Pulse-Width Modulation (PWM) of speed and torque. | 2 | 100 | 11.5 | 50 μA | SPI and Parallel | SPI | Open Circuit detect, Undervoltage, Overtemperature Shutdown, Output Short Protect, Short Circuit Current Limit | 30-pin HSOP | Production |
| MC33926 | 5.0 A Throttle Control H-Bridge | H-Bridge power IC for DC servo motor control like engine throttle control. Load can be PWM'ed up to 20 KHz. | 2 | 120 | 8.0 | 50 μA | Parallel | Status Flag | Output Short Circuit Protect, Overcurrent Limit, Overtemperature | 32-pin PQFN | Production EVB |
| MC33931 | 5.0 A Throttle Control H-Bridge | H-Bridge power IC for DC servo motor control like engine throttle control. Load can be PWM'ed up to 11 KHz | 2 | 120 | 8.0 | 50 μA | Parallel | Status Flag | Output Short Circuit Protect, Overcurrent Limit, Overtemperature | 44-pin HSOP | Production EVB ('932) |
| MC33932 | 5.0 A Throttle Control Dual H-Bridge | H-Bridge power IC for DC servo motor control like engine throttle control. Load can be PWM'ed up to 11 KHz | 4 | 120 | 8.0 | 50 μA | Parallel | Status Flag | Output Short Circuit Protect, Overcurrent Limit, Overtemperature | 44-pin HSOP | Production EVB |
| MPC17C724 | 0.4A Dual H-Bridge Motor Driver IC | H-Bridge driver for bipolar stepper motors and brush DC motors. Load can be PWM'ed up to 200 KHz, for speed/ torque and current control. | 2 | 1000 | 0.80 | 1 μA | Parallel | — | Shoot Through Protect, Undervoltage Detect | 16-pin QFN | Production EVB |
| MPC17510 | 0.45 Ω H-Bridge | Single 15 V H-Bridge with charge pump | 2 | 450 | 3.0 | 1.0 mA | Parallel | Shutdown Undervoltage | Shoot Through Undervoltage Detect | 24-pin TSSOP | Production |
| MPC17511 | 0.46 Ω H-Bridge | Single 6.8 V H-Bridge with charge pump | 2 | 460 | 3.0 | 1.0 mA | Parallel | Shutdown Undervoltage | Shoot Through Undervoltage Detect | 16-pin VMFP 24-pin QFN | Production |
| MPC17529 | 0.7 Ω Dual 6.8 V with Charge Pump, 3.3 V Logic | Dual 6.8 V with Charge Pump | 2 | 700 | 1.4 | 1.0 mA | Parallel | Shutdown Undervoltage | Shoot Through Undervoltage Detect | 20-pin VMFP | Production |
| MPC17531 | 0.7 Ω Dual 8.6 V with Charge Pump and Sleep Mode | Dual 8.6 V with Charge Pump | 2 | 700 | 1.4 | 1.0 mA | Parallel | Shutdown Undervoltage | Shoot Through Undervoltage Detect | 20-pin VMFP 24-pin QFN | Production |
| MPC17533 | 0.7 Ω Dual 6.8 V External Charge Pump | Dual 6.8 V external Charge Pump | 2 | 700 | 1.4 | < 200 μA | Parallel | Shutdown Undervoltage | Shoot Through Undervoltage Detect | 16-pin VMFP | Production |

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ANALOG AND MIXED SIGNAL PRODUCT (continued)

Power Actuation — H-Bridge Stepper Motors

| Product | Description | Main Characteristics | Operating Voltage (V) | Packaging | Status |
|-----------|--|---|-----------------------|--------------------------|-----------------------|
| MM908E626 | Stepper Motor Control, Quad Half-Bridge with Embedded MCU and LIN for High Temperature $T_J = 135^{\circ}\text{C}$. See Embedded MCU + Power (page 9) | Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slewrates | 5 to 28 | 54-pin SOICW Exposed Pad | Production EVB ('625) |

Power Actuation — Pre-Drivers (High-Side MOSFET Gate Drivers)

| Product | Description | Main Characteristics | Operating Voltage (V) | Control ¹ | Output Drives High/Low-Side, Drive Current | Status Reporting ¹ | Protection Features | Packaging | Status |
|---------|--|--|-----------------------|--------------------------------|--|-------------------------------|--|--------------------------|---------------------------|
| MC33800 | Engine Control Integrated Circuit | Engine control IC, with six MOSFET gate pre-drivers, eight Low-Side Switches, and two constant current Low-Side switches | 5.0 to 36 | Parallel, SPI | 6 H, 2mA (typ) | SPI | Open Load Detect, Overcurrent Protect, Overvoltage Protect, Shorted Load Detect, Undervoltage Protect, Thermal Protect | 54-pin SOICW Exposed Pad | Production EVB |
| MC33810 | Automotive Engine Control IC | Engine control IC with four MOSFET/IGBT gate drivers and four Low-Side switches. | 4.5 to 36 | Parallel, SPI | 4 L, 780 μA (typ) | SPI, Status Flags | Shorted Load Detect, Thermal Protect | 32-pin SOICW Exposed Pad | Production EVB |
| MC33812 | Single Cylinder Engine Control IC | Engine control power IC with three Low-Side driver, one pre-driver, +5V pre-regulator, IOS-9141 physical interface and MCU watchdog circuit. | 4.5 to 36 | Parallel | 2L, 4.0 A (typ) 1L, 1.5 A (typ.) | Parallel | Overcurrent Outputs Short to Battery, Overtemperature Protect | 32-pin SOICW Exposed Pad | Production EVB Ref. Dsgn. |
| MC33883 | Quad TMOS driver, for fuel injector | Quad TMOS driver, in H-Bridge configuration | 5.5 to 28/55 | 4 non-invert CMOS, LSTTL logic | n/a | None | Overvoltage, Undervoltage | 20-pin SOICW | Production EVB |
| MC33937 | Three-Phase Field Effect Transistor Pre-Driver | Triple High-Side and Low-Side FET pre-drivers, with parallel & SPI control and programmable shoot-through protect. | 8.0 to 58 | Parallel, SPI | 3 H, 3 L, 1.0 A (typ) | SPI | Programmable Deadtime, Reverse Charge Injection Protect | 54-pin SOICW Exposed Pad | Production EVB |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

Power Actuation — LED Drivers

| Product | Description | Main Characteristics | Operating Input Voltage (V) | Output Voltages | Protection Features | Packaging | Status |
|---------|--|--|-----------------------------|-----------------|--|-------------------------|-----------------------------|
| MC34844 | 10 Channel LED Backlight Driver with Integrated Power Supply | High efficiency LED driver for use in backlighting LCD displays. Capable of driving more than 150 LEDs, in 10 parallel strings, with 50/80 mA per string. Currents in the 10 strings are matched to within $\pm 2\%$. Controlled through an I ² C bus. Contains a PWM generator for LED dimming. | 7.0 to 28 | 60 V, @ 3.0 A | Undervoltage Lockout, Overvoltage protection. Over-temperature protect. Overcurrent protection. Output Short protect | 32-pin QFN, Exposed Pad | Production EVB ¹ |
| MC34845 | 6 Channel LED Backlight Driver with Integrated Power Supply | High efficiency LED driver for use in backlighting LCD displays. Capable of driving more than 96 LEDs, in 6 parallel strings. Currents in the 6 strings are matched to within $\pm 2\%$. Programmable LED current setting. Contains a PWM generator for LED dimming. | 6.0 to 21 | 60 V @ 2.1A | Undervoltage Lockout, Overvoltage protection. Over-temperature & Overcurrent protect. Output Short and Open protect | 24-pin QFN, Exposed Pad | Production EVB |

