Analog and Mixed Signal

Power Actuation
Power Management
Network Transceivers
Embedded MCU + Power + LIN
Signal Conditioning
Special Function-Wired Communication
Access and Remote Control

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freescale™
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Introduction

FREESCALE SEMICONDUCTOR ANALOG AND MIXED SIGNAL PRODUCTS

Freescale Semiconductor is a supplier of world class Analog and Mixed Signal products for power switching, networking, communications, motion control, and power management. In addition, a change bar appears in the left margin of every page in this selector guide that contains new or revised information.

SMARTMOS PRODUCTS

Many of the Analog products use the proprietary *SMARTMOS*™ mixed signal silicon which is a hybrid process that allows for the integration of digital, precision analog, and power products.

There are three main categories of products—monolithic *SMARTMOS* ICs, multi-die single package intelligent high power switch products, and intelligent distributed control products. The common thread between these product families is the *SMARTMOS* silicon.

Our *SMARTMOS* integrated circuit products feature a rich set of mixed-signal building blocks including A/D and D/A converters, rail-to-rail op amps, comparators, charge pumps and gate drivers, voltage regulators, precision references, digital logic, and non-volatile memory. For driving loads we have power MOSFET products with inductive energy clamps, independent thermal management, short circuit protection, and diagnostic load sensing.

Freescale Semiconductor *SMARTMOS* technology allows designers to interface high-precision components with harsh environments.

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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)	Protection Features	Control	Status/Fault Reporting	Packaging	Status
MC33291	(1.2 Ω $R_{DS(on)}$) Smart Eight Output Switch with SPI Interface	8	L	0.35	1000	1.0 to 3.0	25	Short Circuit, Current Limit, Temp Sense	SPI	SPI	24-pin SOICW	Production EVB
MC33291L	(1.6 Ω $R_{DS(on)}$) Smart Eight Output Switch with SPI Interface	8	L	0.35	1400	1.0 to 3.0	25	Short Circuit, Current Limit, Temp Sense	SPI	SPI	24-pin SOICW	Production EVB
MC33298	(0.8 Ω $R_{DS(on)}$) Smart Eight Output Switch with SPI I/O Control	8	L	0.5	650	3.0 to 6.0	50	Short Circuit, Current Limit, Temp Sense	SPI	SPI	24-pin SOICW	Production EVB
MC33385	(0.25 Ω $R_{DS(on)}$) Quad Low-Side Injector Driver	4	L	2.0	500	3.0	6.0 (mA)	Short Circuit, Current Limit, Temp Sense	Parallel	SPI	20-pin HSOP	Production
MC33397	(0.9 Ω $R_{DS(on)}$) Smart Dual/Hex Output Switch with SPI and Parallel Input Control	2 or 6	L	0.35	2 x 223, 6 x 700	1.5	10	Short Circuit, Current Limit, Temp Sense	SPI	SPI	24-pin SOICW 32-pin QFN (7 x 7)	Production EVB
MC33879	(1.0 Ω $R_{DS(on)}$) Configurable Eight Output SPI Controlled Switch	8	H/L	0.35	550	1.2	25	Short Circuit, Current Limit, Temp Sense	SPI w/ 2 PWM	SPI	32-pin SOICW Exposed Pad	Production
MC33880	(1.0 Ω $R_{DS(on)}$) Configurable Eight Output SPI Controlled Switch	8	H/L	0.5	550	1.2	25	Short Circuit, Current Limit, Temp Sense	SPI w/ 2 PWM	SPI	32-pin SOICW	Production EVB
MC33882	(0.8 Ω $R_{DS(on)}$) Smart Six Output Switch with SPI and Parallel Input Control	8	L	1.0	375	3.0	10	Short Circuit, Current Limit, Temp Sense	SPI	SPI	30-pin HSOP 32-pin QFN (7 x 7)	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	Short Circuit, Current Limit, Temp Sense, Open Load	SPI	SPI	32-pin SOICW	Production EVB
MC33999	16 Output Hardware Low-Side Switch with 24-Bit Serial Input Control and 8 Parallel Control	16	L	0.5	450	1.0 to 2.5	50	Short Circuit, Current Limit, Temp Sense, Open Load	SPI and Parallel	SPI	54-pin SOICW	Production EVB

