Analog, Mixed Signal and Power Management

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Analog, Mixed Signal and Power Management
- Power Actuation
- Network Transceivers
- Signal Conditioning
- System Basis Chip
- Embedded MCU plus Power
- Audio and Video
- Power Management

Access and Remote Control

freescale semiconductor

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 rug 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 Exposed Pad, 32-pin QFN 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
MM912F634	See Embedded MCU + Power (page 9)											
MM912G634	See Embedded MCU + Power (page 9)											
MM912H634	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.

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
MC10XS3535	Penta High-Side Switch (3 x 10mΩ, 2 x 35 mΩ), with PWM, Protection, Diagnostics and SPI Control	5	H	2.8, 5.5	3x10, 2x35	30, 60	2.0	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 EVB
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
MC35XS3500	Penta High-Side Switch (5 x 35 mΩ), with PWM, Protection, Diagnostics and SPI Control	5	H	2.8	35	30	2.0	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)											
MM912F634	See Embedded MCU + Power (page 9)											
MM912G634	See Embedded MCU + Power (page 9)											
MM912H634	See Embedded MCU + Power (page 9)											

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 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, 36-pin PQFN, 54-pin SOICW Exposed Pad	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
MC34933	Dual H-Bridge Motor Driver	Monolithic dual H-Bridge driver IC with charge pump.	2	400	1.0	1 μA	Parallel	—	Shoot Through Protect, Undervoltage Detect, Thermal detection	16 pin UDFN	Production
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
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	800	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	800	1.4	< 200 μA	Parallel	Shutdown Undervoltage	Shoot Through Undervoltage Detect	16-pin VMFP	Production

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 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°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 ±2%. Controlled through an I^2C 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 ±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
MC34848	8 Channel LED Backlight Driver with Integrated Boost Power Supply	High efficiency, LED driver for use in LCD backlighting applications. It is designed to support up to 160mA /channels in scanning mode, or 80mA/channels in local dimming mode. Current reference for LED current tolerance is accurate to ±1% channel-to-channel and IC-to-IC. The current can be programmed in both local dimming and scanning modes.	12 to 28	45 V (external FET)	LED short & open protect, Overvoltage protection. Over-temperature & Overcurrent protect.	48-pin QFN Exposed Pad	Production

1. Supporting backlight EVB - KITLEDBKLT16EVBE

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

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Power Actuation — Powertrain Control and Engine Management