1. Supporting backlight EVB - KITLEDCLKL16EVBE

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ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Power Actuation — Squib Drivers

| Product | Description | Main Characteristics | Regulation Voltage | Operating Voltage (V) | Packaging | Status |
|---------|------------------------------|---|--------------------|-----------------------|--------------|------------|
| MC33797 | Four Channel Squib Driver IC | Four-Channel High-Side and Low-Side 2.0 A FET Switches, Externally Adjustable FET Current Limiting, Adjustable Current Limit Range: 0.8 A to 2.0 A, 8-Bit SPI for Diagnostics and FET Switch Activation, Diagnostics for High-Side Safing Sensor Status | 7.0 to 35 | 4.75 to 5.25 | 32-pin SOICW | Production |

Power Actuation — Powertrain Control and Engine Management

| Product | Description | Main Characteristics | Peak Current Limit (A) | R _{DS(on)} (mΩ) | Control ¹ | Operating Voltage (V) | Packaging | Status |
|---------|--|---|--|--|----------------------|-----------------------|--------------------------|---------------------------|
| MC33800 | Engine Control Integrated Circuit | Engine control IC, with six MOSFET gate pre-drivers, eight Low-Side Switches, and two constant current Low-Side switches | 2 @ 6.0 6 @ 2.0 1 @ 2.8 1 @ 1.0 | 2 @ 700 6 @ 1000 1 @ 250 1 @ 1000 | SPI, Parallel | 5.0 to 36 | 54-pin SOICW Exposed Pad | Production EVB |
| MC33810 | Automotive Engine Control IC | Engine control IC with four MOSFET/IGBT gate drivers and four Low-Side switches. | 6.0 | 100 | SPI, Parallel | 4.5 to 36 | 32-pin SOICW Exposed Pad | Production EVB |
| MC33811 | Solenoid Monitor Integrated Circuit | 5 input solenoid monitoring to verify proper electrical and mechanical solenoid operation. | See Pg. 8 Signal Cond. | See Pg. 8 Signal Cond. | SPI | 10.5 to 15.5 | 16-pin SOICW | Production EVB |
| MC33812 | Single Cylinder Engine Control Integrated Circuit | Engine control power IC, with three Low-Side drivers, one pre-driver, +5V pre-regulator, IOS-9141 physical interface and MCU watchdog circuit. | 2 @ 6.0 1 @ 2.0 | 2 @ 200 1 @ 1000 | Parallel | 4.5 to 36 | 32-pin SOICW Exposed Pad | Production EVB Ref. Dsgn. |
| MC33899 | Programmable H-Bridge Power IC | Designed to drive a DC motor in both forward and reverse shaft rotation under Pulse-Width Modulation (PWM) of speed and torque. Can be controlled by SPI or parallel control lines. | 15.0 | 90 | SPI, Parallel | 6.0 to 26.5 | 30-pin HSOP | Production |
| MC33926 | 5.0A Throttle Control H-Bridge | H-Bridge power IC for DC servo motor control like engine throttle control. Load can be PWM'ed up to 20 KHz | 8.0 | 120 | Parallel | 8.0 to 28 | 32-pin PQFN | Production EVB |
| MC33937 | Three-Phase Field Effect Transistor Pre-Driver | Triple High-Side and Low-Side FET pre-drivers, with parallel & SPI control and programmable shoot-through protect. | See Pg. 5 Pre-Drivers | - | Parallel, SPI | 8.0 to 58 | 54-pin SOICW Exposed Pad | Production EVB |
| MC33975 | 22 input Multiple Switch Detect Interface with 32 mA Wetting Current and Wake-up | 22 inputs contact monitoring (14 GND, 8 configurable), 4.0 mA or 32 mA pulse wetting current, low-power mode interrupt capability, wake-up. External sensors current supply. | See Pg. 8 Signal Conditioning | See Pg. 8 Signal Conditioning | SPI | 5.5 to 26.5 | 32-pin SOICW Exposed Pad | Production EVB |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

Network Transceivers — CAN Physical Interface Components

| Product | Description | Main Characteristics | Communication Protocol | Operating Voltage (V) | Current Limit Standby (μA) | | Other Features | Control and Status Reporting ¹ | Protection Features | Packaging | Status |
|---------|---|--|---|-----------------------|----------------------------|-----|--|---|--|--|----------------|
| | | | | | Typ | Max | | | | | |
| MC33742 | System Basis Chip with Enhanced High Speed CAN (250k to 1Mbps) | Dual V _{REG} , Enhance HS CAN with Bus failure diagnostics, 4 wake-up inputs. | CAN high-speed dual wires | 5.5 to 27 | 60 | 150 | Low power modes, remote and local wake-up inputs | 4 MHz SPI (for diag) | Current and thermal protection for CAN and regulator | 28-pin SOICW 48-pin QFN Exposed Pad | Production EVB |
| MC33889 | System Basis Chip Lite with Low-Speed CAN | Dual V _{REG} , LS CAN, 2 wake-up inputs | CAN low-speed, dual wires | 5.5 to 27 | 100 | 100 | Dual voltage regulator, watchdog, wake input, sleep and stop modes | SPI 4 MHz | Fault tolerant | 28-pin SOICW | Production EVB |
| MC33897 | Single-Wire CAN | Low or high (33.3 kbps or 83.3 kbps) data rates, wake-up capability (GMW3089 v2.3 compatible) | Single-wire CAN | 6.0 to 27 | 45 | 60 | Regulator Control Output Waveshaping, Undervoltage lockout and loss of GND | 2 Mode Control Pins | Thermal shutdown, Current limit | 14-pin SOICN 8-pin SOICN | Production |
| MC33989 | System Basis Chip with High-Speed CAN | Dual V _{REG} , HS CAN, 4 wake-up inputs | CAN high-speed, dual wires | 5.5 to 27 | 150 | 150 | Dual voltage regulator, watchdog, wake input, sleep mode, and cyclic sense | SPI 4 MHz | n/a | 28-pin SOICW | Production EVB |
| MC33902 | High-speed CAN Interface with Embedded 5V supply | High-speed CAN physical interface. Includes a 5.0V internal supply for the CAN bus transceiver | CAN high-speed, dual wires | 5.5 to 27 | 14 | 30 | Wake-up, Fault reporting, Low power modes | Pseudo SPI, Parallel | Overcurrent, Overtemp., Short circuit, UnderVolt. | 14-pin SOICN | Production |
| MC33904 | System Basis Chip(SBC)-Gen 2-with High Speed CAN Interface | High speed CAN physical interface. 5.0 or 3.3 V and VAux regs w/current sharing | CAN high-speed, dual wires | 5.5 to 27 | 20 | 65 | Config. I/O, MUX - out, pin compatible with MC33905 | SPI | See MC33905 | 32-pin SOICW Exposed Pad | 1Q2010 |
| MC33905 | System Basis Chip(SBC)-Gen 2-with High Speed CAN & LIN Interfaces | High speed CAN & 1 or 2 LIN physical interfaces. 5.0 or 3.3 V and VAux regulators w/current sharing. | CAN high-speed, dual wires. LIN single wire | 5.5 to 27 | 20 | 65 | Config. I/O, MUX - out, SAFE output, Low power modes w/INT and Reset. | SPI | Overcurrent, Overtemperature, Short circuit | 32-pin SOICW Exposed Pad 54-pin SOICW, Exposed Pad | 1Q2010 |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