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)	Protection Features	Control	Status/Fault Reporting	Packaging	Status
MC33143	Smart Dual High-Side Switch	2	H	3.0	380	3.0 to 6.0	300	Short Circuit, Current Limit, Temp Sense	Parallel	2 Status Pins	24-pin SOICW	Production
MC33286	Dual High-Side Switch	2	H	6.0	2 x 35	30	5.0	Short Circuit, Current Limit, Temp Sense	Parallel	1 Status Pin (Overtemp / Openload)	20-pin SOICW	Production
MC33288	Solid State Relay for High-Current Incandescent Lamps	2	H	8.0	2 x 20	30	5.0	Short Circuit, Current Limit, Temp Sense	Parallel	1 Status Pin (Overtemp / Openload)	20-pin HSOP	Production
MC33289	Dual High-Side Switch for Inductive Load	2	H	4.0	2 x 40	9.0	5.0	Short Circuit, Current Limit, Temp Sense, Current Recopy	Parallel	1 Status Pin (Overtemp / Openload)	20-pin SOICW	Production EVB
MC33486A	Dual High-Side Switch for H-Bridge	2	H	10	15	35	5.0	Short Circuit, Current Limit, Temp Sense, Current Recopy	Parallel	1 Status Pin (Overtemp / Overcurrent)	20-pin HSOP	Production
MC33879	(1.0 Ω $R_{DS(on)}$) Configurable Eight Output SPI Controlled Switch	8	H/L	0.35	550	1.2	25	Short Circuit, Current Limit, Temp Sense	SPI w/ 2 PWM	SPI	32-pin SOICW Exposed Pad	Production
MC33880	Configurable Eight Output SPI Controlled Switch	8	H/L	0.5	550	1.2	25	Short Circuit, Current Limit, Temp Sense	SPI w/ 2 PWM	SPI	32-pin SOICW	Production EVB
MC33888	Quad High-Side Switch and Octal Low-Side Switch	12	H/L	2 @ 10 A 8 @ 500 mA 2 @ 5.0 A	2 x 10, 2 x 40, 8 x 600	45/20	5.0	Short Circuit, Current Limit, Temp Sense, Current Recopy	SPI	SPI	36-pin PQFN	Production
MC33982B	Self Protected 2 mΩ Switch with Diagnostic and Protection	1	H	60.0	2	100 or 150 Selectable	5.0	Temp Sense, Over/Undervoltage, Shutdown, Overcurrent, Reverse Polarity, Current Recopy	SPI and Parallel	SPI	16-pin PQFN	Production EVB
MC33984B	Self Protected 4 mΩ Switch with Diagnostic and Protection	2	H	30.0	4	100 or 75 Selectable	5.0	Temp Sense, Over/Undervoltage, Shutdown, Overcurrent, Reverse Polarity, Current Recopy	SPI and Parallel	SPI	16-pin PQFN	Production EVB

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

ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Power Actuation — H-Bridges and Motor Drivers

Product	Description	Main Characteristics	No of Outputs	R_{DS(on)} (mΩ) of Each Output	Current Limitation (A)	Current Limitation Standby Max	Protection Features	Control	Status Reporting	Packaging	Status
MC33186	H-Bridge Driver (5.0 A)	40 V/150 mΩ per FET	2	150	6.0	20 mA	Short Circuit, Current Limit, Temp Sense	Parallel	1 Status Pin (Overcurrent / Overtemp)	20-pin HSOP	Production
MC33395 MC33395T	Three-Phase Bridge Gate Driver IC (5 µs Dead Time) Three-Phase Bridge Gate Driver IC (1 µs Dead Time)	Three-channel high-side/three-channel low-side MOSFET driver with fault report pin, mode selectable	6	n/a	Internal comparator (adjustable)	60 mA	Current Limit, Temp Sense	Parallel	No Status	32-pin SOICW	Production
MC33486A	Dual High-Side Switch for H-Bridge	40 mΩ, 10 A	2	2 x 15	35	5.0 µA	Short Circuit, Current Limit, Temp Sense, Current Recopy	Parallel	1 Status Pin (Overcurrent / Overtemp)	20-pin HSOP	Production
MC33886	H-Bridge Driver (5.2 A)	225 mΩ @150°C	2	120	6.0	20 mA	Short Circuit, Current Limit, Temp Sense	Parallel	1 Status Pin (Overcurrent / Overtemp)	20-pin HSOP	Production EVB
MC33887 MC33887A	H-Bridge Driver with Sleep Mode (5.2 A)	130 mΩ @ 25°C, sleep mode, current sense	2	130	6.0	25 µA	Short Circuit, Current Limit, Temp Sense	Parallel	1 Status Pin (Overcurrent / Overtemp)	20-pin HSOP 54-pin SOICW	Production EVB
MC34920	0.77 Ω max Dual 45 V H-Bridge DC/Stepper Motors with Charge Pump and Dual Regulators, device can be paralleled in H-Bridge configuration	Dual 45 V H-Bridge Driver for DC/ stepper motor with charge pump and dual regulators	8	2800	2.4 Note	14 mA (nom)	Overcurrent Undervoltage Overtemp Shutdown	Serial I/F	System Reset on Faults	44-pin PLCC	Production
MC34921	Integrated Motor Drive IC	Dual PWM DC Motor Drive	4	700	2.5 Note	30 mA	Shoot Through Undervoltage Detect	Serial	n/a	54-pin SOIC 64-pin LQFP	Production
MC34923	Single 45 V H-Bridge with Charge Pump	Single 45 V H-Bridge with charge pump	2	600	8.0 Note	n/a	Overcurrent Undervoltage Overtemp Reverse Battery	Serial I/F	Overcurrent Undervoltage Overtemp Reverse Battery	24-pin SOICW	Production
MPC17510	0.45 Ω H-Bridge	Single 15 V H-Bridge with charge pump	2	450	3.0 Note	1.0 mA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	24-pin TSSOP	Production
MPC17511	0.46 Ω H-Bridge	Single 6.8 V H-Bridge with charge pump	2	460	3.0 Note	1.0 mA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	16-pin VMFP	Production
MPC17517	0.6 Ω, H-Bridge	6.8 V Bridge with charge pump	3	460	3.0 Note	1.0 mA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	16-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 Note	1.0 mA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	20-pin VMFP	Production
MPC17531	0.7 Ω Dual 6.8 V with Charge Pump and Sleep Mode	Dual 6.8 V with Charge Pump	2	700	1.4 Note	1.0 mA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	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 Note	< 200 µA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	16-pin VMFP	Production
MPC17550	0.7 Ω Quad 5.0 V H-Bridge Driver with DC-DC Converter	Quad 5.0 V H-Bridge Driver with DC-DC Converter	4	700	2.0 Note	5.0 µA	Shoot Through Undervoltage Detect	Parallel	Shutdown Undervoltage	36-pin VMFP	Production
MPC17559	Dual H-Bridge Driver with Dual 3-Phase Motor Drivers	Dual H-Bridge with Dual Motor Drivers	4	1300	0.6 Note	1.0 mA	Low Voltage Detect	Parallel	n/a	56-pin QFN	Production