Product	Description	Main Characteristics	Peak Current Limit (A)	R_{DSON} (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) Typ	Max	Other Features	Control and Status Reporting[1]	Protection Features	Packaging	Status
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	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	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	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	n/a	28-pin SOICW	Production EVB
MC33902	High-speed CAN Interface with Embedded 5V supply	High-speed CAN physical interface. Includes a 5.0 V 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 EVB
MC33903	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces	High speed CAN and 1 or 2 LIN physical interfaces. 5.0 or 3.3 V VDD regulators.	CAN high-speed, dual wires, LIN single wire	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, MUX - out, pin compatible with MC33905	"safe" SPI	See MC33905	32-pin SOICW Exposed Pad	Production EVB('905)
MC33904	System Basis Chip(SBC)-Gen 2-with High Speed CAN Interface	High speed CAN physical interface. 5.0 or 3.3 V VDD and VAux regs w/current sharing.	CAN high-speed, dual wires	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, MUX - out, pin compatible with MC33905	"safe" SPI	See MC33905	32-pin SOICW Exposed Pad	Production EVB('905)
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 VDD and VAux regulators w/current sharing.	CAN high-speed, dual wires. LIN single wire	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, MUX - out, SAFE output, Low power modes w/INT and Reset.	"safe" SPI	Overcurrent, Overtemperature, Short circuit	32-pin SOICW Exposed Pad, 54-pin SOICW 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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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) Typ	Max	Other Features	Control and Status Reporting[1]	Protection Features	Packaging	Status
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 18	20	50	Wake-up input pin, control of external voltage regulator	Parallel	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	7.0 to 18	8.0	12	Compatibility with 5.0 V and 3.3 V micros, wake-up input control of external regulator	Parallel	Current limitation, Thermal protection	8-pin SOICN	Production EVB
MC33662	LIN 2.1/SAE J2602-2 LIN Physical Layer Transceiver	Single wire LIN supports normal baud rates of 10 kbps (J) or 20 kbps (L) and fast rate of 100 kbps	LIN single wire	7.0 to 18	6.0	11	Active bus waveshaping, EMI immunity, Local & Remote wakeup	Parallel	Current limitation, Thermal protection	8-pin SOICN	June 2011 (EVB in Dev.)
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.
MC33903	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces	High speed CAN and 1 or 2 LIN physical interfaces. 5.0 or 3.3 V VDD regulators.	CAN high-speed, dual wires LIN single wire	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, MUX - out, pin compatible with MC33905	“safe” SPI	See MC33905	32-pin SOICW Exposed Pad	Production EVB(‘905)
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 VDD and VAux regulators w/current sharing.	CAN high-speed, dual wires. LIN single wire	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, MUX - out, SAFE output, Low power modes w/INT and Reset	“safe” SPI	Overcurrent, Overtemperature, Short circuit and undervolt. detect	32-pin SOICW Exposed Pad, 54-pin SOICW Exposed Pad	Production EVB
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	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	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	Multiple wake-up sources, LDO Fault Detect, Low Voltage Reset	32-pin LQFP	Production EVB (x2)

1. Products available with SPI Control work with the KITUSBSPIEVME and the KITUSBSPIDGLEVME 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 (SBC) with Power Supply and PSI5 Sensor Interface	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	Production EVB (contact sales)
MC33790	Distributed System Interface (DSI) Physical Interface (DSIP)	Dual current-limited waveshaped outputs, current sensing inputs, 3.3 V and 5.0 V	5 - 150 kbps	-40 to +85	6.0	16-pin SOICW	Production EVB
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 -14 to 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	Production EVB
MC34827	**Mini or Micro-USB Interface IC**	A dedicated IC for managing charging and signal multiplexing between a cell phone and its accessory via a 5-pin Mini or Micro-USB connector.	0 to 28 (VBus only)	2.7 to 5.5	20-pin 3x3 & 3x4 mm QFN w/Exposed Pad	Production

System Basis Chip

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Max	Other Features	Diagnostics[1]	Protection Features	Packaging	Status
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	Current and thermal protection for CAN and regulator	28-pin SOICW, 48-pin QFN Exposed Pad	Production EVB
MC33789	Airbag System Basis Chip (SBC) with Power Supply and PSI5 Sensor Interface	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.	PSI5	5.2 to 20	-	-	Safing state machine, 9 switch input monitors, 2 config. high/low side drivers, Power-on-reset, watchdog timer, Squib energy reserve	SPI	Safing state machine, Scrap mode	64-pin LQFP Exposed Pad	Production EVB (contact sales)
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	Fault tolerant	28-pin SOICW	Production EVB
MC33903	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces	High speed CAN and 1 or 2 LIN physical interfaces. 5.0 or 3.3 V VDD regulators.	CAN high-speed, dual wires, LIN	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, pin compatible with MC33905	“safe” SPI	Same as MC33905	32-pin SOICW Exposed Pad	Production EVB(‘905)
MC33904	System Basis Chip(SBC)-Gen 2-with High Speed CAN Interface	High speed CAN physical interface. 5.0 or 3.3 V VDD and VAux regulators w/current sharing	CAN high-speed, dual wires	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, pin compatible with MC33905	“safe” SPI	Same as MC33905	32-pin SOICW Exposed Pad	Production EVB(‘905)
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 VDD and VAux regulators w/current sharing.	CAN high-speed, dual wires. LIN single wire	5.5 to 27	15	35	Fail-safe state machine, Config. I/O, SAFE output, Low power modes w/INT and Reset	“safe” SPI	Overcurrent, Overtemperature, Short circuit and undervoltage detect	32-pin SOICW Exposed Pad, 54-pin SOICW Exposed Pad	Production EVB
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	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	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	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	Current limitation, Thermal protectionl	28-pin SOICW	Production EVB

