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Analog

Automotive Selector Guide

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Freescale Semiconductor Analog and Mixed-Signal Products

The product categories range from Power Actuation and Communication 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.

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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	SPI, Parallel	SPI	Open Load detect, Overcurrent protect, Overvoltage protect, Shorted 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	SPI, Parallel	SPI Status Flags	Shorted Load detect, Thermal protect	32-pin SOICW Exposed Pad	Production EVB
MC33812	Engine control power IC, with 3 Low-side drivers, one pre-driver, +5V pre-regulator, ISO-9141 physical interface and MCU watchdog circuit.	3	L	2 @ 4.0 1 @ 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.Design
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 $R_{DS(on)}$ 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
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	SPI. Parallel	SPI	Short-circuit, Current Limit, Temp Sense, Open Load	54-pin SOICW	Production EVB
MM912_634	Integrated S12 MagniV Based Relay Drivers with LIN	See Embedded MCU + Power/ S12 MagniV Mixed-Signal MCUs (page 10)										

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

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

Product	Description	No of Outputs	High-side or Low-side	Maximum 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
MC33879	(1.0 Ω $R_{DS(on)}$) Configurable Eight Output SPI Controlled Switch	8	H/L	1.2	550	1.2	25	SPI w/ 2 PWM	SPI	Short-circuit, Current Limit, Temp Sense	32-pin SOICW Exposed Pad	Production EVB
MM908E621	Integrated Quad Half-Bridge and Triple High-side with Embedded MCU and LIN for High End Mirror	**See Embedded MCU plus Power - 8-bit Intelligent Distributed Controllers**										
MM908E622	Integrated Quad Half-Bridge, Triple High-side and EC Glass Driver with Embedded MCU and LIN for High End Mirror											
MM908E624	Triple High-side Switch with Embedded MCU+Power+LIN											
MM908E625	Quad Half H-Bridge with P/S + HC08 + LIN											
MM912_634	Integrated S12 MagniV Based Relay Drivers with LIN	**See S12 Mixed-Signal Analog MCUs**										
MC12XS2	**12 V Multipurpose Low $R_{DS(on)}$ eXtreme Switches**											
MC33981	Single High-side Switch (4.0 mΩ), with PWM, Protection and Diagnostics	1	H	40	4	100	5.0	Parallel	Status Pin, Current Monitor, Temperature	Over-current, Over-temperature, Short-circuit, Under-voltage Lock Out	16-pin PQFN	Production
MC33982	Self Protected 2.0 mΩ Switch with Diagnostic and Protection	1	H	60	2	150	5.0	SPI and Parallel	SPI	Temp Sense, Over/Under-voltage, Shutdown, Over-current, Reverse Polarity, Current Recopy	16-pin PQFN	Production EVB
MC33984	Self Protected 4.0 mΩ Switch with Diagnostic and Protection	2	H	30	4	100	5.0	SPI and Parallel	SPI	Temp Sense, Over/Under-voltage, Shutdown, Over-current, Reverse Polarity, Current Recopy	16-pin PQFN	Production EVB
MC33988	Self Protected 8.0 mΩ Switch with Diagnostic and Protection	2	H	30	8	60	5.0	SPI and Parallel	SPI	Temp Sense, Over/Under-voltage, Shutdown, Over-current, Reverse Polarity, Current Recopy	16-pin PQFN	Production EVB
MC12XS3	**12V Automotive Exterior Lighting Multichannel eXtreme Switches**											
MC06XS3517	Penta High-side Switch (3 x 6mΩ, 2 x 17 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver.	5+1	H	2.8, 5.5	3 X 6, 2 X 17	48, 96	5.0	SPI and Parallel	SPI	Overcurrent, Overtemperature, Overvoltage, Undervoltage & Short-circuit protect	24-pin PQFN	Production EVB
MC07XS3200	Dual High-side Switch (2 x 7mΩ), with PWM, Protection, Diagnostics and SPI Control	2	H	6.0	2 X 7	93	5.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	Production
MC09XS3400	Quad High-side Switch (4 x 9mΩ), with PWM, Protection, Diagnostics and SPI Control	4	H	6.0	4 X 9	89	5.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	24-pin PQFN	Production EVB
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	78	5.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	24-pin PQFN	Production EVB
MC10XS3425	Quad High-side Switch (2 x 10 mΩ, 2 x 25mΩ), with PWM, Protection, Diagnostics and SPI Control	4	H	6.0	2 X 10, 2 X 25	39, 78	5.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	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	78	5.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	24-pin PQFN	Production EVB

Power Actuation — High-side Switches (Solid State Intelligent Switches) (continued)

Product	Description	No of Outputs	High-side or Low-side	Maximum 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
MC10XS3535	Penta High-side Switch (3 x 10 mΩ, 2 x 35 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver.	5+1	H	2.8, 5.5	3x10, 2x35	44, 88	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	78	5.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	24-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	39	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. Also, 1 logic level output driver.	5+1	H	2.8	35	39.5	2.0	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	24-pin PQFN	Production EVB
MC12XS6	**External Automotive Lighting Multichannel Scalable eXtreme Switches**											
MC07XS6517	Penta High-side Switch (3 x 7 mΩ, 2x 17 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver.	5+1	H	11, 5.5	3 x 17 2 x 7	100, 50	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	54-pin SOICW Exposed Pad	Production EVB
MC08XS6421	Quad High-side Switch (2 x 8 mΩ, 2x 21 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	4+1	H	11, 5.5	2 x 8.0 2 x 21.0	100, 50	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed PAD	Production EVB
MC17XS6400	Quad High-side Switch (4 x 17 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	4+1	H	5.5	4 x 17	50	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed PAD	Production EVB
MC17XS6500	Penta High-side Switch (5 x 17 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver.	5+1	H	5.5	5 x 17	50	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	Production EVB
MC10XS6200	Dual High-side Switch (2 x 10 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	2+1	H	9	2 x 10	85	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	2Q 2015 EVB
MC10XS6225	Dual High-side Switch (1 x 10 mΩ, 1 x 25 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	2+1	H	9, 4.5	1 x 10 1 x 25	85, 40	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	2Q 2015 EVB
MC10XS6325	Triple High-side Switch (2 x 10 mΩ, 1 x 25 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	3+1	H	9, 4.5	2 x 10 1 x 25	85, 40	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	2Q 2015 EVB
MC25XS6300	Triple High-side Switch (3 x 25 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	3+1	H	4.5	3 x 25	40	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	2Q 2015 EVB
MC40XS6500	Penta High-side Switch (5 x 40 mΩ), with PWM, Protection, Diagnostics and SPI Control. Also, 1 logic level output driver	5+1	H	3.9	5 x 40	35	20	SPI Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit	32-pin SOICW Exposed Pad	Production EVB

Power Actuation — High-side Switches (Solid State Intelligent Switches) (continued)

Product	Description	No of Outputs	High-side or Low-side	Maximum 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
MC24XS4	**External Automotive Lighting Multichannel Scalable eXtreme Switches**											
MC06XS4200	Dual High-side Switch (2 x 6 mΩ), with PWM, Protection, Diagnostics and SPI Control (24 V)	2	H	9.0	2 X 6	30, 90	10	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit, Parallel operation	24-pin PQFN	Production EVB
MC10XS4200	Dual High-side Switch (2 x 10 mΩ), with PWM, Protection, Diagnostics and SPI Control (24 V)	2	H	6.0	2 X 10	18, 55	10	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit, Parallel operation	24-pin PQFN	Production EVB
MC20XS4200	Dual High-side Switch (2 x 20 mΩ), with PWM, Protection, Diagnostics and SPI Control (24 V)	2	H	3.0	2 X 20	9.0, 27	10	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit, Parallel operation	24-pin PQFN	Production EVB
MC22XS4200	Dual High-side Switch (2 x 22 mΩ), with PWM, Protection, Diagnostics, and SPI Control (24 V)	2	H	3.0	2 X 22	9.0, 27	10	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit, Parallel operation	32-pin SOIC Exposed Pad	Production EVB
MC50XS4200	Dual High-side Switch (2 x 50 mΩ), with PWM, Protection, Diagnostics, and SPI Control (24 V)	2	H	1.2	2 x 50	3.5, 11	10	SPI and Parallel	SPI	Fail-safe Mode, Overcurrent Shutdown, Overtemperature, Short-circuit, Parallel operation	32-Pin SOIC Exposed Pad	Production EVB

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

Power Actuation — H-Bridge and Motors Drivers

Product	Description	Main Characteristics	No of Outputs	$R_{DS(on)}$ (mΩ) of Each Output	Current Limitation (A)	Current Limitation Standby Max	Control [1]	Status/Fault 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	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	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.	2	100	11.5	50 μA	SPI and Parallel	SPI	Open Circuit detect, Undervoltage, Overtemperature Shutdown, Output 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, 32-pin SOICW with Exposed Pad	Production EVB
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, 54-pin SOICW with Exposed Pad	Production EVB