Note: Peak Current Limitation

ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Power Actuation — H-Bridge Stepper Motors

Product	Description	Main Characteristics	Operating Voltage (V)	Packaging	Status
MC33970	Dual Gauge Driver Large Pointer	4 Dual Output H-Bridge coil drivers, MMT-licensed two-phase stepper motor compatible, analog microstepping (12-steps/deg of pointer movement)	6.2 to 26	24-pin SOICW	Production
MC33971	Single Gauge Driver Integrated Circuit	Monolithic IC has 4 Output H-Bridge coil drivers and their associated control and management logic, automatically controls speed, direction, and magnitude of current	6.2 to 26	24-pin SOICW	Production
MC33976	Dual Gauge Driver with Configurable Response Time	4 Dual Output H-Bridge coil drivers, MMT-licensed two-phase stepper motor compatible, analog microstepping (12-steps/deg of pointer movement) with unproved pointer movement	6.2 to 26	24-pin SOICW	Production EVB
MC33977	Single Gauge Driver	Monolithic IC has 4 Output H-Bridge coil drivers and their associated control and management logic, automatically controls speed, direction, and magnitude of current	6.2 to 26	24-pin SOICW	Production
MC33991	Dual Gauge Driver Integrated Circuit	4 Dual Output H-Bridge coil drivers, MMT-licensed two-phase stepper motor compatible, analog microstepping (12 steps/dep of pointer movement)	6.2 to 26	24-pin SOICW	Production

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

Product	Description	Main Characteristics	Operating Voltage (V)	Input Control	Output Drives High/Low-Side Drive Current	Protection Features	Status Reporting	Packaging	Status
MC33198	High-Side, N-Channel MOSFET Gate Driver for Driving Loads with High In-Rush Current — Lamp Driver	Single-channel high-side MOSFET gate driver with 1 kHz PWM capability and status report pin	7.0 to 20	1 CMOS logic	1H 110 µA (typ)	Short Circuit, Overvoltage Load Dump	1 Status Pin	8-pin SOICN	Production
MC33285	Dual High-Side TMOS Driver	Dual channel high-side MOSFET gate driver with fault report pin	7.0 to 40	1 analog	2H 110 µA (typ)	Short Circuit Overvoltage Load Dump, Rev. Battery	None	8-pin SOICN	Production
MC33395	Three-Phase Bridge Gate Driver IC (5 µs Dead Time)	Three-channel high-side/three-channel low-side MOSFET driver with fault report pin, mode selectable	5.5 to 26	1 CMOS logic	3H, 3L	Overvoltage Current Limit, Thermal Unit	None	32-pin SOICW	Production
MC33395T	Three-Phase Bridge Gate Driver IC (1 µs Dead Time)								
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	Overvoltage, Undervoltage	None	20-pin SOICW	Production