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ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Network Transceivers — LIN, ISO-9141, J-1850 Physical Interface Components

| Product | Description | Main Characteristics | Communication Protocol | Operating Voltage (V) | Current Limitation Standby (μA) | | Other Features | Control and Status Reporting ¹ | Protection Features | Packaging | Status |
|---------|---|--|---|-----------------------|---------------------------------|-----|--|---|---|---|---------------------------|
| | | | | | Typ | Max | | | | | |
| MC33399 | Local Interconnect Network (LIN) Physical Layer | Offers speed communication from 1.0 kbps to 20 kbps, and up to 60 kbps for Programming Mode. It supports LIN Protocol Specification 1.3. | LIN single wire | 7.0 to 27 | 20 | 50 | Wake-up input pin, control of external voltage regulator | Parallel Communication | Current limitation, Thermal protection | 8-pin SOICN | Production EVB |
| MC33661 | eLIN – Enhanced LIN Physical Layer (Local Interconnect Network) | Selectable slew rate for operations at 10, 20, 100 kbps; bus short to ground fail safe; excellent EMC behavior. | LIN single wire | 5.5 to 27 | 8.0 | 12 | Compatibility with 5.0 V and 3.3 V micros, wake-up input control of external regulator | Parallel Communication | Current limitation, Thermal protection | 8-pin SOICN | Production EVB |
| MC33812 | Single Cylinder Engine Control IC | Engine control power IC, with 3 Low-Side drivers, one pre-driver, +5V pre-regulator, ISO-9141 physical interface and MCU watchdog circuit. | ISO-9141 | 4.5 to 36 | — | — | MCU Watchdog timer, +5V pre-regulator for MCU, MCU Power on RESET | Parallel | Overcurrent, Outputs Short to Battery, Overtemperature | 32-pin SOICW Exposed Pad | Production EVB Ref. Dsgn. |
| MC33905 | System Basis Chip(SBC)-Gen 2-with High Speed CAN & LIN Interfaces | High speed CAN & 1 or 2 LIN physical interfaces. 5.0 or 3.3 V and VAux regulators w/current sharing. | CAN high-speed, dual wires. LIN single wire | 5.5 to 27 | 20 | 65 | Config. I/O, MUX - out, SAFE output, Low power modes w/INT and RST capability. | SPI | Overcurrent, Overtemperature, Short circuit and undervoltage detect | 32-pin SOICW, Exposed Pad 54-pin SOICW, Exposed Pad | 1Q2010 |
| MC33910 | System Basis Chip with High-Side Drivers and LIN Physical Interface | LIN 2.0 compatible, 5.0 V60mA LDO, 2 High-Side drivers w/PWM, 1 analog/digital input | LIN single wire | 5.5 to 18 | 48 | 80 | Hall Sensor supply, Configurable Window Watchdog | SPI 4 MHz | Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset | 32-pin LQFP | Production EVB ('912) |
| MC33911 | System Basis Chip with DC Motor Pre-driver and LIN Physical Interface | LIN 2.0 compatible, 5.0 V60mA LDO, 2 High-Side drives & 2 Low-Side drivers w/PWM, 2 analog/digital inputs | LIN single wire | 5.5 to 18 | 48 | 80 | Configurable Window Watchdog | SPI 4 MHz | Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset | 32-pin LQFP | Production EVB ('912) |
| MC33912 | System Basis Chip with DC Motor Pre-driver and Current Sense and LIN Physical Interface | LIN 2.0 compatible, 5.0 V60mA LDO, 2 High-Side drives & 2 Low-Side drivers w/PWM, 4 analog/digital inputs | LIN single wire | 5.5 to 18 | 48 | 80 | Hall Sensor supply, Configurable Window Watchdog, Current Sense | SPI 4 MHz | Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset | 32-pin LQFP | Production EVB |

1. Products available with SPI Control work with the KITUSBSPiEVME and the KITUSBSPiDGLVME USB-SPI Interface Boards.

Network Transceivers — Distributed Systems Interface (DSI) Components

| Product | Description | Main Characteristics | Max Data Rate | Operating Temp Range (°C) | Bus Sw. Resistance, typ/max (Ω) | Packaging | Status |
|---------|---|---|---------------|---------------------------|---------------------------------|--------------------------|------------|
| MC33780 | Dual DSI Master with Differential Drive | Bus controller for two differential DSI channels. SPI port for uC interface. Variable CRC generation and detection, thermal protection, frequency spreading. | 150 kbps | -40 to +85 | n/a | 16-pin SOICW | Production |
| MC33781 | Quad DSI Master with Differential Drive | Bus controller for four differential DSI channels. Dual SPI ports for uC and safing interfaces. Variable CRC generation and detection, comprehensive fault detection, thermal protection, frequency spreading | 200 kbps | -40 to +90 | n/a | 32-pin SOICW Exposed Pad | Production |
| MC33784 | DSI Sensor Interface | DSI slave device optimized as a sensor interface. Differential bus capability & dual bus switches for improved EMC performance, 2-channel 10-bit ADC, 5.0 V regulated output, 3 configurable logic pins, CRC generation and checking. | n/a | -40 to +150 | 3.0/6.0 | 16-pin SOICN | Production |
| MC33789 | Airbag System Basis Chip (IC) (SBC) | Air bag control module which monitors battery voltage, sensor status and supplies various voltages to the air bag system. Uses SPI for MCU communication. Uses PSi5 for satellite sensors communication. | 125 kbps | -40 to +125 | n/a | 64-pin LQFP, Exposed Pad | 2Q2010 |
| MC33793 | DSI Sensor Interface | DSI slave device. 5.0 V regulated output, 4 configurable I/O pins (logic I/O or 8-bit ADC), fault tolerant, logic output high current buffer. | n/a | -40 to +125 | 4.0/8.0 | 16-pin SOICN | Production |

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ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Signal Conditioning

| Product | Description | Main Characteristics | Switch Monitor Voltage (V) | Operating Voltage (V) | Packaging | Status |
|---------|---|--|----------------------------|-----------------------|--|----------------|
| MC33811 | Solenoid Monitor Integrated Circuit | 5 input solenoid monitoring to verify proper electrical and mechanical solenoid operation. | 0 to 64 | 10.5 to 15.5 | 16-pin SOICW | Production EVB |
| MC33972 | 22 input Multiple Switch Detect Interface with 16 mA Wetting Current and Suppressed Wake-up | Multiple switch detection interface with suppressed wake-up designed to detect closing and opening of up to 22 switch contacts (14 GND, 8 configurable), wetting current of 2.0 mA or 16 mA. | -14 to 38/40 | 5.5 to 26 | 32-pin SOICW 32-pin SOICW Exposed Pad | Production EVB |
| MC33975 | 22 input Multiple Switch Detect Interface with 32 mA Wetting Current and Wake-up | 22 inputs contact monitoring (14 GND, 8 configurable), 4.0 mA or 32 mA pulse wetting current, low-power mode interrupt capability, wake-up. Can supply current to external sensors. | -14 to 38/40 | 5.5 to 26.5 | 32-pin SOICW Exposed Pad | Production EVB |
| MC34825 | Micro-USB Interface IC | Supports the UCS/OMTP recommended charger function as well as provides USB interface signal levels and other audio interface functions | 0 to 28 (VBus only) | 2.7 to 5.5 | 20-pin QFN Exposed Pad | 1Q2010 |