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

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	Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slewrates	5.0 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	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, 2 mA (typ)	SPI	Open Load detect, Overcurrent, Overvoltage, Shorted Load detect, Undervoltage, Thermal	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	32-pin SOICW Exposed Pad	Production EVB
MC33812	Single cylinder Engine control IC.	Engine control power IC, with 3 Low-side drivers, one pre-driver, +5.0 V pre-regulator, ISO-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.Design
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 deadtime (shoot-through protect).	8.0 to 58	Parallel, SPI	3 H, 3 L, 1.0 A (typ)	SPI	Programmable Deadtime, Reverse Charge Injection	54-pin SOICW Exposed Pad	Production EVB

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

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 Ref. Design

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 See Signal Conditioning	5 input solenoid monitoring to verify proper electrical and mechanical solenoid operation.	—	—	SPI	10.5 to 15.5	16-pin SOICW	Production EVB
MC33812	Single cylinder Engine control IC	Engine control power IC, with 3 Low-side drivers, one pre-driver, +5V pre-regulator, ISO-9141 physical interface and MCU watchdog circuit.	2 @ 6.0 1 @ 2.0	2@200 1@1000	Parallel	4.5 to 36	32-pin SOICW Exposed Pad	Production EVB Ref.Design
MC33813	One Cylinder Small Engine Control IC	Engine control analog power IC intended for one cylinder motorcycle and other small engine control applications. Includes ISO9141 communication interface.	1 @ 3.0 1 @ 6.0 2 @ 2.4 1 @ .110	1 @ 400 1 @ 300 2 @ 1500 1 @ 20000	SPI, Parallel	6.0 to 18	48-pin LFQP, Exposed Pad	Production EVB
MC33814	Two Cylinder Small Engine Control IC	Engine control analog power IC intended for two cylinder motorcycle and other small engine control applications. Includes ISO9141 communication interface.	2 @ 3.0 1 @ 6.0 2 @ 2.4 1 @ .110	2 @ 400 1 @ 300 2 @ 1500 1 @ 20000	SPI, Parallel	6.0 to 18	48-pin LFQP, Exposed Pad	Production EVB

Product	Description	Main Characteristics	Peak Current Limit (A)	R_{DSON} (mΩ)	Control[1]	Operating Voltage (V)	Packaging	Status
MC33816	Engine Control IC with Smart Gate Control	A 12-channel gate driver IC for automotive engine control applications. The IC consist of five external MOSFET high-side pre-drivers and seven external MOSFET low side pre-drivers. Also contains four independent and concurrent digital microcores	-	-	SPI Parallel	9.0 to 16	64-pin LQFP Exposed Pad	Production EVB
PT2000	Programmable Solenoid Controller for Automotive/Truck Engine (Direct Injection) Control	The PT2000 is a programmable gate driver IC for precision solenoid control applications. The chip integrates six microcores used to control, seven external MOSFET high-side pre-drivers, eight external MOSFET low-side pre-drivers (two of them with higher switching frequency can be used for DC/DC converters), integrated end of injection detection, current measurement, and diagnostics and protection for both high-side and low-side.	-	-	SPI Parallel	5.0 to 36	80-pin LQFP	Production EVB Planned
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	5.0 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	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 deadtime (shoot-through protect).	—	—	SPI, Parallel	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 See Signal Conditioning	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.	—	—	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.

Communication Transceivers — CAN Physical Interface Components

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Current Limitation Standby (µA) Max	Other Features	Control and Status Reporting[1]	Protection Features	Packaging	Status
MC33CM0902	Dual High-Speed CAN Transceiver	The CM0902 is a dual high-speed CAN transceiver device, providing the physical interface between the CAN protocol controller of an MCU and the physical dual wire CAN bus. Both channels are completely independent, featuring CAN bus wake-up on each CAN interface, and TXD dominant timeout functionality	Dual CAN HS dual wire	4.5 to 5.5	-	15	CAN bus wake-up, 3.3 or 5.0 V MCU I/O, TXD dominant time-out	Parallel	High system ESD spec.	14-pin SOICN	Production EVB
MC33742	System Basis Chip with Enhanced High-Speed CAN (250k to 1Mbps)	**See System Basis Chip**									
MC33889	System Basis Chip Lite with Low-Speed CAN										
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 detect and loss of GND	2 Mode Control Pins	Thermal shutdown, current limit	14-pin SOICN	Production
MC33901	High-Speed CAN Transceiver	Single CAN high-speed physical layer provides operation up to 2 Mbps and the physical interface between an MCU and the physical dual wires of the CAN bus.	CAN HS dual wire	4.5 to 5.5	-	5.0	CAN bus wake-up. TXD dominant timeout, 3.3 or 5.0 V MCU I/O	Parallel	High system ESD spec.	8-pin SOICN	Production EVB
MC33903	System Basis Chip (SBC)-Gen 2- with High Speed CAN & LIN Interfaces	**See System Basis Chip**									
MC33904	System Basis Chip (SBC)-Gen 2- with High Speed CAN Interface										
MC33905	System Basis Chip (SBC)-Gen 2- with High Speed CAN & LIN Interfaces										
MC33907	Safe System Basis Chip with Buck and Boost DC/DC up to 800 mA										
MC33908	Safe System Basis Chip with Buck and Boost DC/DC up to 1.5 A										
MC33909	System Basis Chip with CAN, LIN and Multiple Switch-to-Ground Interface										
MC33989	System Basis Chip with High-Speed CAN										

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

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

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Current Limitation Standby (µA) 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
MC33660	ISO K Line Serial Link Interface	ISO9141 physical interface device	ISO9141	8.0 to 18	—	50	Data rates up to 50 Kbps	Serial	Output short-circuit 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, SAE J2602-	7.0 to 18	6.0	11	Active bus waveshaping, EMI immunity, Local & Remote wakeup	Parallel	Current limitation, Thermal protection	8-pin SOICN	Production EVB

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Max	Other Features	Control and Status Reporting[1]	Protection Features	Packaging	Status
MC33663	LIN 2.1 / SAEJ2602-2 Dual LIN Physical Layer Transceivers	Integrates two physical layer LIN bus transceivers. The devices offer baud rates of 10 and 20 kbps as well as 100 kbps for test/programming modes.	LIN Single-wire, SAE J2602-2	7.0 to 18	12	36	Active bus waveshaping, EMI immunity, 2 wake-up input pins, Compatibility with 5.0 V and 3.3 V micros	Parallel	Over-temperature protection, Output short-circuit	14-pin SOICN	Production
MC33664	Isolated Network High Speed Transceiver Physical Layer (TPL)	Isolated network communication rate at 2.0 Mbps, Dual SPI architecture, High EMC performance	Dual wires	4.75 to 5.5	30	50	3.0 V and 5.0 V compatible, low sleep mode current with automatic bus wake up, current limit protection	SPI	Current limitation	16-pin SOICN	2Q 2015 EVB Planned
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 Protect	32-pin SOICW	Production EVB Ref.Design
MC33903	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces	**See System Basis Chip**									
MC33905	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces										
MC33907	Safe System Basis Chip with Buck and Boost DC/DC up to 800 mA										
MC33908	Safe System Basis Chip with Buck and Boost DC/DC up to 1.5 A										
MC33909	System Basis Chip with LIN, CAN and Multiple Switch-to-Ground Interface										
MC33910	System Basis Chip with High-side Drivers and LIN Physical Interface										
MC33911	System Basis Chip with DC Motor Pre-driver and LIN Physical Interface										
MC33912	System Basis Chip with DC Motor Pre-driver and Current Sense and LIN Physical Interface										

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

Communication Transceiver - 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/an/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, 5.0V regulated output, 3 configurable logic pins, CRC generation and checking.	n/a	-40 to +150	3.0/6.0	16-pin SOICN	Production
MC33789	Airbag System Basis Chip (IC) (SBC)	Air bag control module which monitors battery voltage, sensor status and supplies various voltages to the air bag system. Uses SPI for MCU communication. Uses PSI5 for satellite sensors communication.	125 kbps	-40 to +125	n/a	64-pin LQFP Exposed Pad	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
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

Millimeter Wave and Radar

Product	Description	Main Characteristics	Operating Temp Range (°C) T_A= Ambient Temp T_B= Backside of Die Temp T_A	T_B	Packaging	Status
MC33MR1501	2-channel 77 GHz Radar Transmitter	3.3 V and 5.0 V power supply, Integrating fractional-N phase lock loop (PLL) with a voltage control oscillator (VCO), which can generate frequency modulation continuous waveform (FMCW) signals with digitally programmable frequencies	—	-40 to +125	Bare die	2Q 2015
MC33MR1503	4-channel 77 GHz Radar Receiver	3.3 V power supply integrating mixer and IF buffer	—	-40 to +125	Bare die	2Q 2015
MC33MR2001	Multi-channel 77 GHz Radar Transceiver Chipset	Scalable number of transmitter and receiver channels	-40 to +125	—	6x6 mm BGA	Production KITRADAR 2001EVM

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
MC33978	22 input Multiple Switch Detect Interface with programmable Wetting Current	Multiple switch detection interface designed to detect closing and opening of up to 22 switch contacts (14 GND, 8 configurable), programmable wetting current from 2.0 to 20 mA. 24 to 1 Analog Multiplexer.	-14 to 38 V	4.5 to 36	32-pin SOICW Exposed Pad	Production EVB