Power Actuation — Audio and Telephony

Product	Description	Input Voltage (V)	Audio Frequency	Warble Rate (Hz)	Start / Stop Input Voltage (Vrms)	Other	Temperature (°C)	Packaging	Status
MC34017A-1	Telephone Tone Ringer	Phone Line Power	1.0 kHz	12.5	36/21	Meets Bell and EIA Standards for Impedance and Transient Rejection	-20 to 60	8-pin DIP 8-pin SOICN	Production
MC34017A-2	Telephone Tone Ringer	Phone Line Power	2.0 kHz	12.5	36/21		-20 to 60	8-pin DIP 8-pin SOICN	Production
MC34017A-3	Telephone Tone Ringer	Phone Line Power	500 Hz	12.5	36/21		-20 to 60	8-pin DIP	Production

Product	Description	Input Voltage (V)	Attenuator Range (dB)	Speaker Impedance	Level Detectors	Internal Hybrid?	Temperature (°C)	Packaging	Status
MC34018	Voice Switched Speakerphone Circuit	6.0 to 11	44	Yes	2	No	-20 to 60	28-pin DIP 28-pin SOICN	Production
MC34118	Voice Switched Speakerphone Circuit	3.5 to 6.5	52	No	4	Yes	-20 to 60	28-pin DIP 28-pin SOICN	Production

Product	Description	Input Voltage (V)	Gain (dB)	Speaker Impedance	Max Speaker Power	Supply Current	Temperature (°C)	Packaging	Status
MC34119	Low Power Audio Amplifier	2.0 to 16	<0 to >46	8 Ohms and Up	500 mW	2.7 mA	-20 to 70	8-pin DIP 8-pin SOICN	Production

Product	Description	Input Voltage (V)	Line Regulation	Load Regulation	Supply Current	Other	Temperature (°C)	Packaging	Status
MC34129 MC34129D	High Performance Current Mode Controller	4.0 to 12	2.0 mV Typical	1.0 mV Typical	2.5 mA	Has Soft-Start, Fault Timer, and Undervoltage Lockout	-40 to 85 0 to 70	14-pin DIP* 14-pin SOICN	Production

*PDIP not recommended for new design.

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	SPI	32-pin SOICW	Production

Power Actuation — Alternator Voltage Regulators

Product	Description	Main Characteristics	Regulation Voltage	Operating Voltage (V)	Packaging	Status
MC33092A	Alternator Voltage Regulator with Load Response Control–9SI–GM Type	LRC response during initial start. Programmable LRC rates from 2.5 to 1 sec. Fault detection of undervoltage/overvoltage, phase loss and high remote sense resistance.	n/a	4.5 to 24	16-pin SOICW	Production
MC33099 MC33099C	Adaptive Alternator Voltage Regulator	Internal lamp driver. LRC response during initial start. Programmable LRC rates from 1.8 to 7.4 sec. Fault detection of undervoltage/overvoltage, phase loss and high remote sense resistance.	14.8 14.6	4.5 to 24	16-pin SOICW	Production

Power Management — Switching Regulators

Product	Description	Main Characteristics	Operating Input Voltage (V)	Output Voltages	Protection Features	Packaging	Status
MC34129	High Performance Current Mode Controller for Switching Regulators	Step-down switching regulator controller for application up to 48 V, 1.0 A drive output current, automatic restart, start/run comparator, temperature compensated reference, soft start.	V_{CC} is 4.0 to 12 V application up to 48	Adjustable	Soft-start, fault timer, and undervoltage lockout	14-pin SOICN	Production
MC34701	Dual Output Power Supply Switching (1.5 A)	Step-down switching regulator with adjustable output voltage from 0.8 V to 5.0 V. 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, over temperature shutdown	32-pin SOICW	Production EVB
MC34702	Dual Output Power Supply Switching (3.0 A)	Step-down switching regulator with adjustable output voltage from 0.8 V to 5.0 V. 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, over temperature shutdown	32-pin SOICW	Production EVB
MC34703	Dual Output Power Supply Switching (10.0 A)	Step-down switching regulator with adjustable output voltage from 0.8 V to 5.0 V. 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 13.5	Adjustable	Current limit, undervoltage shutdown, overvoltage detect, over temperature shutdown	33-pin PQFN	Samples Now Production May 06 EVB Apr 06
MC34710	Adjustable Dual Output Switching Power Supply	High-Current Adjustable 5.0 V/3.3 V Switching Regulator. Low Noise User-Selectable 3.3 V/2.5 V/1.8 V/1.5 V Linear Regulator. On-Chip Thermal Shutdown and Error Reset Circuitry. Supervisory Functions (Power-ON Reset and Error Reset Circuitry). Sequenced I/O and Core Voltages.	13 to 32	Switching 3.3 or 5 V Linear 1.5, 1.8, 2.5 or 3.3 V	Undervoltage	32-pin SOICW	Production EVB JAN 06

ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Power Management — Linear Regulators