System Basis Chip

| Product | Description | Main Characteristics | Bus Type and Standard | Operating Voltage (V) | Current Limitation Standby (μ A) | | Other Features | Diagnostics ¹ | Protection Features | Packaging | Status |
|---------|---|--|---|-----------------------|---------------------------------------|-----|--|--------------------------|---|--|-----------------------|
| | | | | | Typ | Max | | | | | |
| MC33742 | System Basis Chip with Enhanced High Speed CAN (250K to 1Mbps) | SBC, Dual V_{REG} Enhance HS CAN with Bus failure diagnostic capability, 4 wake-up inputs | CAN HS dual wire | 5.5 to 27 | 60 | 150 | Low power modes, remote and local wake-up capabilities | SPI 4 MHz | Current and thermal protection for CAN and regulator | 28-pin SOICW 48-pin QFN | Production EVB |
| MC33889 | System Basis Chip with Low Speed Fault Tolerant CAN | Dual 5.0 V regulators LS CAN, 2 wake-up inputs | CAN low-speed, dual wires | 5.5 to 27 | 60 | 100 | Dual voltage regulator, watchdog, wake input, sleep and stop modes | SPI 4 MHz | Fault tolerant | 28-pin SOICW | Production EVB |
| MC33904 | System Basis Chip(SBC)-Gen 2-with High Speed CAN Interface | High speed CAN physical interface. 5.0 or 3.3 V and VAux regulators w/current sharing | CAN high-speed, dual wires | 5.5 to 27 | 20 | 65 | Config. I/O, MUX - out, pin compatible with MC33905 | SPI | Same as MC33905 | 32-pin SOICW Exposed Pad | 1Q2010 |
| MC33905 | System Basis Chip(SBC)-Gen 2-with High Speed CAN & LIN Interfaces | High speed CAN & 1 or 2 LIN physical interfaces. 5.0 or 3.3 V and VAux regulators w/current sharing. | CAN high-speed, dual wires. LIN single wire | 5.5 to 27 | 20 | 65 | Config. I/O, MUX - out, SAFE output, Low power modes w/INT and RST capability. | SPI | Overcurrent, Overtemperature, Short circuit and undervoltage detect | 32-pin SOICW, Exposed Pad 54-pin SOICW, Exposed Pad | 1Q2010 |
| MC33910 | System Basis Chip with High-Side Drivers and LIN Physical Interface | LIN 2.0 compatible, 5.0 V 60mA LDO, 2 High-Side drivers w/PWM, 1 analog/digital input | LIN single wire | 5.5 to 18 | 48 | 80 | Hall Sensor supply, Configurable Window Watchdog | SPI 4 MHz | Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset | 32-pin LQFP | Production EVB ('912) |
| MC33911 | System Basis Chip with DC Motor Pre-driver and LIN Physical Interface | LIN 2.0 compatible, 5.0 V 60mA LDO, 1 High-Side driver & 2 Low-Side drivers w/PWM, 2 analog/digital inputs | LIN single wire | 5.5 to 18 | 48 | 80 | Configurable Window Watchdog | SPI 4 MHz | Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset | 32-pin LQFP | Production EVB ('912) |
| MC33912 | System Basis Chip with DC Motor Pre-driver and Current Sense and LIN Physical Interface | LIN 2.0 compatible, 5.0 V 60mA LDO, 2 High-Side drives & 2 Low-Side drivers w/PWM, 4 analog/digital inputs | LIN single wire | 5.5 to 18 | 48 | 80 | Hall Sensor supply, Configurable Window Watchdog, Current Sense | SPI 4 MHz | Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset | 32-pin LQFP | Production EVB |
| MC33989 | System Basis Chip with High Speed CAN | Dual 5.0 V regulators HS CAN, 4 wake-up inputs | CAN high speed, dual wires | 5.5 to 27 | 80 | 150 | Dual voltage regulator, watchdog, wake input, sleep and stop modes | SPI 4 MHz | Current limitation, Thermal protection | 28-pin SOICW | Production EVB |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Embedded MCU plus Power

| Product | Description | Main Characteristics | Power Features | MCU Reference | MCU Detail | Additional Information | Packaging | Status |
|-----------|--|--|--|---------------|--|---|--------------------------|-----------------------|
| MM908E621 | DC Motor/Mirror Control and LIN Mirror Control, Integrated Quad Half-Bridge and Triple High-Side with Embedded MCU and LIN for High End Mirror | Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slewrates, Window Watchdog, "Normal/Stop/Sleep Mode "Control | 2 x 275 mΩ Half-Bridges; 2 x 750 mΩ Half-Bridges; 1 x 185 mΩ High-Side; 2 x 440 mΩ High-Side; Switched 5.0 V Output (25 mA) | MC68HC908EY16 | HC08 Core, 16K Flash, 512 Bytes RAM, ESCI, 8-Channel 10-bit ADC, Two 16-bit 2 Channel Timers, Internal Clock Generator | 2/3 Pin Hall Sensor Input, Analog Input with Current Source, 40 V Rated Wake-up Input, V _{sup} , Chip Temperature and Current Sensing | 54-pin SOICW Exposed Pad | Production |
| MM908E622 | DC Motor/Mirror Control and LIN Mirror Control, Integrated Quad Half-Bridge, Triple High-Side and EC Glass Driver with Embedded MCU and LIN for High End Mirror | Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slewrates, Window Watchdog, "Normal/Stop/Sleep Mode "Control | 2 x 275 mΩ Half-Bridges; 2 x 750 mΩ Half-Bridges; 1 x 185 mΩ High-Side; 2 x 440 mΩ High-Side; Switched 5.0 V Output (25 mA) EC Glass Driver | MC68HC908EY16 | HC08 Core, 16K Flash, 512 Bytes RAM, ESCI, 8-Channel 10-bit ADC, Two 16-bit 2 Channel Timers, Internal Clock Generator | 2/3 Pin Hall Sensor Input, Analog Input with Current Source, 40 V Rated Wake-up Input, V _{sup} , Chip Temperature and Current Sensing | 54-pin SOICW Exposed Pad | Production |
| MM908E624 | DC Motor Control Using Relays (for example, Window Lift, Sun Roof, and Power Seats), Triple High-Side Switch with Embedded MCU + Power + LIN | Voltage Regulator 5.0 V/50 mA, LIN Physical Layer with Selectable Slewrates, Window Watchdog with Selectable Timing, Normal/Stop/Sleep Mode Control | 1 x 7 Ω High-Side, 2 x 2.5 Ω High-Side Switches for Relay Control | MC68HC908EY16 | HC08 Core, 16K Flash, 512 Bytes RAM, ESCI, 8-Channel 10-bit ADC, Two 16-bit 2 Channel Timers, Internal Clock Generator | Operational Amplifier, 2 x 40 V Rated Wake-up Inputs | 54-pin SOICW | Production EVB |
| MM908E625 | Mirror Control, Stepper Motor Control, Door Lock Quad Half-Bridge and Single High-Side with Embedded MCU and LIN | Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slewrates, Timeout Watchdog with Periodic Wake-up Feature, Normal/Stop Mode Control | 4 x 400 mΩ Half-Bridges with Current Control; 1 x 600 mΩ High-Side; Switched 5.0 V Output (25 mA) | MC68HC908EY16 | HC08 Core, 16K Flash, 512 Bytes RAM, ESCI, 8-Channel 10-bit ADC, Two 16-bit 2 Channel Timers, Internal Clock Generator | 3 x 2 Pin Hall Sensor Inputs with Cyclic Wake-up Feature, Analog Input with Current Source, V _{sup} , Chip Temperature and Current Sensing | 54-pin SOICW Exposed Pad | Production EVB |
| MM908E626 | Stepper Motor Control, Quad Half-Bridge with Embedded MCU and LIN for High Temperature T _j = 135°C | Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slewrates | 4 x 400 mΩ Half-Bridges with Current Control; Switched 5.0 V Output (24 mA) | MC68HC908EY16 | HC08 Core, 16K Flash, 512 Bytes RAM, ESCI, 8-Channel 10-bit ADC, Two 16-bit 2 Channel Timers, Internal Clock Generator | V _{sup} , Chip Temperature and Current Sensing | 54-pin SOICW Exposed Pad | Production EVB ('625) |
| MM912x634 | DC Motor Control Using Relays (for example, Window Lift, Sun Roof, and Power Seats), Dual High-Side and Dual Low Side Switches with Embedded S12 MCU + Power + LIN | Cascaded Dual Voltage Regulator 2.5 V/ 50 mA and 5.0 V/80 mA, LIN Physical Layer with Selectable Slewrates, Window Watchdog with Selectable Timing, Normal/ Stop/Sleep Mode Control, Hall Supply of 18 V/30 mA | 7 Ω High-Side Switches, 2.5 Ω Low-Side Switches for Relay Control | MC9S12132(F) | S12 16-Bit Core, 32K Flash, 2K Bytes RAM, ESCI, Multi channel 10-bit ADC, 16-bit 4 Channel Timer, Internal Clock Generator | High Voltage Wake-up Inputs, Selectable Gain I-Sense, Battery Voltage Sense. | 48-pin LQFP Exposed Pad | 1Q2010 |