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)

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 Slew rates, 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 Slew rates, 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 Slew rates, 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 Slew rates, 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 Slew rates	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, Two16-bit 2Channel Timers, Internal Clock Generator	V_{sup}, Chip Temperature and Current Sensing	54-pin SOICW Exposed Pad	Production EVB (‘625)
MM912F634	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 Slew rates, 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	MC9S12I32(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	Production EVB
MM912G634	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/ 10mA, 5.0 V/130 mA, LIN Physical Layer with Selectable Slew rates, Window Watchdog with Selectable Timing, Normal/ Stop/Sleep Mode Control, Hall Supply of 18 V/30 mA, ESCI, Multi channel 10-bit ADC	7 Ω High-Side Switches, 2.5 Ω Low-Side Switches for Relay Control	MC9S12I64	S12 16-Bit Core, 48K Bytes Flash, 2K Bytes RAM, 2K Bytes data Flash, 16-bit 4 Channel Timer, Internal Clock Generator, BDM	High Voltage Wake-up Inputs, Selectable Gain ISense, Battery Voltage Sense, additional 2.5V/80 mA voltage regulator.	48-pin LQFP with/without Exposed Pad	June 2011 (EVB - See ‘H634)
MM912H634	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/ 10mA, 5.0 V/130 mA, LIN Physical Layer with Selectable Slew rates, Window Watchdog with Selectable Timing, Normal/ Stop/Sleep Mode Control, Hall Supply of 18 V/30 mA, ESCI, Multi channel 10-bit ADC	7 Ω High-Side Switches, 2.5 Ω Low-Side Switches for Relay Control	MC9S12I64	S12 16-Bit Core, 64K Bytes Flash, 6K Bytes RAM, 4K Bytes data Flash, 16-bit 4 Channel Timer, Internal Clock Generator, BDM	High Voltage Wake-up Inputs, Selectable Gain ISense, Battery Voltage Sense, additional 2.5V/80 mA voltage regulator.	48-pin LQFP with/without Exposed Pad	June 2011 (EVB - in Dev.)
MM912J637	Intelligent Integrated Precision Battery Sensor	Battery voltage & current measurement with 16-bit sigma-delta ADC & IIR filter, PGA and simultaneous sampling, Voltage Regulators: 2.5 V/10mA & 60mA, 5.0 V/80 mA, LIN 2.1 Physical Layer w/Selectable Slew rates and triggered wake-up, Window Watchdog with Selectable Timing, Normal/Stop/Sleep/Crank Mode Control,	—	MC9S12I128	S12 16-Bit Core, 128K Flash, 6K Bytes RAM,4K bytes data Flash, ESCI, 16-bit 4 Channel Timer, Internal Clock Generator, BDM	Selectable Internal or external temp sense, 4 X 5V GPIO, 8 MCU GPIO including SPI functionality, internal or external oscillator	48-pin QFN Exposed Pad	3Q 2011 (EVB - in Dev.)

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Audio and Video

Product	Description	Main Characteristics	Operating Voltage (V)	Power Dissipation (mW)	Frequency Band (KHz)	Additionaln 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	20-pin QFN, 32-pin QFN	Production

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.