System Basis Chip

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation 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)	SBC, Dual V_{REG}, Enhance HS CAN with Bus failure diagnostic capability, 4 wake-up inputs.	CAN High-Speed dual wires	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	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-up 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 interface. 5.0 or 3.3 V VDD regulator.	CAN high-speed, dual wires, LIN single wire	5.5 to 27	15	35	Fail-safe state machine, Configurable I/O, MUX - out, pin compatible with MC33905	“Secured” SPI	Overcurrent, Overtemperature, Short-circuit, protect	32-pin SOICW Exposed Pad	Production EVB

Product	Description	Main Characteristics	Bus Type and Standard	Operating Voltage (V)	Current Limitation Standby (µA) Typ	Max	Other Features	Control and Status Reporting[1]	Protection Features	Packaging	Status
MC33904	System Basis Chip (SBC)-Gen 2-with High Speed CAN Interface	High speed CAN physical interface. 5.0 or 3.3 VDD and VAux regulators, w/current sharing	CAN high-speed, dual wires	5.5 to 27	15	35	Fail-safe state machine, Configurable I/O, MUX - out, pin compatible with MC33905	"Secured" SPI	Overcurrent, Overtemperature, Short -circuit and undervoltage detect	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 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, Configurable I/O, MUX - out, SAFE output, Low power modes w/ INT and RST capability.	"Secured" SPI	Overcurrent, Overtemperature, Short -circuit and undervoltage detect	32-pin SOICW Exposed Pad, 54-pin SOICW Exposed Pad	Production EVB
MC33907	Safe System Basis Chip with Buck and Boost DC/DC up to 800 mA	Multiple switching and linear voltage regulators, built-in enhanced high speed CAN interface fulfills the ISO11898-2 and -5 standards.	CAN high-speed, dual wires.	5.6 to 40	32	60	Safe Assure product	"Secured" SPI	Overcurrent, Overtemperature, Over & Undervoltage detect	48-pin LQFP Exposed Pad	Production EVB
MC33908	Safe System Basis Chip with Buck and Boost DC/DC up to 1.5 A	Multiple switching and linear voltage regulators, built-in enhanced high speed CAN interface fulfills the ISO11898-2 and -5 standards.	CAN high-speed, dual wires.	5.6 to 40	32	60	Safe Assure product	"Secured" SPI	Overcurrent, Overtemperature, Over & Undervoltage detect	48-pin LQFP Exposed Pad	Production EVB
MC33909	System Basis Chip with CAN, LIN Multiple Switch-to-Ground Interface	Two high speed CAN interfaces plus four LINs, compatible with specification 2.1 and SAEJ2602-2. Also contains 17 switch to ground inputs for switch detection.	CAN high-speed, dual wires. LIN single wire	3.5 to 27	125	-	Watchdog timer, Switched inputs wake-up, Fail-safe mode	SPI	Overvoltage	64-pin LQFP Exposed Pad	4Q 2015 EVB Planned
MC33910	System Basis Chip with High-side Drivers and LIN Physical Interface	LIN 2.0 compatible, 5.0 V/60 mA 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/60 mA 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/60 mA 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-up input, sleep and stop modes	SPI	Current limitation, thermal	28-pin SOICW	Production EVB

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

Battery Management - Battery Cell Controller

Product	Description	Main Characteristics	Operating Voltage (V)	Output Voltages	Protection Features	Packaging	Status
MC33771	Battery Cell Controller IC (BCC)	4 Mbps SPI Interface or Isolated 2Mbps Differential Communication 14 Cells Terminal, 1 current channel with Auto PGA 7 Configurable ADC/GPIO/Temperature Sensor Inputs 5.0 V @ 5 mA Temp Reference Supply Output I2C EEPROM interface Fault Output Failure detection: OV/UV voltage, OV/UV temp, internal diagnostics	9.6 to 61.6	Cell balancing : 10 V to 12 V Fault pin: 5.0 V GPIO: 5.0 V or 3.3 V	Safety concept: over/undervoltage, over/ under temperature, open/ short cell balancing detection. Failure can be reported by the fault pin output	64-pin LQFP-EP	2Q 2015 EVB

Embedded MCU plus Power - S12 Mixed-Signal Analog MCUs

Product	Description	Main Characteristics	MCU References	MCU Details	Additional Information	Packaging	Status
MM912_637	Battery Sensor with LIN for 12 V Lead-acid Batteries	Simultaneous Battery voltage & current measurement with 16-bit sigma-delta ADC & IIR filter. 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,	16-bit MCU CPU12_V1	S12 16-bit core, 128 K/96 KBytes Flash, 6 KBytes RAM, 4 K Bytes data Flash, ESCI, 16-bit 4 Channel Timer, Internal Clock Generator, BDM	Selectable Internal or external temp sense, GPIO, including SPI functionality, internal or external oscillator. Window Watchdog with Selectable Timing, Normal/Stop/Sleep/Crank Mode Ctrl. High Voltage Wake-up Inputs,	48-pin QFN, Exposed Pad	Production EVB
MM9Z1_638	Battery Sensor with CAN and LIN	This is a fully integrated battery monitoring device. The device supports precise current measurement via an external shunt resistor. The MM9Z1_638 includes LIN 2.2 protocol and physical interface, and an MSCAN protocol controller,	16-bit MCU S12Z	S12Z MCU with 128 KB Flash, 8 KB RAM, 4 KB EEPROM	Four battery voltage measurements with internal resistor dividers, and up to five direct voltage measurements for use with an external resistor divider. Measurement synchronization between voltage channels and current channels.	48-pin QFN Exposed Pad	Production EVB Ref. Design
MM912_P812	S12P MCU and Multifunctional Ignition and Injector Driver System In Package (SiP)	An engine control IC combining an MCU (S12P) and analog control die (MC33812) intended for motorcycle and other single/dual cylinder small engine control applications.	16-bit MCU S12P	The MCU S12P has 6 KB RAM, and flash memory size of 96 KB or 128 KB. The S12P family uses many of the same features found on the S12XS family, including error correction code (ECC) on flash memory, a separate data-flash module for diagnostic or data storage, a fast analog-to-digital converter (ATD), and a frequency modulated phase locked loop (IPLL) that improves electromagnetic compatibility (EMC).	Analog functions consists of three integrated low side drivers, one pre-driver, a +5.0 V, voltage pre-regulator, an MCU watchdog circuit, an ISO 9141 K-Line interface, and a parallel interface for MCU communication. The three low side drivers are provided for driving a fuel injector, a lamp or LED, and a relay, another injector or fuel pump.	100 lead LQFP, Exposed Pad	Production Ref.Design
MM912_S812	S12XS MCU and Multifunctional Ignition and Injector Driver System In Package (SiP)	An engine control IC combining an MCU (S12XS) and analog control die (MC33812) intended for motorcycle and other single/dual cylinder small engine control applications.	16-bit MCU S12XS	The MCU S12XS has 8 KB or 12 KB RAM, and flash memory size of 128 KB or 256 KB. The S12XS family uses many of the same features found on the S12P family, including error correction code (ECC) on flash memory, a separate data-flash module for diagnostic or data storage, a fast analog-to-digital converter (ATD), and a frequency modulated phase locked loop (IPLL) that improves the electromagnetic compatibility (EMC) performance.	Analog functions consists of three integrated low side drivers, one pre-driver, a +5.0 V, voltage pre-regulator, an MCU watchdog circuit, an ISO 9141 K-Line interface, and a parallel interface for MCU communication. The three low side drivers are provided for driving a fuel injector, a lamp or LED, and a relay, another injector or fuel pump.	100 lead LQFP, Exposed Pad	Production Ref. Design

S12 Mixed-Signal Analog MCUs

Product	Description	Main Characteristics	Power Features	MCU Reference	MCU Detail	Additional Information	Packaging	Status
MM912_634	Integrated S12 MagniV Based Relay Drivers with 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 Dual High-side and Dual Low Side Switches with Embedded S12 MCU + Power + LIN	7 Ω High-side Switches, 2.5 Ω Low-side Switches for relay drivel	16-bit MCU	S12 16-bit Core, 32KB Flash, 2KB 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. Timing, Normal/Stop/Sleep Mode Control, Hall Supply of 18 V/30 mA	48-pin LQFP Exposed Pad	Production EVB

8-bit Intelligent Distributed Controllers

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	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)	8-bit MCU HC908EY16	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 Temp. 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	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			2/3 Pin Hall Sensor Input, Analog Input with Current Source, 40 V Rated Wake-up Input, V_{sup}, Chip Temp. 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			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 Modes	4 x 400 mΩ Half-Bridges with Current Control; 1 x 600 mΩ High-side; Switched 5.0 V Output (25 mA)			3 x 2 Pin Hall Sensor Inputs with Cyclic Wake-up Feature, Analog Input with Current Source, V_{sup}, Chip Temp. and Current Sensing	54-pin SOICW Exposed Pad	Production EVB
MM908E626	Stepper Motor Control, Quad Half-Bridge with Embedded MCU and LIN	Voltage Regulator 5.0 V/60 mA, LIN Physical Layer with Selectable Slew rates. High Temperature use, T_J = 135×C	4 x 400 mΩ Half-Bridges with Current Control; Switched 5.0 V Output (24 mA)			V_{sup}, Chip Temperature and Current Sensing	54-pin SOICW Exposed Pad	Production EVB (‘625)

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.