Audio and Video

| Product | Description | Main Characteristics | Operating Input Voltage (V) | Power Dissipation (mW) | Frequency Band (KHz) | Additional Features | Packaging | Status |
|----------|-----------------------------|--|-----------------------------|------------------------|----------------------|---|--|------------|
| SGTL5000 | Ultra Low-Power Audio Codec | A low-power stereo codec that includes headphones amplifier and is designed to provide a comprehensive audio solution for portable products that require line-in, mic-in, line-out, headphone-out and digital I/O. | 1.62 to 3.6 | <10 | .020 to 20 | PLL clocking; I2S, I2C and SPI communications; 2 internal power supplies; stereo line in; ADC & DAC; Mic line in; Integrated Digital Processing | 3mm x 3mm 20-pin QFN 5mm x 5mm 32-pin QFN | Production |

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FREESCALE SEMICONDUCTOR POWER MANAGEMENT PRODUCTS

The Power Management products portfolio provides solutions for Linear and Switching voltage regulators. Hot Swap control and Power over Ethernet devices for use in applications ranging from Consumer and Industrial to Automotive.

SMARTMOS™—Freescale Semiconductor SMARTMOS technology allows designers to interface high-precision components with the harsh automotive environment.

Cost-Effective—Ideally suited for rugged automotive applications, SMARTMOS solutions offer a cost-effective blend of analog, digital, and robust power silicon that enables integrated, mixed-signal, power control ICs.

Functionality—SMARTMOS solutions implement traditional analog functions with smaller die size, and a modular process produces components with the minimum number of process steps for each circuit, minimizing overhead.

Benefits—Freescale Semiconductor SMARTMOS technology brings a wide range of benefits to today's designs, including component reductions, power capability, durability, efficiency, precision, high-performance analog, and robustness.

Packaging - Freescale devices may be offered in EPP and RoHS compliant packages; view the external web for specifics.

For additional information, visit:

Documentation, Tool, and Product Libraries

www.freescale.com

www.freescale.com/analog

www.freescale.com/powermanagement

POWER MANAGEMENT

Power Management — Linear Regulators

| Product | Description | Main Characteristics | Bus Type and Standard | Operating Voltage (V) | Current Limitation Standby (μA) | | Other Features | Diagnostics ¹ | Protection Features | Packaging | Status |
|----------|---|--|----------------------------|------------------------|---------------------------------|-----|---|--------------------------|---|-------------------------------------|----------------|
| | | | | | Typ | Max | | | | | |
| MPC18730 | 1.15 V/2.4 V 2-CH DC to DC converters with 3 low dropout regulators | 2 Programmable DC-DC Converters, 3 Programmable Low Drop Regulators, Low Battery Operation 0.9 V | n/a | 0.9 to 4.2 | 5.0 | 12 | Pow Switches, Vout Set by Serial Input | SPI 4 MHz | n/a | 64-pin QFN | Production EVB |
| MC33730 | Switch Mode Power Supply with Multiple Linear Regulators and Power Sequencing | Step-down Switching regulator (2.0 A), with 3 Programmable Linear Regulators (15 mA, 15 mA, 15 mA) and two 5.0 V Sensor supplies (100 mA, 100 mA). | n/a | 4.5 to 28 | 150 | — | Programmable voltage regulator, power sequencing, adjustable OSC - Switcher | None | Reverse Battery Protect, Undervoltage and Overvoltage Lockout, Reset monitor signals for regulators (4) | 32-pin SOICW-EP Exposed Pad | Production EVB |
| MC33742 | System Basis Chip with Enhanced High Speed CAN (250 K to 1 Mbps) | SBC, Dual V _{REG} , Enhance HS CAN with Bus failure diagnostic capability, 4 wake-up inputs; pin and function compatible with MC33989 | CAN HS dual wire | 5.5 to 27 | 60 | 150 | Low power modes, remote and local wake-up capabilities | SPI 4 MHz | Current and thermal protection for CAN and regulator | 28-pin SOICW 48-pin QFN Exposed Pad | Production EVB |
| MC33889 | System Basis Chip with Low Speed Fault Tolerant CAN | Dual 5.0 V regulators LS CAN, 2 wake-up inputs | CAN low-speed, dual wires | 5.5 to 27 | 60 | 100 | Dual voltage regulator, watchdog, wake input, sleep and stop modes | SPI 4 MHz | Fault tolerant | 28-pin SOICW | Production EVB |
| MC33989 | System Basis Chip with High Speed CAN | Dual 5.0 V regulators HS CAN, 4 wake-up inputs | CAN high speed, dual wires | 5.5 to 27 | 80 | 150 | Dual voltage regulator, watchdog, wake input, sleep and stop modes | SPI 4 MHz | Current limitation, Thermal protection | 28-pin SOICW | Production EVB |
| MC34700 | 3.6 V/5.25 V 3-CH DC-DC converters and 1- 3.6 V Linear regulator. | 3 adjustable Buck switching regulators and 1 adjustable Linear regulator. ±1.5% output voltage accuracy. 800 KHz switching frequency. | n/a | 1.5 to 6.0 & 9.0 to 18 | — | — | Power-up sequencing, Separate enable functions | PGOOD signal | Current limit, Short Circuit protect, Overtemperature protection, Overvoltage & Undervoltage protection | 32-pin QFN Exposed pad | Production EVB |

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME USB-SPI Interface Boards.

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POWER MANAGEMENT (continued)