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POWER MANAGEMENT

Power Management — Linear Regulators

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation Standby Typ(μA)	Max(μA)	Other Features	Diagnostics[1]	Protection Features	Packaging	Status
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 & Overvoltage Lockout, Reset monitor signals for regulators (4)	32-pin SOICW 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; fully compatible with MC33989	CAN HS dual wire	5.5 to 27	60	150	Low power modes, remote and local wake-up capabilities	SPI	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	Fault tolerant	28-pin SOICW	Production EVB
MC33903	See System Basis Chip - (Page 8)										
MC33904	See System Basis Chip - (Page 8)										
MC33905	See System Basis Chip - (Page 8)										
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	Current limitation, Thermal protectionl	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 Voltage (V)	Output Voltages	Protection Features	Packaging	Status
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 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^2C 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^2C 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^2C 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 protect, 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

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POWER MANAGEMENT (continued)

LED Drivers

Product	Description	Main Characteristics	Operating 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 ± 2%. Controlled through an I^2C 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 ±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
MC34848	8 Channel LED Backlight Driver with Integrated Boost Power Supply	High efficiency, LED driver for use in LCD backlighting applications. It is designed to support up to 160mA /channels in scanning mode, or 80mA/ channels in local dimming mode. Current reference for LED current tolerance is accurate to ±1% channel-to-channel and IC-to-IC. The current can be programmed in both local dimming and scanning modes.	12 to 28	45 V (external FET)	LED short & open protect, Overvoltage protection. Over-temperature & Overcurrent protect.	48-pin QFN Exposed Pad	Production)

1. Supporting backlight EVB - KITLEDBKLT16EVBE

Battery Management

Product	Description	Main Characteristics	Operating 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 ±0.7% voltage accuracy and a maximum user programmable charge current of 600 mA, with ±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 ±0.7% voltage accuracy and a maximum user programmable charge current of 1200 mA, with ±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 ±0.4% voltage accuracy and a maximum factory selectable charge current of 1050 mA, with ±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 ±0.7% voltage accuracy and a maximum user programmable charge current of 1000 mA, with ±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 ±0.7% voltage accuracy and a maximum user programmable charge current of 400/1200 mA, with ±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 Integrated Circuits (PMIC)

Product	Description	Main Characteristics	MCU Support	Operating 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, loudspreaker 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^2C 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 Integrated Circuit (PMIC)	18 regulators: 12 LDOs, 4 buck switchers, 2 boost switchers; Li Ion and Coin cell battery charging, single and serial path, SPI, I^2C, 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)	Production EVB ('VK, 'VL)
MC34704	Multiple Channel DC-DC Power Management Integrated Circuit (PMIC)	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^2C 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)
MC34708	Power Management Integrated Circuit (PMIC)	5 programmable buck converters and 8 low drop out (LDO) regulators for primary use with Freescale i.MX series of microprocessors, graphics, peripheral and memory devices, as well as other system supplies. Li-ionbattery charger.	i.MX35, i.MX37, i.MX50, i.MX51, i.MX53	3.0 to 4.5	Regulators are over-voltage & under-current protected, Thermal limit protect, Battery mgmt. protect.	–	4 wire Touch Screen, PWM outputs, RTC, Coincell	207-pin MBGA (8x8 mm, 13x13 mm)	June 2011

Power over Ethernat (PoE)

Product	Description	Main Characteristics	Operating 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

Automotive Alternator Voltage Regulators(LIN 1.3 compliant)

Product	Description	Main Characteristics	Bus Type	Operating Voltage (Vdc)	Regulation Voltage (VDC)	Other Features	Diagnostics	Protection Features	Packaging	Status
TC80310	An integrated circuit intended to regulate the output voltage of an automotive alternator. It supplies a current via a high side MOSFET to the excitation coil of the alternator and provides an internal free-wheeling diode.	High side field driver, Internal freewheeling diode, Up to 8.0 A rotor current (excitation coil), Load response control (LRC), LIN interface, Set point voltage selectable	LIN	8 to 27	13.5 to 15.0 (100 mv steps)	Factory Selectable Features: LRC Rate, LRC disable RPM, Self start, Self start threshold, Alternator Pole pairs, Thermal Fault Threshold, Thermal Compensation Threshold, Phase Sensitivity, Phase Start Regulating RPM, Phase Stop Regulating RPM	LIN communication used for Electrical, Mechanical and Thermal fault reporting	Load Dump Protection, Thermal protection, Thermal compensation	Die	Production

Note: Choice of 16 parametric fields may be specified by the customer. Contact sales for specific parameter combinations and part numbering.