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Power Management — Linear Regulators

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
MC3373	Switch Mode Power Supply with Multiple Linear Regulators and Power Sequencing	Step-down Switching regulator (2.0 A), with 3 Programmable Linear Regulators (15 mA, 15 mA, 15 mA) and two 5.0 V Sensor supplies (100 mA, 100 mA).	n/a	4.5 to 28	150	—	Programmable voltage regulator, power sequencing, adjustable OSC - Switcher	None	Reverse Battery Protect, Undervoltage and Overvoltage Lockout, Reset monitor signals for regulators (4)	32-pin SOICW	Production EVB
MC33742	System Basis Chip with enhanced High-Speed CAN (250k to 1Mbps)	**See System Basis Chip**									
MC33889	System Basis Chip with Low-Speed Fault Tolerant CAN										
MC33903	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces										
MC33904	System Basis Chip (SBC)-Gen 2-with High Speed CAN Interfaces										
MC33905	System Basis Chip (SBC)-Gen 2-with High Speed CAN & LIN Interfaces										
MC33907	System Basis Chip (SBC) with CAN, LIN, and SPI Interfaces										
MC33908	System Basis Chip (SBC) with CAN, LIN, and SPI Interfaces										
MC33909	System Basis Chip (SBC) with CAN and LIN Interfaces										
MC33989	System Basis Chip with High-Speed CAN										

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

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	Production EVB

Automotive Alternator Voltage Regulators

Product	Description	Main Characteristics	Bus Type	Operating Voltage	Regulation Voltage	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 1.3	8 to 27	150	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 AUTOMOTIVE SENSORS

Freescale is a leading sensor supplier for automotive safety for airbags, Tire Pressure Monitoring Systems (TPMS), Electronic Stability Control (ESC) and for engine management with barometric absolute pressure (BAP) and manifold absolute pressure (MAP) applications..

Our Zero Defects process, Automotive Electronics Council (AEC) membership and functional safety with Safe Assure are critical in providing world-class quality solutions from entry-level to the high end.

Applications — Freescale Semiconductor automotive sensors are designed for a variety of applications ranging from safety and performance to comfort and control. Our sensors are used in under-hood and in-cabin applications, and are compatible with Freescale analog product, power management and microcontroller families.

For additional information, visit www.freescale.com/automotive

Pressure Sensors

Product	Maximum Pressure Rating (kPa)	Full Scale Span Voltage (Typical) (Vdc)	Sensitivity (mV/kPa)	Accuracy 0 °C to 85 °C (% of V_{FSS})	Packaging	Status
MPX4115A	115 115	4.6 4.4	46 38	±1.5 ±1.5	Super-Small Outline Package (SSOP) SSOP	Available Available
MPX4250A	250 250	4.7 4.7	20 19	±1.5 ±1.4	SSOP SSOP	Available Available
MPXV5004	4	3.9	1000	±2.5	SOP	Available
MPXV5010	10	4.5	450	±5.0	SOP	Available
MPX5100	100	4.5	45	±2.5	6-pin unibody package	Available
MPX5700	700	4.5	6.4	±2.5	6-pin unibody package	Available
MPX5999	1000	4.5	4.5	±2.5	6-pin unibody package	Available
MPXH6101	102	4.6	54	±1.8	SSOP	Available
MPXV7007	7	4.0	286	±5.0	SOP	Available
MPXV7025	25	4.5	90	±5.0	SOP	Available

Barometric Absolute Pressure (BAP) and Manifold Absolute Pressure (MAP) Sensors

Product	Maximum Pressure Rating (kPa)	Full Scale Span Voltage (Typical) (Vdc)	Sensitivity (mV/kPa)	Accuracy 0 °C to 85 °C (% of V_{FSS})	Packaging	Status
MPXH6101	102	4.6	54	±1.8	Super-Small Outline Package (SSOP)	Available
MPXA6115	115	4.6	45.9	±1.5	SOP	Available
MPXAZ6115A	115	4.5	45.9	±1.5	SOP	Available
MPXHZ6115A	115	4.5	45.9	±1.5	SSOP	Available
MPXH6250A	250	4.7	20	±1.5	SSOP	Available
MPXHZ6250	250	4.7	20	±1.5	SSOP	Available
MPXH6300	300	4.7	16	±1.8	SSOP	Available
MPXH6400	400	4.7	12	±1.5	SSOP	Available
MPXHZ6400	400	4.7	12	±1.5	SSOP	Available

Inertial Sensors[1]

Product	Sensing Direction	Acceleration (±g)	Sensitivity (mV/V/g)	Sensitivity (count/g)	Temperature Range	Roll-Off Frequency	Analog	Digital	Communication	Packaging	Status
Analog Sensors:											
MMA1270KEG	Z	2.5 g	150	—	-40 °C to +105 °C	50 Hz	Yes	—	—	16-pin SOIC	Available
MMA1250KEG	Z	5 g	80	—	-40 °C to +105 °C	50 Hz	Yes	—	—	16-pin SOIC	Available
MMA1220KEG	Z	8 g	50	—	-40 °C to +85 °C	250 Hz	Yes	—	—	16-pin SOIC	Available
MMA2240KEG	X	7 g	300	—	-40 °C to +125 °C	50 Hz	Yes	—	—	16-pin SOIC	Available
MMA2244KEG	X	20 g	100	—	-40 °C to +125 °C	400 Hz	Yes	—	—	16-pin SOIC	Available
MMA2201KEG	X	40 g	10	—	-40 °C to +125 °C	400 Hz	Yes	—	—	16-pin SOIC	Available
MMA2202KEG	X	50 g	8	—	-40 °C to +125 °C	400 Hz	Yes	—	—	16-pin SOIC	Available
MMA2204KEG	X	100 g	4	—	-40 °C to +125 °C	400 Hz	Yes	—	—	16-pin SOIC	Available
MMA2300KEG	X	250 g	1.6	—	-40 °C to +125 °C	400 Hz	Yes	—	—	16-pin SOIC	Available
MMA2301KEG	X	200 g	2	—	-40 °C to +125 °C	400 Hz	Yes	—	—	16-pin SOIC	Available
MMA3201KEG	XY	40 g	10	—	-40 °C to +125 °C	400 Hz	Yes	—	—	20-pin SOIC	Available
MMA3221KEG	XY	50/20 g	40/100	—	-40 °C to +125 °C	400 Hz	Yes	—	—	20-pin SOIC	Available
MMA3204KEG	XY	100/30 g	4/13	—	-40 °C to +125 °C	400 Hz	Yes	—	—	20-pin SOIC	Available
MMA3202KEG	XY	100/50 g	4/8	—	-40 °C to +125 °C	400 Hz	Yes	—	—	20-pin SOIC	Available
Digital Sensors:											
MMA5106KW	Z	60 g	—	8	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5112KW	Z	120 g	—	4	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5124KW	Z	240 g	—	2	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5148KW	Z	480 g	—	1	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5206KW	X	60 g	—	8	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5212KW	X	120 g	—	4	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5224KW	X	240 g	—	2	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA5248KW	X	480 g	—	1	-40 °C to +125 °C	400 Hz	—	Yes	PSI5	16-pin QFN	Available
MMA2612KW	X	125 g	—	4.096	-40 °C to +125 °C	400 Hz	—	Yes	DSI	16-pin QFN	Available
MMA1618KW	Z	187 g	—	2.731	-40 °C to +125 °C	400 Hz	—	Yes	DSI	16-pin QFN	Available
MMA2725W	X	250 g	—	2	-40 °C to +125 °C	400 Hz	—	Yes	DSI3	QFN 6x6 mm 16-pin	Available
MMA2712W	X	125 g	—	4	-40 °C to +125 °C	400 Hz	—	Yes	DSI3	Self Test	Available
MMA2737W	X	375 g	—	1.3	-40 °C to +125 °C	400 Hz	—	Yes	DSI3	Self Test	Available
MMA2718W	X	187 g	—	2.7	-40 °C to +125 °C	400 Hz	—	Yes	DSI3	Self Test	Available
MMA2702W	X	25 g	—	20.4	-40 °C to +125 °C	400 Hz	—	Yes	DSI3	Self Test	Available
MMA1725W	Z	250 g	—	2	-40 °C to +125 °C	400 Hz	—	Yes	DSI3	Self Test	Available

1. Freescale Semiconductor reserves the right to modify product specifications and/or introduction dates without any further notice. The product parameters are typical values at V_{DD} = 5.0 V and T = 25 °C, unless otherwise specified. Additional sensitivity and expanded temperature ranges are available upon request. Consult your Freescale Semiconductor sales representative

Inertial Sensors[1] (continued)

Product	Sensing Direction	Acceleration (±g)	Sensitivity (mV/V/g)	Sensitivity (count/g)	Temperature Range	Roll-Off Frequency	Analog	Digital	Communication	Packaging	Status
MMA6255KEG	XY	50/50 g	—	9.76	-40°C to +125 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6852KW	X	35 g	—	13.947	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6854KW	X	75 g	—	6.51	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6811KW	XY	60/25 g	—	8.192/20.479	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6813KW	XY	50/50 g	—	9.766/9.766	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6821KW	XY	120/25 g	—	4.096/20.479	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6823KW	XY	120/60 g	—	4.096/8.192	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6826KW	XY	60/60 g	—	8.192/8.192	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6852KW	XY	120/120 g	—	4.096/4.096	-40°C to +105 °C	400 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6900KQ	XY	3.5 g	—	291.5	-40°C to +105 °C	50 Hz	—	Yes	SPI	16-pin QFN	Available
MMA6901KQ	XY	5g	—	203.6	-40°C to +105 °C	50 Hz	—	Yes	SPI	16-pin QFN	Available