Power Management — Switching Regulators

| Product | Description | Main Characteristics | Operating Input Voltage (V) | Output Voltages | Protection Features | Packaging | Status |
|----------|--|--|-----------------------------|--|---|-----------------------------|-----------------------------|
| MPC18730 | 1.15 V/2.4 V 2-CH DC to DC converters with 3 low dropout regulators | 2 Programmable DC-DC Converters, 3 Programmable Low Drop Regulators, Low Battery Operation 0.9 V | 0.9 to 4.2 | DC-DC: 1.6 to 3.2 V, 0.8 to 1.5 V 3LDO: 2.8 V adj. down | n/a | 64-pin QFN | Production EVB |
| MC33730 | Switch Mode Power Supply with Multiple Linear Regulators and Power Sequencing | Step-down switching regulator (2.0 A), with 3 Programmable Linear Regulators (15 mA, 15 mA, 15 mA) and 2 x 5.0 V sensor supply (100 mA, 100 mA). | 4.5 to 28 | 4.9 to 5.1 V, 2.0 to 3.3 V, 1.5 to 3.3 V, 1.0 to 5.0 V, 5.0 V | Reverse Battery Protect, Undervoltage and Overvoltage Lockout, Reset monitor signals for regulators (4) | 32-pin SOICW-EP Exposed Pad | Production EVB |
| MC34700 | 3.6 V/5.25 V 3-CH DC-DC converters and 1- 3.6 V Linear regulator. | 3 adjustable Buck switching regulators and 1 adjustable Linear regulator. ±1.5% output voltage accuracy. 800 KHz switching frequency. The switching regulators utilize voltage-mode control with external compensation. | 1.5 to 6.0 & 9.0 to 18 | 3.6 V (adj.) @400 mA 5.25 V (adj.) @1500 mA 2 - 3.6 V (adj.) @1250 mA | Current limit, Short Circuit protect, Overtemperature protection, Overvoltage & Undervoltage protection. | 32-pin QFN Exposed Pad | Production EVB |
| MC34701 | Dual Output Power Supply Switching (1.5 A) | Step-down switching regulator and Linear regulator with adjustable output voltage from 0.8 V to 5.0 V. Power sequencing, I ² C bus interface, watchdog, voltage margining, reset. | 2.8 to 6.0 | Adjustable | Current limit, Undervoltage shutdown, Overvoltage detect, Overtemperature shutdown | 32-pin SOICW | Production EVB |
| MC34702 | Dual Output Power Supply Switching (3.0 A) | Step-down switching regulator and Linear regulator with adjustable output voltage from 0.8 V to 5.0 V. Power sequencing, I ² C bus interface, watchdog, voltage margining, reset. | 2.8 to 6.0 | Adjustable | Current limit, Undervoltage shutdown, Overvoltage detect, Overtemperature shutdown | 32-pin SOICW | Production EVB |
| MC34704 | Multiple Channel DC-DC Power Management IC | Features 8(A) or 5(B) buck & boost DC/DC switching regulators, with up to ±2% output voltage accuracy. It provides dynamic voltage scaling on all regulators. It is capable of operating at a switching frequency of up to 2 MHz. The 34704 utilizes I ² C programmability. | 2.7 to 5.5 | 15.0 V (adj.) @ 30 mA 15.0 V (adj.) @ 60 mA (A only) 5.0 V @ 500 mA (A only) 3 - 3.6 V (adj.) @ 300/500 mA 1.8 V (adj.) @ 550 mA -9.0 V (adj.) @ 60 mA (A only) | Output Undervoltage & Overvoltage detect, Overcurrent limit detection and Short Circuit protect, Thermal limit detect | 56-pin QFN Exposed Pad | Production EVB(A) EVB(B) |
| MC34712 | Single synchronous DDR Switch-Mode regulator (±3.0 A) | Synchronous buck switching regulator with adjustable output and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz. | 3.0 to 6.0 | 0.7 to 1.35 V | Overcurrent limit, Short Circuit shutdown, Thermal shutdown, Output Overvoltage & Undervoltage detect | 24-pin QFN | Production EVB |
| MC34713 | Single synchronous buck switching regulator (5.0 A) | Synchronous buck switching regulator with adjustable output and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz. | 3.0 to 6.0 | 0.7 to 3.6 V | Overcurrent limit, Short Circuit protect, Thermal shutdown, Output Overvoltage & Undervoltage detect | 24-pin QFN | Production EVB |
| MC34716 | Dual synchronous DDR Switch-Mode regulators (5.0 A, ±3.0 A) | Synchronous buck switching regulators with adjustable outputs and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz. | 3.0 to 6.0 | Chan. 1: 0.7 to 3.6 V, Chan. 2: 0.7 to 1.35 V | Overcurrent limit, Short Circuit protect, Thermal shutdown, Output Overvoltage & Undervoltage detect | 26-pin QFN | Production EVB |
| MC34717 | Dual synchronous buck switching regulators (5.0 A, 5.0 A) | Synchronous buck switching regulators with adjustable outputs and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz. | 3.0 to 6.0 | Chan. 1: 0.7 to 3.6 V, Chan. 2: 0.7 to 3.6 V | Overcurrent limit, Short Circuit protect, Thermal shutdown, Output Overvoltage & Undervoltage detect | 26-pin QFN | Production EVB |
| MC34726 | A high efficiency, low quiescent current synchronous buck regulator implementing Freescale's innovative Z-Mode architecture. | Voltages ranging from 0.8 V to 3.3 V reduce the number of extra components. The part is able to provide 300 mA continuous load current across the input and output voltage ranges. Switching frequency options of 2 MHz and 4 MHz. | 2.7 to 5.5 | 1.2 V - 3.3 V @ 300 mA | Internal 2 ms Soft Start, Thermal & Overcurrent protection | 8-pin UDFN (2x2) | Production EVB (727) |
| MC34727 | A high efficiency, low quiescent current synchronous buck regulator implementing Freescale's innovative Z-Mode architecture | Voltages ranging from 0.8 V to 3.3 V, reduce the number of extra components. The part is able to provide 600 mA continuous load current across the input and output voltage ranges. Switching frequency of 2 MHz | 2.7 to 5.5 | 1.2 V - 3.3 V @ 600 mA | Internal 2 ms Soft Start, Thermal shutdown, Current limit, Undervoltage lock-out | 8-pin UDFN (2x2) | Production EVB |

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POWER MANAGEMENT (continued)

LED Drivers

| Product | Description | Main Characteristics | Operating Input Voltage (V) | Output Voltages | Protection Features | Packaging | Status |
|---------|--|---|-----------------------------|------------------|---|-------------------------|-----------------------------|
| MC34844 | 10 Channel LED Backlight Driver with Integrated Power Supply | High efficiency LED driver for use in backlighting LCD displays. Capable of driving more than 150 LEDs, in 10 parallel strings, with 50/80 mA per string. Currents in the 10 strings are matched to within $\pm 2\%$. Controlled through an I ² C bus. Contains an PWM generator for LED dimming. | 7.0 to 28 | 60 V, @ 3.0 A | Undervoltage Lockout, Overvoltage protection. Over-temperature protect. Overcurrent protection. Output Short protect | 32-pin QFN, Exposed Pad | Production EVB ¹ |
| MC34845 | 6 Channel LED Backlight Driver with Integrated Power Supply | High efficiency LED driver for use in backlighting LCD displays. Capable of driving more than 96 LEDs, in 6 parallel strings. Currents in the 6 strings are matched to within $\pm 2\%$. Programmable LED current setting. Contains a PWM generator for LED dimming. | 6.0 to 21 | 60 V @ 2.1A | Undervoltage Lockout, Overvoltage protection. Over-temperature protect. Overcurrent protection. Output Short and Open protect | 24-pin QFN, Exposed Pad | Production EVB |

1. Supporting backlight EVB - KITLEDCLKL16EVBE

Battery Management

| Product | Description | Main Characteristics | Operating Input Voltage (V) | Output Voltages | Protection Features | Packaging | Status |
|---------|--|--|-------------------------------------|---|--|-------------------------|----------------|
| MC34671 | High-input Voltage Charger for Single-cell Li-Ion or Li-Polymer Batteries | Fixed output charge voltage with $\pm 0.7\%$ voltage accuracy and a maximum user programmable charge current of 600 mA, with $\pm 5\%$ current accuracy. Supports trickle, CC and CV charge modes. | 2.6 to 10 | 4.2 V @ 600 mA | Undervoltage POR, Input Overvoltage protection above 11 V, Overtemperature protect. Tolerates input voltage up to 28 V DC. | 8-pin UDFN Exposed Pad | Production EVB |
| MC34673 | High-input Voltage Charger for Single-cell Li-Ion or Li-Polymer Batteries | Fixed output charge voltage with $\pm 0.7\%$ voltage accuracy and a maximum user programmable charge current of 1200 mA, with $\pm 6\%$ current accuracy. Supports trickle, CC, and CV charge modes. | 2.6 to 6.6 | 4.2 V @ 1200 mA | Undervoltage POR, Input Overvoltage protection above 6.8 V, Overtemperature protect. Tolerates input voltage up to 28 V DC. | 8-pin UDFN Exposed Pad | Production EVB |
| MC34674 | High-input Voltage Travel Charger for Single-cell Li-Ion or Li-Polymer Batteries | Fixed output charge voltage with $\pm 0.4\%$ voltage accuracy and a maximum factory selectable charge current of 1050 mA, with $\pm 8\%$ current accuracy. Supports trickle, CC, and CV charge modes. Interface to NTC thermistor. | 4.3 to 10.0 | 4.2 V @ various currents - see Data Sheet | Undervoltage POR, Input Overvoltage protection above 11 V, Overtemperature protect. Tolerates input voltage up to 28 V DC. | 8-pin UDFN Exposed Pad | Production EVB |
| MC34675 | High-input Voltage Charger for Single-cell Li-Ion Batteries with Linear Regulator | Fixed output charge voltage with $\pm 0.7\%$ voltage accuracy and a maximum user programmable charge current of 1000 mA, with $\pm 6\%$ current accuracy. Supports trickle, CC, CV and EOC charge modes. The 4.85 V linear regulator is capable of 10 mA output current | 4.3 to 6.6 | 4.2 V @ 1000 mA 4.85 V @ 10 mA | Undervoltage POR, Input Overvoltage protection above 6.8 V, Overtemperature protection. Tolerates input voltage up to 28 V DC. | 8-pin UDFN Exposed Pad | Production EVB |
| MC34676 | High-input Voltage Charger for Single-cell Li-Ion Batteries with Linear Regulator and dual input voltage supplies (AC & USB) | Fixed output charge voltage with $\pm 0.7\%$ voltage accuracy and a maximum user programmable charge current of 400/1200 mA, with $\pm 5\%$ current accuracy. Supports trickle, CC, CV and EOC charge modes. The 4.85 V linear regulator function can supply 50 mA or 12 mA of output current. | 4.0 to 5.5 (USB) 4.0 to 6.6 (AC) | 4.2 V @ various currents - see Data Sheet 4.85 V @ various currents - see Data Sheet | Undervoltage POR, Input Overvoltage protection above 6.8 V (AC) or 5.8 V (USB), Overtemperature protection. Tolerates input voltage up to 28 V DC. | 12-pin UDFN Exposed Pad | Production EVB |