Product	Description	Main Characteristics	Bus Type and Standard	Protection Features	Operating Voltage (V)	Current Limitation Standby (µA)		Other Features	Diagnostics	Packaging	Status
						Typ	Max				
MPC18730	1.15V/2.4V 2-CH DC to DC converters with 3 low dropout regulators	2 Programmable DC-DC Converters, 3 Programmable Low Drop Regulators, Low Battery Operation 0.9V	n/a	n/a	0.9 to 4.2	5.0	12	Pow Switches, Vout Set by Serial Input	SPI 4 MHz	64-pin QFN	Production
MC33389C MC33389D	System Basis Chip	Dual 5.0 V regulators LS CAN, Watchdog, 3 wakeup inputs	CAN low-speed, dual wires	Fault tolerant	5.5 to 27	n/a	150	Dual voltage regulator, watchdog, wakeup input, sleep mode, cyclic sense	SPI 2 MHz	28-pin SOICW 20-pin HS0P	Production EVB
MC33689 MC33689D	System Basis Chip with Enhanced LIN Physical Interface	Low power modes with remote and local wakeup; 5.0 V/60 mA V_{REG} with reset and selectable W/D; enhanced LIN physical layer (same as MC33661)	LIN single wire	Current and thermal protection for LIN, regulator and HS switches	5.5 to 27	30	50	Dual HS switch (150 mA) and single HS switch (50 mA) 2 wakeup inputs, sense amplifier, overvoltage and undervoltage detection	SPI 4 MHz	32-pin SOICW	Production EVB
MC33742 MC33742S	System Basis Chip with Enhanced High Speed CAN (250K to 1Mbps)	SBC, Dual V_{REG}, Enhance HS CAN with Bus failure diagnostic capability, 4 wakeup inputs; pin and function compatible with MC33989	CAN HS dual wire	Current and thermal protection for CAN and regulator	5.5 to 27	60	150	Low power modes, remote and local wakeup capabilities	SPI 4 MHz	28-pin SOICW	Production EVB
MC33889B	System Basis Chip with Low Speed Fault Tolerant CAN	Dual 5.0 V regulators LS CAN, 2 wakeup inputs	CAN low-speed, dual wires	Fault tolerant	5.5 to 27	60	100	Dual voltage regulator, watchdog, wake input, sleep and stop modes	SPI 4 MHz	28-pin SOICW	Production EVB
MC33989	System Basis Chip with High Speed CAN	Dual 5.0 V regulators HS CAN, 4 wakeup inputs	CAN high speed, dual wires	Current limitation, thermal	5.5 to 27	80	150	Dual voltage regulator, watchdog, wake input, sleep and stop modes	SPI 4 MHz	28-pin SOICW	Production EVB

Power Management — Hot Swap

Product	Description	Main Characteristics	Operating Input Voltage (V)	Max Current LImit (A)	Number of Channels	Protection Features	Disable Input	Power Good Outputs	Packaging	Status
MC34652	2.0 A Negative Voltage Hot Swap Controller with Enhanced Programmability	Integrated Power MOSFET, Programmable Overcurrent Limit with Auto Retry, Programmable Charging Current Limit, Programmable Start-Up and Retry Delay Timer, Programmable Over- and Undervoltage Detection, Active High- and Low-Power Good Outputs, Disable Pin with Active High- or Low-Capability	-15 to -80	2.0	1	Thermal Shutdown, Undervoltage Detection, Overvoltage Detection, Undervoltage Lock Out, Overcurrent Limit, Fast Short Circuit Protection	High or Low	High and Low	16-pin SOICN	Production
MC34653	1.0 A Negative Voltage Hot Swap Controller	Integrated Power MOSFET, Programmable Overcurrent Limit with Auto Retry, Programmable Charging Current Limit, Fixed Start-Up and Retry Delay Timer, Fixed Over- and Undervoltage Detection, Active High- and Low-Power Good Outputs, Disable Pin with Active High- or Low-Capability	-39 to -75	1.0	1	Thermal Shutdown, Undervoltage Detection, Overvoltage Detection, Undervoltage Lock Out, Overcurrent Limit, Fast Short Circuit Protection	High or Low	High and Low	8-pin SOICN	Production

ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Network Transceivers - Connectivity Solutions — LIN, ISO-9141, J-1850 Physical Interfaces