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Tire Pressure Monitoring Systems

Product	Flash	RAM	RF Transmitter Frequency	Protocols Supported	Clock Type	Timer	Pressure Range	Pressure Sensor Accuracy	Package	Temperature Range	Status	Description
FXTH870502DT1	16 KB	512 B	315/434MHz	ASK and FSK Modulation	OSC	2-CH, 16-bit PWM	100 - 450 kPA	±15 kPA	7x7 QFN FAM	-40 to 125 °C	Contact Freescale	Automotive Pressure Range (with Z Axis Accelerometer)
FXTH870511DT1	16 KB	512 B	315/434MHz	ASK and FSK Modulation	OSC	2-CH, 16-bit PWM	100 - 450 kPA	±15kPA	7x7 QFN FAM	-40 to 125 °C	Contact Freescale	Automotive Pressure Range (with XZ Axis Accelerometer)
FXTH870902DT1	16 KB	512 B	315/434MHz	ASK and FSK Modulation	OSC	2-CH, 16-bit PWM	100 - 900 kPA	±15 kPA	7x7 QFN FAM	-40 to 125 °C	Contact Freescale	Automotive Pressure Range (with Z Axis Accelerometer)
FXTH870911DT1	16 KB	512 B	315/434MHz	ASK and FSK Modulation	OSC	2-CH, 16-bit PWM	100 - 900 kPA	±15 kPA	7x7 QFN FAM	-40 to 125 °C	Contact Freescale	Automotive Pressure Range (with XZ Axis Accelerometer)
FXTH870912DT1	16 KB	512 B	315/434MHz	ASK and FSK Modulation	OSC	2-CH, 16-bit PWM	100 - 900 kPA	±15kPA	7x7 QFN FAM	-40 to 125°C	Contact Freescale	Automotive Pressure Range (with XZ Axis Accelerometer)
FXTH8709226T1	16 KB	512 B	315/434MHz	ASK and FSK Modulation	OSC	2-CH, 16-bit PWM	100 - 900 kPA	±15 kPA	7x7 QFN FAM	-40 to 125 °C	Contact Freescale	Automotive Pressure Range (with XZ Axis Accelerometer)

FREESCALE SEMICONDUCTOR ACCESS AND REMOTE CONTROL PRODUCTS

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GPS Downconverter

Product	RF Freq (MHz)	Supply Voltage Range (Vdc)	Supply Current (Typ) (mA)	Standby Current (mA)	Conversion Gain (typ) (dB)	Packaging	System Applicability	Documentation
MRFIC1505A	1575.42	2.7 to 3.3	28	3	105	48-pin LQFP (Case No 932)	GPS	MRFIC1505

FREESCALE SEMICONDUCTOR LOCAL INTERCONNECT NETWORK (LIN) SOLUTIONS

Freescale Semiconductor and LIN—As the only semiconductor member of the LIN consortium, Freescale Semiconductor has the industry's most advanced range of components, software, tools, and support available.

Cost Benefits from LIN—A LIN sub-bus system uses a single-wire implementation and self-synchronization, without a crystal or ceramic resonator, in the slave node. With these cost benefits, high-end comfort and convenience features no longer need to be limited only to top-of-the-line cars.

Embedded Controllers—Since the LIN sub-bus is based on common UART/SCI interface hardware, the 8-bit 68HC08, and 16-bit S12 and S12X Families provide the industry's broadest range of performance and features, affording designers the freedom to choose parts ideally suited to their needs.

Advanced Integration with LIN—Microcontrollers will evolve in the LIN environment to integrate the voltage regulator, physical interface, and high-voltage I/O to provide space, cost, and reliability benefits. Freescale Semiconductor solutions provide this capability today.

Software for LIN—Freescale Semiconductor is working closely with the leading LIN tool supplier to ensure a first class, seamless development and debug environment for Freescale Semiconductor LIN products.

For additional information, visit:

Local Interconnect Network (LIN) Home Page
www.lin-subbus.org

Automotive Home Page

LIN Software Products

Product	68HC05	68HC08	S08	S12	S12X
LIN master	n/a	Available	Available	Available	Available
LIN slave	Available	Available	Available	Available	Available
Operating system	n/a	Available	Available	Available	Available

LIN Physical Layer Transceivers

Product	Description	Main Characteristics	Bus Type and Standard	Protection Features	Operating Voltage (V)	Current Limitation Standby (μA) Typ	Current Limitation Standby (μA) Max	Other Features	Control and Status Reporting	Packaging	Status
MC33399	See *Network Transceivers — LIN, ISO-9141, J-1850 Physical Interface Components*										
MC33661	See *Network Transceivers — LIN, ISO-9141, J-1850 Physical Interface Components*										
MC33662	See *Network Transceivers — LIN, ISO-9141, J-1850 Physical Interface Components*										

MCU CHOICES BY APPLICATION

Application	Microcontroller
Transmission, Engine Control and Management Interfaces	MPC5674F, MPC5673F, MPC563xM, MPC5644A, MPC5643A, MPC5642A, MPC5746M, MPC5777M, **S12XE, S12P, S12G**
Hybrid and Electric Auxiliaries	MPC5674F, MPC5673F, MPC563xM, MPC5644A, MPC5643A, MPC5642A, MPC5744P, MPC5746G, MPC5747C, MPC5747G, MPC5748C, MPC55748G, MPC5746M, **S12G**
Watchdog	**S12G, S12P,** *S08QD4, S08SG, S08AW, S08SC4, S08RN*
High Temperature	MPC5744P, **S12G,** *S08SG*
Body Control Module and Gateway	MPC5668x, MPC560xB, MPC560xD, MPC564xB/C, MPC5746G, MPC5747C, MPC5747G, MPC5748C, MPC5748G, **S12G, S12XE,** KEA
HVAC, Lighting, Seats, Window Lift, Doors, Sun Roof	MPC560xB, MPC560xD, **S12XS, S12P**, **S12G, S12VR, S12ZVFP,** *S08D, S08AW, S08EL, S08SG, S08SL, S08MP16, S08SC4, S08RN,* KEA
Body Motor Control	**S12G, S12VR,** *S08MP16, S08RN,* KEA
Infotainment	all i.MX, SVFxxxR, MAC57D5xx, KEA
Telematics	i.MX251, i.MX281, i.MX53, i.MX351, i.MX 6S1, i.MX 6U1, MAC57D5xx
Instrument Cluster	MPC560xS, i.MX534, i.MX 6S1, i.MX 6U1, SVFxxxR, **S12H, S12XH**, **S12XHY**, **S12ZVFP, S12ZVH, S12ZVY** *S08LG*, MAC57D5xx
Head-Up-Display	MAC57D5xx
Multi-function Display	MAC57D5xx
Braking Systems	MPC564xL, MPC560xP, MPC5744P, **S12XE, S12XS**, KEA
Electronic Power Steering	MPC564xL, MPC560xP, MPC5744P, **S12G**
Tire Pressure Monitoring System	MPC560xB, MPC5668G, **S12XE**, **S12XS**, *S08D*, *S08RN*
Semi-Active Suspension	MPC564xL, MPC5744P
Airbag	MPC560xP, MPC5744P, **S12XF, S12XE, S12XS**, *S08SG,* KEA
Electronic Stability Control	MPC564xL, MPC560xP, MPC5744P
Lane Departure	i.MX534, MPC567xK, i.MX 6S4, i.MX 6U4, i.MX 6D4, i.MX 6Q4, MPC577xK
Advanced Cruise Control	MPC564xL, MPC567xK, MPC5744P, MPC577xK, SCP2201, SCP2207
Precrash, Blindspot Detection, Backup Warning	MPC564xL, MPC567xK, MPC5744P, MPC5604E, MPC577xK, **S12ZVFP**, *S08RN*
Ethernet	MPC560xS, MPC5668x, MPC5746G, MPC5747C, MPC5747G, MPC5748C, MPC5748G, MPC5746M, MPC577xK, all i.MX
FlexRay (tm)	MPC5668x, MPC564xL, MPC560xP, MPC5674F, MPC5673F, MPC5644A, MPC5643A, MPC5642A, MPC5744P, MPC5748G, MPC5747C, MPC5747G, MPC5748C, MPC5748G, MPC5746M MPC5642A, MPC577xK, **S12XF**
CAN	MPC5644A, MPC5643A, MPC5642A, MPC5744P, MPC5746G, MPC5747C, MPC5747G, MPC5748C, MPC5748G, MPC5746M, MPC577xK **all S12(X)**, *S08D,* KEA
LIN	MPC5644P, MPC5746G, MPC5747C, MPC5747G, MPC5748C, MPC5748G, MPC577xK, **S12P, S12XS, S12XE, S12G, S12X, S12VR64,** *S08SG, S08EL, S08AW, S08D, S08SL,S08SC4, S08RN,* KEA
	NOTE: 32-bit in plain, **16-bit in bold**, *8-bit in italics*

S08 8 - BIT MICROCONTROLLERS

S08 Core Technology — Optimized for extreme operating economy with a number of low-power options, Freescale's S08 core is particularly attractive for automotive applications. Multiple stop modes, along with wait and standby modes, will help achieve new thresholds in low-power performance under a variety of operating conditions. The S08 core allows efficient, compact, modular coding with full 16-bit stack-pointer and stack-relative addressing, which permit various instruction sizes and enable memory interface in multiple mechanisms and addressing modes. The object code is also compatible with Freescale's legacy HC05 and HC08 cores.