Freescale Semiconductor Access and Remote Control Products

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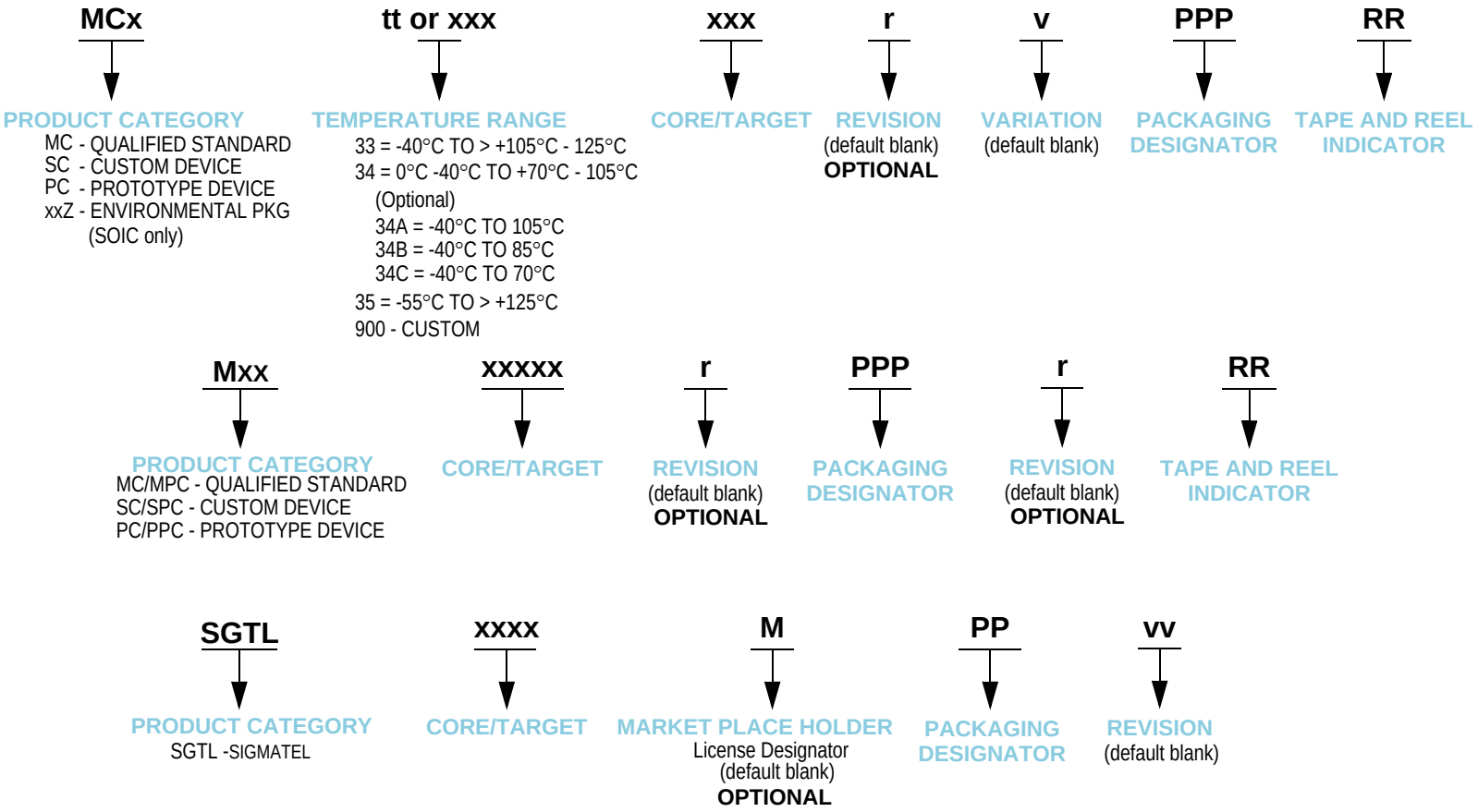
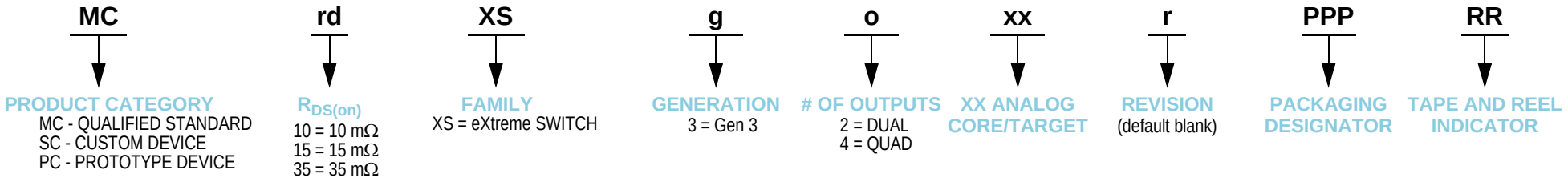
Transmitters and Receivers