Product	Description	Main Characteristics	Bus Type and Standard	Protection Features	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Max	Other Features	Control and Status Reporting	Packaging	Status
MC33290	Serial ISO-9141 K-Line Interface	K line only — OBD II compatible	ISO-9141 K line	Current limitation, thermal protection	8.0 to 18	n/a	50	Sleep mode	Parallel Communication	8-pin SOICN	Production
MC33390	Serial Link J-1850 Bus Transceiver	J-1850 low-speed multiplexing bus	J-1850	Current limitation, thermal protection	9.0 to 16	n/a	65	Sleep mode Waveshaping	Parallel Communication	8-pin SOICN	Production
MC33399	Local Interconnect Network (LIN) Physical Layer	LIN: Local Interconnect Network Physical Interface	LIN single wire	Current limitation, thermal protection	7.0 to 27	20	50	Wakeup input pin, control of external voltage regulator	Parallel Communication	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, pin and function compatible with MC33399	LIN single wire	Current limitation, thermal protection	5.5 to 27	8.0	12	Compatibility with 5.0 V and 3.3 V micros, wakeup input control of external regulator	Parallel Communication	8-pin SOICN	Production EVB
MC33689	System Basis Chip with Enhanced LIN Physical Interface	Low power modes with remote and local wakeup; 5.0 V/60 mA V_{REG} with reset and selectable W/D; enhanced LIN physical layer (same as MC33661)	LIN single wire	Current and thermal protection for LIN, regulator and HS switches	5.5 to 27	30	40	Dual HS switch (150 mA) and single HS switch (50 mA) 2 wakeup inputs, sense amplifier, overvoltage and undervoltage detection	4 MHz SPI (for diag)	32-pin SOICW	Production EVB
MC33689D						35	45				
MC33990	Serial Link J-1850 Bus Transceiver	J-1850 multiplexing bus with loss of ground protection	J-1850	Current limitation, thermal protection	9.0 to 16	n/a	65	Internally reverse battery protected Waveshaping	Parallel Communication	8-pin SOICN	Production

Network Transceivers - Connectivity Solutions — CAN Physical Interface Components

Product	Description	Main Characteristics	Bus Type and Standard	Protection Features	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Max	Other Features	Control and Status Reporting	Packaging	Status
MC33388	Fault-Tolerant CAN Interface	CAN low-speed fault tolerant physical interface	CAN low-speed, dual wires	Fault tolerant thermal shutdown current limit	6.0 to 27	25	25	Wakeup input pin, fault tolerant physical interface, sleep mode	Parallel Communication	14-pin SOICN	Production EVB
MC33389C MC33389D	System Basis Chip	Dual V_{REG}, LS CAN, Watchdog, 3 wakeup inputs	CAN low-speed, dual wires	Fault tolerant	5.5 to 27	150	150	Dual voltage regulator, watchdog, wakeup input, sleep mode, cyclic sense	SPI 2 MHz	28-pin SOICW 20-pin HSOP	Production EVB
MC33742 MC33742S	System Basis Chip with Enhanced High Speed CAN (250k to 1Mbps)	SBC, Dual V_{REG}, Enhance HS CAN with Bus failure diagnostic capability, 4 wakeup inputs, pin and function compatible with MC33989	CAN HS dual wire	Current and thermal protection for CAN and regulator	5.5 to 27	60	150	Low power modes, remote and local wakeup capabilities	4 MHz SPI (for diag)	28-pin SOICW	Production EVB
MC33889B MC33889D	System Basis Chip Lite with Low-Speed CAN	Dual V_{REG}, LS CAN, 2 wakeup inputs	CAN low-speed, dual wires	Fault tolerant	5.5 to 27	100	100	Dual voltage regulator, watchdog, wake input, sleep and stop modes	SPI 4 MHz	28-pin SOICW	Production EVB
MC33897A MC33897B	Single-Wire CAN	Low or high (33.3 kbps or 83.3 kbps data rates, wakeup capability (GMW3089 v2.3 compatible)	SW CAN	Thermal shutdown, current limit	6.0 to 27	45	60	Regulator Control Output Waveshaping Undervoltage lockout detect and handle loss of GND	2 Mode Control Pins	14-pin SOICN	Production
MC33989	System Basis Chip with High-Speed CAN	SBC dual V_{REG}, HS CAN, 4 wakeup inputs	CAN high-speed, dual wires	n/a	5.5 to 27	150	150	Dual voltage regulator, watchdog, wake input, sleep mode, and cyclic sense	SPI 4 MHz	20-pin HSOP 28-pin SOICW	Production EVB

ANALOG AND MIXED SIGNAL PRODUCTS (continued)

Network Transceivers - Connectivity Solutions — Distributed Systems Interface Components

Product	Description	Main Characteristics	System Type	No of Channels	Current Limit (mA)	Max Voltage (V)	Communications	Packaging	Status
MC33790	Distributed System Interface (DSI) Physical Interface (DSIP)	Dual current-limited waveshaped outputs, current sensing inputs, 3.3 V and 5.0 V	Distributed	2	150	26.5	DSI	16-pin SOICW	Production EVB
MC33793	Distributed System Interface (DSI) Share Interface Sensor	4-channel, 8-bit A-to-D converter, 5.0 V regulated output from DSI bus, configurable I/O, fault tolerant, high drive output	Distributed	4	6.0	40	DSI	16-pin SOICN	Production EVB
MC68HC55	2-Channel SPI and DSI Protocol Converter for Bus Masters	Allows any MCU with an SPI to use a DSI Bus	Distributed	2	n/a	n/a	SPI/DSI	16-pin SOICN	Production EVB