S08 Family Benefits — Freescale's S08 families help save cost, reduce board space, increase performance and improve quality through extensive on-chip integration. No longer are external components required, such as an external crystal, LVI circuit, voltage regulator, I/O mux, watchdog circuit or EEPROM. With on-chip emulation and debug, changes can be made in application and in real-time, reducing development time. Also, with the S08 CPU running at 40 MHz, MCUs are able to quickly accomplish a task and go back to sleep. Quick execution translates into power savings, which allows customers to add more embedded content while staying within their power budgets.

8-bit S08 MCUs

Device	Bus Frequency	Flash	RAM	EEPROM	CAN	UART	SPI	I^2C	SLIC	Analog (ADC)	Timer	Clock	Additional Features	Operating Voltage	Temp. Range[1]	Package Options	In Production
S08DZ	200 MHz	Up to 128 KB	Up to 8 KB	Up to 2 KB	1	2xSCI	Up to 2	Up to 2	—	Up to 24-CH, 12-bit, 2 com	Up to 12-CH	MCG	Watchdog OSC/Timer, COP, BDM, Temp Sensor	2.7 to 5.5	C, V, M	32 LQFP, 48 LQFP, 64 LQFP, 100 LQFP	√
S08DV	200 MHz	Up to 128 KB	Up to 6 KB	—	1	2xSCI	Up to 2	Up to 2	—	Up to 24-CH, 12-bit, 2 com	Up to 12-CH	MCG	Watchdog OSC/Timer, COP, BDM, Temp Sensor	2.7 to 5.5	C, V, M	32 LQFP, 48 LQFP, 64 LQFP, 100 LQFP	√
S08DN	200 MHz	Up to 60 KB	Up to 2 KB	Up to 2 KB		1xSCI	1	1	—	Up to 16-CH, 12-bit, 2 com	Up to 6-CH + 2-CH	MCG	Watchdog OSC/Timer, COP, BDM, Temp Sensor	2.7 to 5.5	C, V, M	32 LQFP, 48 LQFP, 64 LQFP	√
S08AW	200 MHz	Up to 60 KB	Up to 2 KB	—		2xSCI	1	1	—	Up to 16-CH, 10-bit	Up to 8-CH	ICG	KBI, ICE, BDM, Temp Sensor	2.7 to 5.5	C, V, M	48 QFN, 44 QFP, 32 LQFP, 64 QFP, 64 LQFP, 44 LQFP	√
S08EL	200 MHz	Up to 32 KB	1 KB	Up to 512 B		1xSCI	1	1	1	Up to 16-CH, 10-bit, 2 com	4-CH + 2-CH	ICS	LIN Auto-Baud/Synch, Watchdog OSC/Timer, BDM, Temp Sensor	2.7 to 5.5	C, V, M	28 TSSOP, 20 TSSOP	√
S08SL	200 MHz	Up to 16 KB	512 B	Up to 256 B		1xSCI	1	1	1	Up to 16-CH, 10-bit, 1 com	2-CH + 2-CH	ICS	LIN Auto-Baud/Synch, Watchdog OSC/Timer, BDM, Temp Sensor	2.7 to 5.5	C, V, M	28 TSSOP, 20 TSSOP	√
S08SG	200 MHz	Up to 32 KB	Up to 1 KB	—		1xSCI	1	1	—	Up to 16-CH, 10-bit, 1 com	Up to 2-CH + 2-CH	ICS	Watchdog OSC/Timer, COP, BDM, POR, KBI, Temp Sensor	2.7 to 5.5	C, V, M, W	28 TSSOP, 20 TSSOP, 16 TSSOP, 8 SOIC	√
S08SC4	200 MHz	4 KB	256 B	—		1xSCI	1	1	—	Up to 8-CH, 10-bit	Up to 2-CH + 2-CH	ICS	Watchdog OSC/Timer, COP, BDM, Temp Sensor	4.5 to 5.5	C, V, M	16 TSSOP	√

8-bit S08 MCUs (continued)

Device	Bus Frequency	Flash	RAM	EEPROM	CAN	UART	SPI	I²C	SLIC	Analog (ADC)	Timer	Clock	Additional Features	Operating Voltage	Temp. Range[1]	Package Options	In Production
S08LG	200 MHz	Up to 32 KB	2 KB	—		1xSCI	1	1	—	Up to 16-CH, 12-bit	Up to 2-CH + 6-CH	ICS	Up to 37x8/41x4 LCD Driver, Watchdog OSC/Timer, RTC, BDM, Temp Sensor	2.7 to 5.5	C, V	80 LQFP, 64 LQFP, 48 LQFP	√
S08MP	200 MHz	16 KB	1 KB	—		2xSCI	1	1	—	13-CH, 12-bit, 3 com	6-CH + 2-CH, 16-bit Flex Timer w/PWM Functions	ICS	MTIM, RTC, COP, CRC, BDM, 5-bit DAC (3x), Temp Sensor	2.7 to 5.5	C, V, M	48 LQFP	√
S08RN	200 MHz	Up to 60 KB	Up to 4 KB	Up to 256 B		1xSCI	1	1	—	Up to 16-CH, 12-bit	Up to 6-CH + 2-CH + 2-CH	ICS	TSI, Watchdog, BDM, RTC Analog Comparator	2.7 to 5.5	C, V, M	64, 48, 32 LQFP 20, 16 TSSOP	√
S08QD	8 MHz	Up to 4 KB	Up to 256 B	—		Up to 3	Up to 2	Up to 1	—	4-CH, 10-bit	2-CH + 1-CH	ICS	Watchdog OSC/Timer, BDM, Temp Sensor	2.7 to 5.5	C, V, M	8 SOIC	√

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40°C to +140 °C, W = -40 °C to +150 °C

S12 AND S12X 16-BIT MICROCONTROLLERS

Freescale has a wide range of 16-bit products to offer automotive designers. S12 and S12X MCUs provide high-performance 16-bit control functionality. The S12X MCUs feature the innovative XGATE module, designed specifically to handle interrupt events without CPU intervention. As a result, the S12X controller has the high-performance capabilities you would normally expect of a 32-bit controller. S12 MagniV mixed-signal MCUs extend the S12 portfolio and offer the right blend of digital programmability and high precision analog in highly-integrated packages.

For additional information, visit:

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16-bit Microcontrollers Home Page
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S12 and S12X Families

Device	Bus Frequency	Flash	RAM	Data Flash	EEPROM	XGATE	MPU	ECC	FlexRay	CAN	SCI	SPI	I^2C	Analog (ADC)	PWM	Motor	SSD	ECT	Timer	PIT	LCD	KWU	EBI	Operating Voltage	Temp. Range[1]	Package Options	In Production
S12XEP100	50 MHz	1 MB	64 KB	—	4 KB	√	√	√		5	8	3	2	2x16-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	8-CH, 16-bit	8-CH	—	25	√	3.13 to 5.5	C, V, M	112 LQFP, 144 LQFP, 208 MAPBGA	√
S12XEP768	50 MHz	768 KB	48 KB	—	4 KB	√	√	√		5	8	3	2	2x16-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	8-CH, 16 -bit	8-CH	—	25	√	3.13 to 5.5	C, V, M	112 LQFP, 144 LQFP, 208 MAPBGA	√
S12XEQ512	50 MHz	512 KB	32 KB	—	4 KB	√	√	√		4	6	3	2	2x12-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	8-CH, 16-bit	8-CH	—	25	√	3.13 to 5.5	C, V, M	80 LQFP, 112 LQFP, 144 LQFP	√
S12XEQ384	50 MHz	384 KB	24 KB	—	4 KB	√	√	√		4	4	3	1	2x12-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	4-CH	—	25	√	3.13 to 5.5	C, V, M	80 LQFP, 112 LQFP, 144 LQFP	√
S12XET512	50 MHz	512 KB	32 KB	—	4 KB	√	√	√		3	6	3	2	24-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 4-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP, 112 LQFP, 144 LQFP	√
S12XET384	50 MHz	384 KB	24 KB	—	4 KB	√	√	√		3	6	3	2	24-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 4-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP, 112 LQFP, 144 LQFP	√
S12XET256	50 MHz	256 KB	16 KB	—	4 KB	√	√	√		3	4	3	1	2x12-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	4-CH	—	25	√	3.13 to 5.5	C, V, M	80 LQFP, 112 LQFP, 144 LQFP	√
S12XEG384	50 MHz	384 KB	24 KB	—	4 KB	√	√	√		2	6	3	2	24-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 4-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP, 112 LQFP, 144 LQFP	√
S12XEG256	50 MHz	256 KB	16 KB	—	4 KB	√	√	√		2	4	3	1	16-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 4-CH	—	25	√	3.13 to 5.5	C, V, M	112 LQFP	√
S12XEG128	50 MHz	128 KB	12 KB	—	2 KB	√	√	√		2	2	2	1	16-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 2-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP, 112 LQFP	√
S12XEA256	54 MHz	256 KB	16 KB	—	4 KB	√	√	√		3	2	3	1	8-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 8-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP	√
S12XEA128	50 MHz	128 KB	12 KB	—	2 KB	√	√	√		2	2	2	1	12-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 8-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP	√
S12XES384	55 MHz	384 KB	24 KB	—	4 KB	√	√	√		1	2	1	1	16-CH, 12-bit	8-CH, 8-bit	—	—	8-CH, 16-bit	—	Up to 8-CH	—	25	√	3.13 to 5.5	C, V, M	80 QFP, 112 LQFP, 144 LQFP	√
S12GA128	25 mhZ	128 KB	8 KB	—	4 KB	—	—	√	—	1	3	3	—	12-CH, 12-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M	48 LQFP, 64 LQFP, 100 LQFP,	√
S12GA96	25 mhZ	96 KB	8 KB	—	4 KB	—	—	√	—	1	3	3	—	12-CH, 12-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M	48 LQFP, 64 LQFP, 100 LQFP,	√
S12GA64	25 mhZ	64 KB	4 KB	—	2 KB	—	—	√	—	1	2	2	—	12-CH, 12-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	48 LQFP, 64 LQFP	√