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	-40ºC to +85ºC	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	-40ºC to +85ºC	32 LQFP, 32 QFN	RSSI (75 dB digital and 55 dB analog), Strobe OSC and Data Manager	Yes	Remote/Secure Entry (2-way RF)

PRODUCT NUMBERING — ANALOG



PRODUCT NUMBERING — ANALOG eXtreme SWITCH



PRODUCT NUMBERING - RF TRANSCEIVER

MMM
- **PRODUCT CATEGORY**
  - MMM - QUALIFIED STANDARD
  - SMM - CUSTOM DEVICE
  - PMM - PROTOTYPE DEVICE

xxxxx
- **CORE/TARGET**

r
- **REVISION**
  - (default blank)
  - OPTIONAL

RR
- **TAPE AND REEL INDICATOR**

PRODUCT NUMBERING — ANALOG EMBEDDED MCU plus POWER

MM
- **PRODUCT CATEGORY**
  - MM - QUALIFIED STANDARD
  - SM - CUSTOM STANDARD
  - PM - PROTOTYPE DEVICE

9
- **MEMORY TYPE**
  - 9 = FLASH, OTP
  - BLANK = ROM

CC
- **CORE**
  - 08 = HC08
  - 12 = HC12

f
- **MEMORY SIZE**
  - A = 1K
  - B = 2K
  - C = 4K
  - D = 8K
  - E = 16K
  - F = 32K
  - G = 48K
  - H = 64K
  - I = 96K
  - J = 128K

xxx
- **ANALOG CORE/TARGET**

r
- **REVISION**
  - (default blank)

t
- **TEMPERATURE RANGE**
  - I = 0°C TO 85°C
  - C = -40°C TO 85°C
  - V = -40°C TO 105°C
  - M= -40°C TO 125°C

v
- **VARIATION**
  - (default blank)

PPP
- **PACKAGING DESIGNATOR**

RR
- **TAPE AND REEL INDICATOR**

Product Numbering System for Analog Embedded MCU and Power Flash programming

SX
- **PRODUCT CATEGORY**
  - SC - 1 TIME PROGRAM (OTP)
  - SF - MULTIPLE TIME PROGRAM (MTP)
  - SP - MTP FULL FLASH FUNCTIONAL TEST

xxxxxx
- **CORE/TARGET**
  - From RPC system

t
- **TEMPERATURE RANGE**
  - I = 0°C TO 85°C
  - C = -40°C TO 85°C
  - V = -40°C TO 105°C
  - M= -40°C TO 125°C

v
- **VARIATION**
  - (default blank)

PPP
- **PACKAGING DESIGNATOR**

RR
- **TAPE AND REEL INDICATOR**

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