Embedded MCU + Power + LIN

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, 10-bit ADC, 2x2 Channel, 16-bit Timer, Internal Clock Generator	2/3 Pin Hall Sensor Input, Analog Input with Current Source, 40 V Rated Wakeup 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, 10-bit ADC, 2x2 Channel, 16-bit Timer, Internal Clock Generator	2/3 Pin Hall Sensor Input, Analog Input with Current Source, 40 V Rated Wakeup 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, 10-bit ADC, 2x2 Channel, 16-bit Timer, Internal Clock Generator	Operational Amplifier, 2 x 40 V Rated Wakeup 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 Wakeup 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, 10-bit ADC, 2x2 Channel, 16-bit Timer, Internal Clock Generator	3 x 2 Pin Hall Sensor Inputs with Cyclic Wakeup 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, 10-bit ADC, 2x2 Channel, 16-bit Timer, Internal Clock Generator	V_{sup}, Chip Temperature and Current Sensing	54-pin SOICW Exposed Pad	Production EVB (625)

Signal Conditioning — Flexible I/O

| Product	Description	Main Characteristics	Operating Voltage (V)	Packaging	Status
MC33287	Contact Monitoring and Dual Low-Side Protected Driver	Contact monitor and dual 500 mA low-side	7.0 to 18	20-pin SOICW	Production
MC33884	Switch Monitor Interface	12 inputs contact monitoring (6 GND, 2 V_{BAT}, 4 configurable), pulse wetting current master, slave, and low-power mode interrupt capability	7.0 to 26	24-pin SOICW	Production
MC33972 MC33972A	Multiple Switch Detection Interface with Suppressed Wake-Up	Multiple switch detection interface with suppressed wake-up designed to detect closing and opening of up to 22 switch contacts	5.5 to 26	32-pin SOICW	Production
MC33975 MC33975A	22 input Multiple Switch Detect Interface with Higher Wetting Current	22 inputs contact monitoring (14 GND, 8 configurable), 32 mA pulse wetting current low-power mode interrupt capability, wakeup	5.5 to 26.5	32-pin SOICW Exposed Pad	Production
MC33993	22 input Multiple Switch Detect Interface	22 inputs contact monitoring (14 GND, 8 configurable), pulse wetting current low-power mode interrupt capability, wakeup	5.5 to 26.5	32-pin SOICW	Production EVB

ACCESS AND REMOTE CONTROL
Transmitters and Receivers
Transmitter (TANGO3)

Product	Description	Packaging	Band (MHz)	Data Rate (Kbps)	MCU Interface	Operating Voltage (V)	Status
MC33493	PLL Tuned UHF Transmitter, OOK/FSK Modulation, -40°C to +125°C	14-pin TSSOP	315, 434, 868	1 to 11	2 Logic Lines	1.8 to 3.6	Available

Receiver (ROMEO2)

Product	Description	Packaging	Band (MHz)	Data Rate (Kbps)	MCU Interface	Operating Voltage (V)	Status
MC33591	PLL Tuned UHF Receiver, OOK/FSK Modulation, IF BW = 500 kHz, -40°C to +85°C	24-pin LQFP	315, 434	1 to 11	SPI	5.0	Available
MC33592	PLL Tuned UHF Receiver, OOK Modulation, IF BW = 300 kHz, -40°C to +85°C	24-pin LQFP	315, 434	1 to 11	SPI	5.0	Available
MC33593	PLL Tuned UHF Receiver, OOK/FSK Modulation, IF BW = 500 kHz, -40°C to +85°C	24-pin LQFP	868	1 to 11	SPI	5.0	Available
MC33594	PLL Tuned UHF Receiver, OOK/FSK Modulation (Data Manager in FSK only), IF BW = 500 kHz, -40°C to +105°C Extended Temperature	24-pin LQFP	315, 434	1 to 11	SPI	5.0	Available

TAG Reader (STARC) for Immobilizer Applications

Product	Description	Packaging	Band (MHz)	Data Rate (Kbps)	MCU Interface	Operating Voltage (V)	Status
MC33690	Stand-alone TAG reader with Voltage Regulator	20-pin SOIC	125 (kHz)	0.5 to 8	ISO-9141 K line	12	Available