S12 and S12X Families (continued)

Device	Bus Frequency	Flash	RAM	Data Flash	EEPROM	XGATE	MPU	ECC	FlexRay	CAN	SCI	SPI	I²C	Analog (ADC)	PWM	Motor	SSD	ECT	Timer	PIT	LCD	KWU	EBI	Operating Voltage	Temp. Range[1]	Package Options	In Production
S12G64	25 mhZ	64 KB	4 KB	—	2 KB	—	—	√	—	1	2	2	—	12-CH, 10-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	32 LQFP, 48 LQFP, 64 LQFP	√
S12GA48	25 mhZ	48 KB	4 KB	—	1.5 KB	—	—	√	—	1	2	2	—	12-CH, 12-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	48 LQFP, 64 LQFP	√
S12G48	25 mhZ	48 KB	4 KB	—	1.5 KB	—	—	√	—	1	2	2	—	12-CH, 10-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	32 LQFP, 48 LQFP, 64 LQFP	√
S12GNA48	25 mhZ	48 KB	4 KB	—	1.5 KB	—	—	√	—	—	2	2	—	12-CH, 12-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	48 LQFP, 64 LQFP	√
S12GN48	25 mhZ	48 KB	4 KB	—	1.5 KB	—	—	√	—	—	2	2	—	12-CH, 10-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	32 LQFP, 48 LQFP, 64 LQFP	√
S12GNA32	25 mhZ	32 KB	2 KB	—	1 KB	—	—	√	—	—	1	1	—	8-CH, 12-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	48 LQFP	√
S12GN32	25 mhZ	32 KB	2 KB	—	1 KB	—	—	√	—	—	1	1	—	8-CH, 12-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	20 TSSOP, 32 LQFP, 48 LQFP, 48 QFN	√
S12GNA16	25 mhZ	16 KB	1 KB	—	512 B	—	—	—	—	—	1	1	—	8-CH, 12-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	48 LQFP	√
S12GN16	25 mhZ	16 KB	1 KB	—	512 B	—	—	√	—	—	1	1	—	8-CH, 10-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	16	—	3.13 to 5.5	C, V, M, W	20 TSSOP, 32 LQFP, 48 LQFP, 48 QFP	√
S12G192	25 MHz	192 KB	11 KB	—	4 KB	—	—	√	—	1	3	3	—	16-CH, 10-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	—	—	3.13 to 5.5	M	20 TSSOP, 32 LQFP, 48 LQFP, 48 QFN, 64 LQFP, 100 LQFP	√
S12G240	25 MHz	240 KB	11 KB	—	4 KB	—	—	√	—	1	3	3	—	16-CH, 10-bit	8-CH, 8-bit	—	—	—	8-CH, 16 -bit	—	—	—	—	3.13 to 5.5	M	20 TSSOP, 32 LQFP, 48 LQFP, 48 QFN, 64 LQFP, 100 LQFP	√
S12GN32	25 MHz	32 KB	2 KB	—	1 KB	—	—	√	—	—	1	1	—	8-CH, 10-bit	6-CH, 8-bit	—	—	—	6-CH, 16-bit	—	—	—	—	3.13 to 5.5	M	20 TSSOP, 32 LQFP, 48 LQFP, 48 QFN, 64 LQFP, 100 LQFP	√
S12G128	25 MHz	128 KB	8 KB	—	4 KB	—	—	—	—	1	3	3	—	12-CH, 10-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	—	—	3.13 to 5.5	M	48 LQFP, 64 LQFP, 100 LQFP	√
S12G96	25 MHz	96 KB	8 KB	—	3 KB	—	—	—	—	1	3	3	—	12-CH, 10-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	—	—	3.13 to 5.5	M	48 LQFP, 64 LQFP, 100 LQFP	√
S12XS256	40 MHz	256 KB	12 KB	8 KB	—			√		1	2	1	—	16-CH, 12-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	4-CH	—	18		3.13 to 5.5	C, V, M, J	64 LQFP, 80 QFP, 112 LQFP, KGD	√
S12XS128	40 MHz	128 KB	8 KB	8 KB	—			√		1	2	1	—	16-CH, 12-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	4-CH	—	18		3.13 to 5.5	C, V, M, J	64 LQFP, 80 QFP, 112 LQFP, KGD	√
S12XS64	40 MHz	64 KB	4 KB	4 KB	—			√		1	2	1	—	16-CH, 12-bit	8-CH, 8-bit	—	—	—	8-CH, 16-bit	4-CH	—	18		3.13 to 5.5	C, V, M, J	64 LQP, 80 QFP, 112 LQFP, KGD	√
S12XF512	50 MHz	512 KB	32 KB	—	4KB	√		√	√	1	2	2	—	16-CH, 12-bit	6-CH, 15-bit	—	—	—	8-CH, 16-bit	4-CH	—	11		3.13 to 5.5	C, V, M	112 LQFP, 64 LQFP	√
S12XF384	50 MHz	384 KB	24 KB	—	4KB	√		√	√	1	2	2	—	16-CH, 12-bit	6-CH, 15-bit	—	—	—	8-CH, 16-bit	4-CH	—	11		3.13 to 5.5	C, V, M	112 LQFP, 64 LQFP	√
S12XF256	50 MHz	256 KB	20 KB	—	2 KB	√		√	√	1	2	2	—	16-CH, 12-bit	6-CH, 15-bit	—	—	—	8-CH, 16-bit	4-CH	—	11		3.13 to 5.5	C, V, M	112 LQFP, 64 LQFP	√

S12 and S12X Families (continued)