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POWER MANAGEMENT (continued)

Power Management and User Interface IC (PMUIC)

| Product | Description | Main Characteristics | MCU Support | Operating Input Voltage (V) | Protection Features | Light Management | Additional Features | Packaging | Status |
|---------|--|---|-------------------------------------|-----------------------------|---|--|--|--|--------------------------|
| MC13783 | Highly Integrated, High Tier Power Management & Audio IC | 18 LDOs, 4 buck and 1 boost switching regulators; Li Ion battery charging; 2 handset mic & 1 headset mic transmitter amplifiers; Earpiece, loudspeaker and headset receiver amplifiers; 13 bit voice Codec; 16 bit stereo record; 16 bit stereo DAC; multiple charging modes; Dual SPI and Dual SSI interfaces. | **Single and dual i.MX31 and i.MX27 | 2.9 to 4.65 | Over Temperature, Over Voltage, Under Voltage | 3 zone LED drivers, 3 zone RGB drivers | RTC, USB-OTG, CEA-936-A Carkit, Dynamic Voltage Scaling (DVS), Coincell, Touchscreen Interface | **247 pin BGA, 10x10 mm | Production |
| MC13883 | Integrated Charger, USB On-the-Go Transceiver and Carkit Interface | 2 Linear Regulators, Li Ion battery charger, Carkit switching transmitter amplifier, Dual, single serial path charging modes, SPI & I ² C interfaces | n/a | 2.9 to 4.65 | Over Voltage | Charge indicator only | USB-OTG, GP ADC, CEA-936-A Carkit | 40 pin QFN, 6x6 mm | Production |
| MC13892 | Power Management and User Interface IC | 18 regulators: 12 LDOs, 4 buck switchers, 2 boost switchers; Li Ion and Coin cell battery charging, single and serial path, SPI, I ² C, 10 bit ADC with 8 channels, 3 GPO ADCs, mux and scaling circuitry included. | **i.MX27, i.MX35, i.MX37, i.MX51 | 2.55 to 4.65 | Over Temperature, Over Voltage, Over Current, Short Circuit | 3 zone LED drivers, 3 zone RGB drivers | RTC, USB - OTG, Dynamic Voltage Scaling (DVS) | **139 pin BGA 7x7 mm, **186 pin BGA 12x12 mm | 1Q2010 |
| MC34704 | Multiple Channel DC-DC Power Management IC | Features 8(A) or 5(B) buck & boost DC/DC switching regulators, with up to ±2% output voltage accuracy. It is capable of operating at a switching frequency of up to 2 MHz. The 34704 utilizes I ² C programmability. | i.MX25, i.MX27 | 2.7 to 5.5 | Output Undervoltage & Overvoltage detect, Overcurrent limit detection and Short Circuit protect, Thermal limit detect | n/a | Dynamic Voltage Scaling (DVS) | 56-pin QFN Exposed Pad | Production EVB(A) EVB(B) |

Power over Ethernet (PoE)

| Product | Description | Main Characteristics | Operating Input Voltage (V) | Max Current Limit (A) | Number of Channels | Protection Features | Packaging | Status |
|---------|--|--|-----------------------------|-----------------------|--------------------|---|--------------|----------------|
| MC34670 | IEE 802.3af Powered Device with Current Mode Switching Regulator | Integrated IEEE 802.3af Compliant Interface, Signature Detection and Power Classification Functionality, High Performance Current Mode Switching Regulator | 30 to 60 | 2.1 | 1 | Fast Short Circuit Detect, Thermal Shutdown, Overvoltage Shutdown, Inrush Current Limit, Overvoltage Lock Out | 20-pin SOICW | Production EVB |

Freescale Semiconductor Access and Remote Control Products

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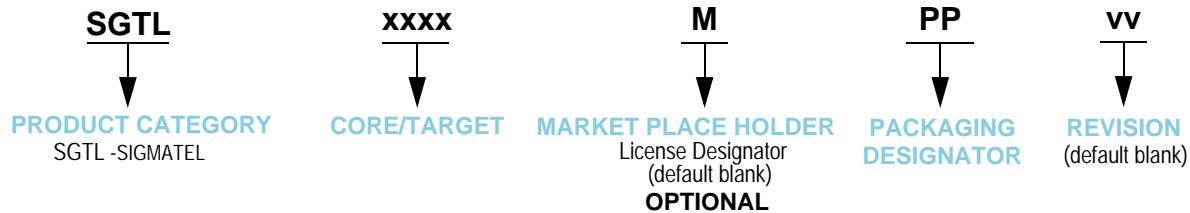
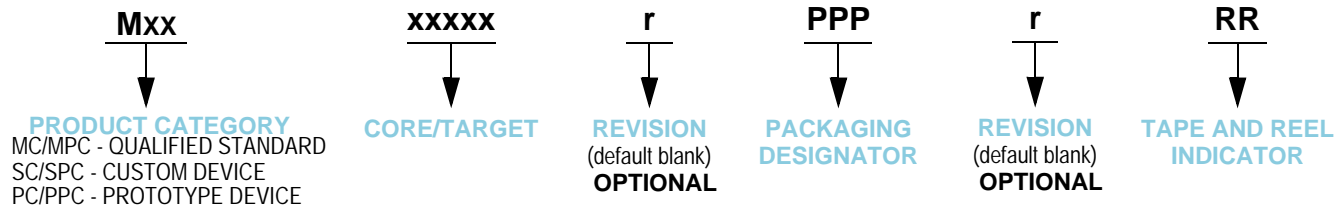
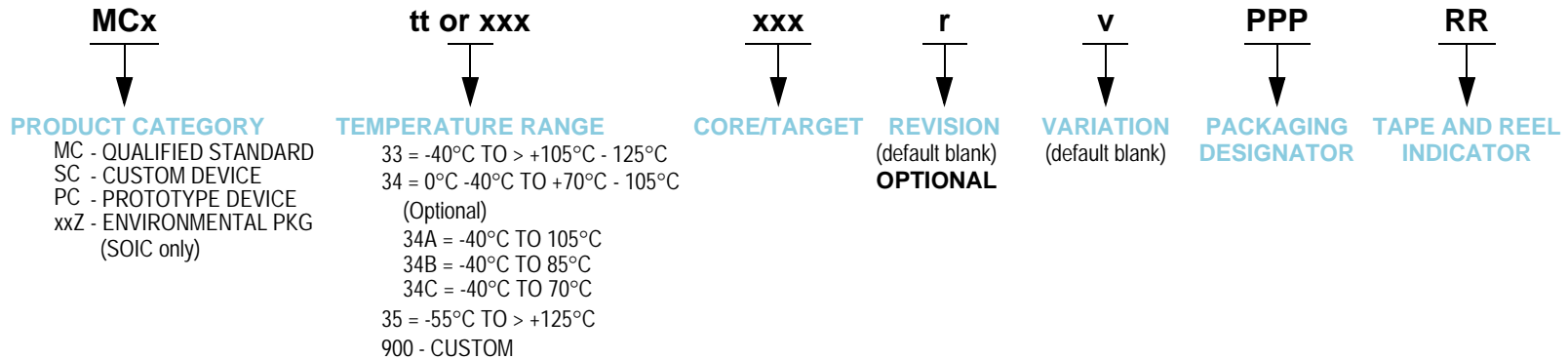
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Transmitters and Receivers