COMMUNICATIONS APPLICATION-SPECIFIC STANDARD PRODUCTS
68HC08 Family

Product	ROM (KB)	RAM (KB)	Flash or OTP (KB)	EEPROM (KB)	Timer	I/O	Serial	MUX	A/D	PWM	Packaging	Oper Voltage (V)	Oper Freq (MHz)	Temp	Flash or OTP	Status	Additional Information	Documentation
MC68HC908RF2	n/a	128	2 Flash	n/a	1-CH, 16-bit	12	n/a	n/a	n/a	See Timer	32-pin LQFP (FA)	1.8 to 3.6	4.0 Max	C, M	Flash	Available	RF transmitter integrated	MC68HC908RF2

PRODUCT NUMBERING — ANALOG

MC   XXXXX   PPP RR

PRODUCT CATEGORY
- M   QUALIFIED STANDARD
- S   CUSTOM DEVICE
- P   PROTOTYPE DEVICE

CORE/TARGET

TAPE AND REEL INDICATOR

PACKAGING DETAILS
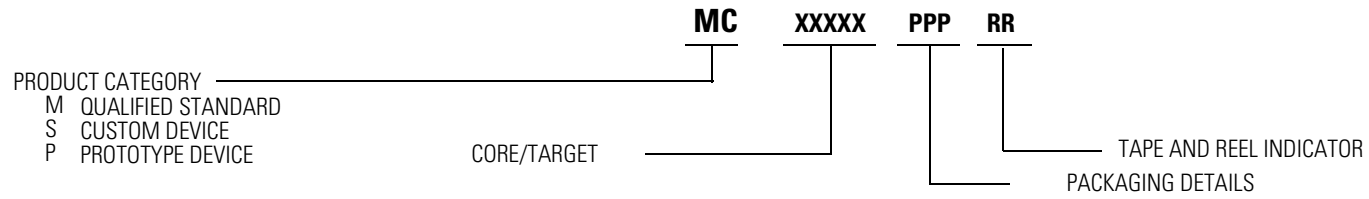
PRODUCT NUMBERING — EMBEDDED MCU + POWER

MM 9 08 f xxx r t ppp rr

PRODUCT CATEGORY
- MM PRODUCTION
- PM ENG SAMPLES

9   FLASH, OTP
BLANK   ROM

08 HC08 CORE

A   1K
B   2K
C   4K
D   8K
E   16K

xxx ANALOG CORE/TARGET

REVISION (DEFAULT IS A)

TEMPERATURE RANGE

PACKAGING DESIGNATOR

REEL INDICATOR
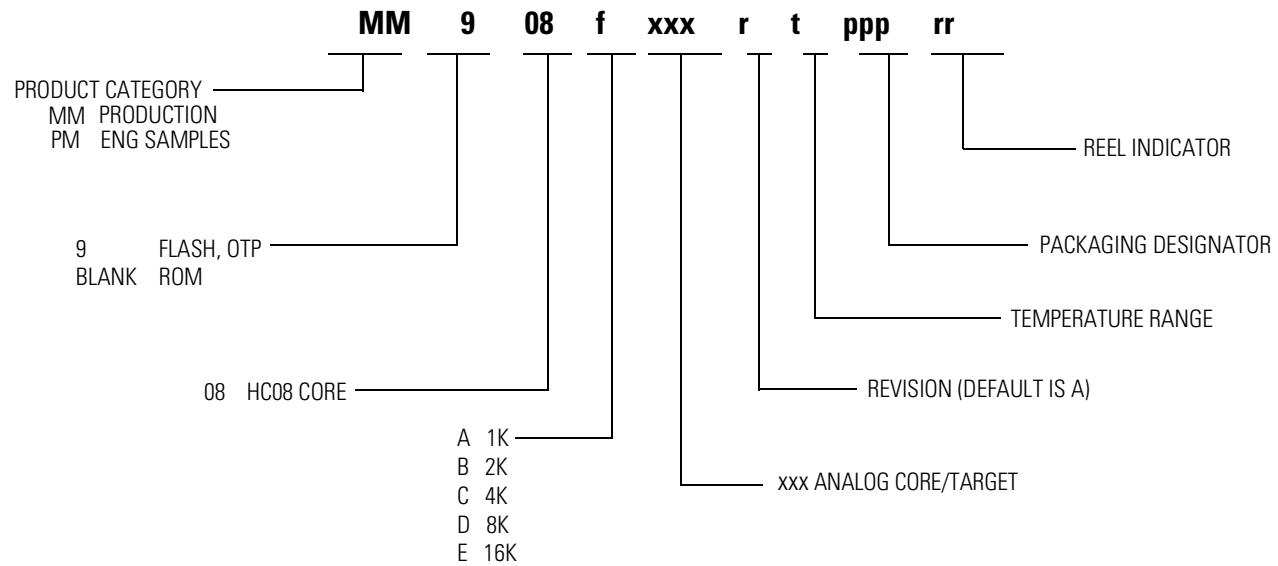
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