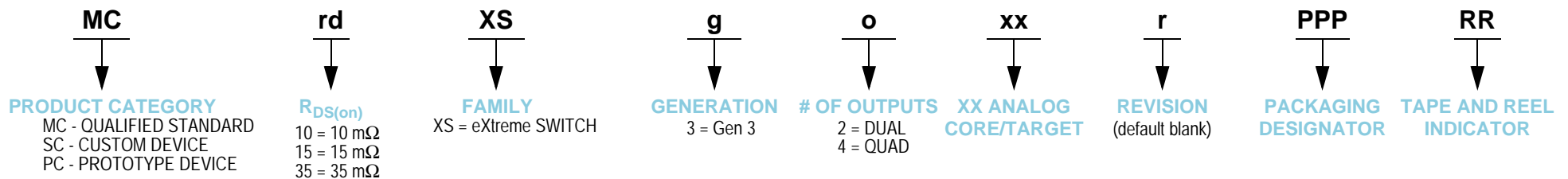
| Product | RF Type | RF Frequency | Protocols Supported | Clock Type | Bandwidth | Sensitivity | Temperature | Package | Additional Features | In Production | Market Focus |
|---------|-------------|-------------------|--------------------------|---------------------------------|-----------|------------------------------------|----------------|-----------------|---|---------------|--|
| MC33596 | Receiver | 315 MHz - 915 MHz | OOK and FSK Demodulation | Programmable PLL and Strobe OSC | 380 kHz | -103 dBm to -81 dBm typ in 4 steps | -40°C to +85°C | 32 LQFP, 32 QFN | RSSI (75 dB digital and 55 dB analog), Strobe OSC and Data Manager with clock recovery for Manchester coded signals | Yes | UHF RF Receiver, RF, Remote and Secure Entry |
| MC33696 | Transceiver | 315 MHz - 915 MHz | OOK and FSK Demodulation | Programmable PLL and Strobe OSC | 380 kHz | -103 dBm to -81 dBm typ in 4 steps | -40°C to +85°C | 32 LQFP, 32 QFN | RSSI (75 dB digital and 55 dB analog), Strobe OSC and Data Manager | Yes | Remote/Secure Entry (2-way RF) |

**Because of an order from the United States International Trade Commission, BGA-packaged product lines and part numbers indicated here currently are not available from Freescale for import or sale in the United States prior to September 2009: i.MX product families; MC13783 in 247 MAPBGA and MC13892 in 139, 186 MAPBGA packages.

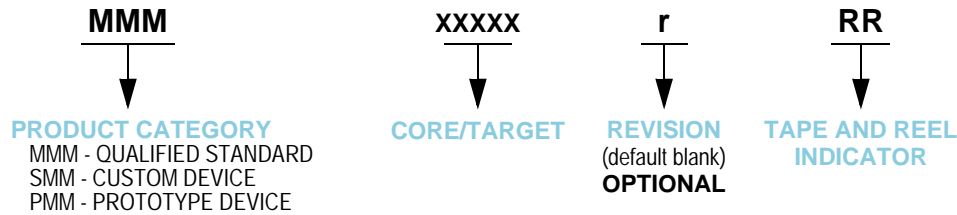
PRODUCT NUMBERING — ANALOG



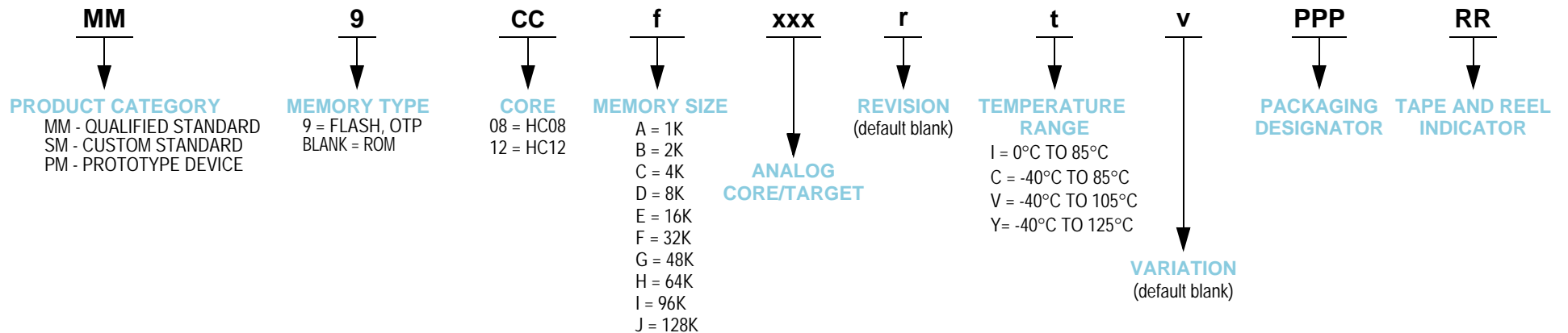
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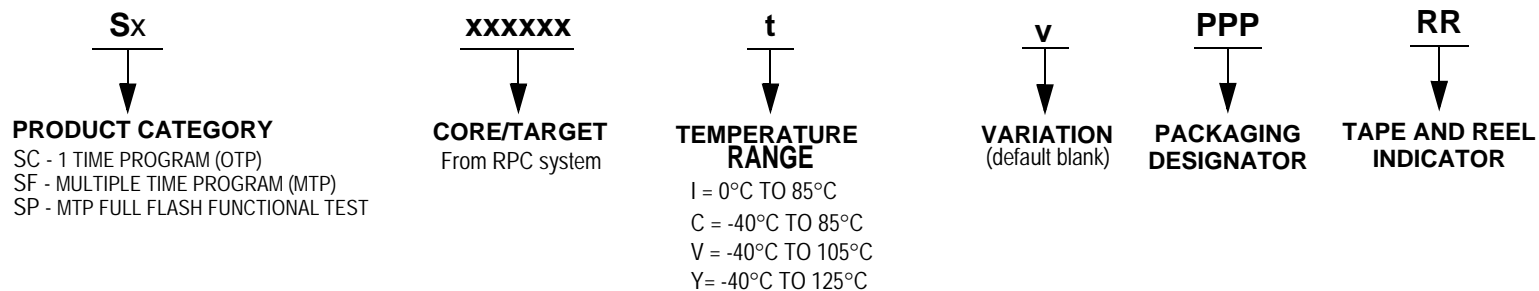
PRODUCT NUMBERING - RF TRANSCEIVER



PRODUCT NUMBERING — ANALOG EMBEDDED MCU plus POWER



Product Numbering System for Analog Embedded MCU and Power Flash programming



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