Device	Bus Frequency	Flash	RAM	Data Flash	EEPROM	XGATE	MPU	ECC	FlexRay	CAN	SCI	SPI	I^2C	Analog (ADC)	PWM	Motor	SSD	ECT	Timer	PIT	LCD	KWU	EBI	Operating Voltage	Temp. Range[1]	Package Options	In Production
S12XF128	50 MHz	128 KB	16 KB	—	2 KB	√		√	√	1	2	2	—	16-CH, 12-bit	6-CH, 15-bit	—	—	—	8-CH, 16 -bit	4-CH	—	11		3.13 to 5.5	C, V, M	112 LQFP, 64 LQFP	√
S12XHZ512	40 MHz	512 KB	32 KB	—	4 KB	√				2	2	1	2	16-CH, 10-bit	8-CH, 8-bit	24/6	6	8-CH, 16-bit		4-CH	32x4	8	√	4.5 to 5.5	C, V, M	112 LQFP, 144 LQFP	√
S12XHZ384	40 MHz	384 KB	28 KB	—	4 KB	√				2	2	1	2	16-CH, 10-bit	8-CH, 8-bit	24/6	6	8-CH, 16-bit		4-CH	32x4	8	√	4.5 to 5.5	C, V, M	112 LQFP, 144 LQFP	√
S12XHZ256	40 MHz	256 KB	16 KB	—	4 KB	√				2	2	1	2	16-CH, 10-bit	8-CH, 8-bit	24/6	6	8-CH, 16-bit	—	4-CH	32x4	8	√	4.5 to 5.5	C, V, M	112 LQFP, 144 LQFP	√
S12XHY256	40 MHz	256 KB	12 KB	8 KB	-	–	-	√	–	2	2	1	-	12-ch., 10-bit	8-CH, 8-bit/ 4-CH, 16-bit	16/4	4	-	-	16-CH., 16-bit	40 x 4	25	-	4.5 to 5.5	C, V, M	100 LQFP, 112 LQFP	√
S12XHY128	40 MHz	128 KB	8KB	8 KB	-	–	-	√	–	2	2	1	-	12-ch., 10-bit	8-CH, 8-bit/ 4-CH, 16-bit	16/4	4	-	-	16-CH., 16-bit	40 x 4	25	-	4.5 to 5.5	C, V, M	100 LQFP, 112 LQFP	√
S12P128	32 MHz	128 KB	6 KB	4 KB	—			√		1	1	1	—	10-CH, 12-bit	6-CH, 8-bit	—	—	—	8-CH, 16 -bit	—	—	12		3.13 to 5.5	C, V, M	80 QFP, 64 LQFP, 48 QFN	√
S12P96	32 MHz	96 KB	6 KB	4 KB	—			√		1	1	1	—	10-CH, 12-bit	6-CH, 8-bit	—	—	—	8-CH, 16 -bit	—	—	12		3.13 to 5.5	C, V, M	80 QFP, 64 LQFP, 48 QFN	√
S12P64	32 MHz	64 KB	4 KB	4 KB	—			√		1	1	1	—	10-CH, 12-bit	6-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	12		3.13 to 5.5	C, V, M	80 QFP, 64 LQFP, 48 QFN	√
S12P32	32 MHz	32 KB	2 KB	4 KB	—			√		1	1	1	—	10-CH, 12-bit	6-CH, 8-bit	—	—	—	8-CH, 16-bit	—	—	12		3.13 to 5.5	C, V, M	80 QFP, 64 LQFP, 48 QFN	√
S12HZ128	25 MHz	128 KB	6 KB	—	2 KB					2	2	1	1	16-CH, 10-bit	6-CH, 8-bit	16/4	4	—	8-CH, 8-bit	—	32x4	8		4.5 to 5.5	C, V, M	112 LQFP	√
S12HZ64	25 MHz	64 KB	4 KB	—	1 KB					1	1	1	—	8-CH, 10-bit	4-CH, 8-bit	16/4	4	—	8-CH, 8-bit	—	24x4	8		4.5 to 5.5	C, V, M	80 QFP, 112 LQFP	√
S12HN64	25 MHz	64 KB	4 KB	—	1 KB						1	1	—	8-CH, 10-bit	4-CH, 8-bit	16/4	4	—	8-CH, 8-bit	—	24x4	8		4.5 to 5.5	C, V, M	80 QFP, 112 LQFP	√
S12HY64	32 MHz	64 KB	4 KB	4 KB	—					1	1	1	1	8-CH, 10-bit	8-CH, 8-bit	16/4	Support	—	8-CH+8-CH 16-bit	—	40x4	22		3.13 to 5.5	C, V, M	64 LQFP, 100 LQFP	√
S12HA64	32 MHz	64 KB	4 KB	4 KB	—						1	1	1	8-CH, 10-bit	8-CH, 8-bit	16/4	Support	—	8-CH+8-CH 16-bit	—	40x4	22		3.13 to 5.5	C, V, M	64 LQFP, 100 LQFP	√
S12HY48	32 MHz	48 KB	4 KB	4 KB	—					1	1	1	1	8-CH, 10-bit	8-CH, 8-bit	16/4	Support	—	8-CH+8-CH 16-bit	—	40x4	22		3.13 to 5.5	C, V, M	64 LQFP, 100 LQFP	√
S12HA48	32 MHz	48 KB	4 KB	4 KB	—						1	1	1	8-CH, 10-bit	8-CH, 8-bit	16/4	Support	—	8-CH+8-CH 16-bit	—	40x4	22		3.13 to 5.5	C, V, M	64 LQFP, 100 LQFP	√
S12HY32	32 MHz	32 KB	2 KB	4 KB	—					1	1	1	1	8-CH, 10-bit	8-CH, 8-bit	16/4	Support	—	8-CH+8-CH 16-bit	—	40x4	22		3.13 to 5.5	C, V, M	64 LQFP, 100 LQFP	√
S12HA32	32 MHz	32 KB	2 KB	4 KB	—						1	1	1	8-CH, 10-bit	8-CH, 8-bit	16/4	Support	—	8-CH+8-CH 16-bit	—	40x4	22		3.13 to 5.5	C, V, M	64 LQFP, 100 LQFP	√

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40 °C to +140 °C, W = -40 °C to +150 °C

S12 MagniV Mixed-signal MCUs

Device	Bus Frequency	Flash	RAM	EEPROM	ECC	CAN	CAN-PHY	SCI	LIN-PHY	SPI	I^2C	Ext. Analog (ADC)	Int. Analog (ADC)	PWM	Timer	LCD	KWU	Motor	High Voltage Input	Other Analog	Vreg	Ext. Supply	Operating Voltage	Temp. Range[1]	Package Options	In Production
S12ZVCA192	32 MHz	192 KB	12 KB	2 KB	√	1	1	2	—	2	1	16-CH, 12-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	2-CH ACMP, DAC	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVCA128	32 MHz	128 KB	12 KB	2 KB	√	1	1	2	—	2	1	16-CH, 12-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	2-CH ACMP, DAC	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVCA96	32 MHz	96 KB	12 KB	2 KB	√	1	1	2	—	2	1	16-CH, 12-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	2-CH ACMP, DAC	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVCA64	32 MHz	64 KB	4 KB	1 KB	√	1	1	2	—	2	1	16-CH, 12-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	2-CH ACMP, DAC	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVC192	32 MHz	192 KB	12 KB	2 KB	√	1	1	2	—	2	1	16-CH, 10-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	—	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVC128	32 MHz	128 KB	12 KB	2 KB	√	1	1	2	—	2	1	16-CH, 10-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	—	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVC96	32 MHz	96 KB	12 KB	2 KB	√	1	1	2	—	2	1	16-CH, 10-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	—	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVC64	32 MHz	64 KB	4 KB	1 KB	√	1	1	2	—	2	1	16-CH, 10-bit		4+4-CH, 16-bit	8+4-CH, 16-bit	—	34	—	2-CH HVI, Vsup Sense	—	2	5.0 V/20 mA		C, M, V, W	64 LQFP-EP, 48 LQFP	
S12ZVL32	32 MHz	32 KB	1 KB	128 B	√	—	—	2	1	1	1	10-CH, 10-bit		8-CH, 8-bit or 4-CH, 16-bit	6+2-CH, 16-bit	—	23	—	1-CH HVI, Vsup Sense	3-CH NGPIO (5.0 V/25 mA)	1	5.0 V/20 mA		C, V, M	48 LQFP, 32-LQFP	
S12ZVL16	32 MHz	16 KB	1 KB	128 B	√	—	—	2	1	1	1	10-CH, 10-bit		8-CH, 8-bit or 4-CH, 16-bit	6+2-CH, 16-bit	—	23	—	1-CH HVI, Vsup Sense	3-CH NGPIO (5.0 V/25 mA)	1	5.0 V/20 mA		C, V, M	48 LQFP, 32-LQFP	
S12ZVL8	32 MHz	8 KB	1 KB	128 B	√	—	—	2	1	1	1	10-CH, 10-bit		8-CH, 8-bit or 4-CH, 16-bit	6+2-CH, 16-bit	—	23	—	1-CH HVI, Vsup Sense	3-CH NGPIO (5.0 V/25 mA)	1	5.0 V/20 mA		C, V, M	48 LQFP, 32-LQFP	
S12ZVLS32	32 MHz	32 KB	1 KB	128 B	√	—	—	2	1	1	1	10-CH, 10-bit		8-CH, 8-bit or 4-CH, 16-bit	6+2-CH, 16-bit	—	23	—	1-CH HVI, Vsup Sense	3-CH NGPIO (5.0 V/25 mA)	1	5.0 V/20 mA		C, V, M	32 QFN	
S12ZVLS16	32 MHz	16 KB	1 KB	128 B	√	—	—	2	1	1	1	10-CH, 10-bit		8-CH, 8-bit or 4-CH, 16-bit	6+2-CH, 16-bit	—	23	—	1-CH HVI, Vsup Sense	3-CH NGPIO (5.0 V/25 mA)	1	5.0 V/20 mA		C, V, M	32 QFN	
S12VR64	25 MHz	64 KB	2 KB	512 B	√	—	—	2	1	1	—	6-CH, 10-bit	4-CH, 10-bit	4-CH, 8-bit	4-CH, 16 -bit	—	6	2-CH Relay, LS Driver	4-CH HVI, Vbat-Sense, Vsup Sense	2-CH, HS Driver	2	5.0 V, 20 mA	6.0 to 18	C, V	32 LQFP, 48 LQFP	√
S12VR48	25 MHz	48 KB	2 KB	512 B	√	—	—	2	1	1	—	6-CH, 10-bit	4-CH, 10-bit	4-CH, 8-bit	4-CH, 16 -bit	—	6	2-CH Relay, LS Driver	4-CH HVI, Vbat-Sense, Vsup Sense	2-CH, HS Driver	2	5.0 V, 20 mA	6.0 to 18	C, V	32 LQFP, 48 LQFP	√
S12ZVH128	32 MHz	128KB	8 KB	4 KB	√	1	1	2	—	1	1	8-CH, 10-bit	8-CH, 10-bit	8-CH(8-bit), 4-CH(16-bit)	Two 8-CH x16-bit	4x40	24	4 Stepper	Vbat-Sense, Vsup-Sense	—	2		5.5 V to 18 V	C, V	100 LQFP, 144 LQFP	√
S12ZVH64	32 MHz	64 KB	4 KB	4 KB	√	1	1	2	—	1	1	8-CH, 10-bit	8-CH, 10-bit	8-CH(8-bit), 4-CH(16-bit)	Two 8-CH x16-bit	4x40	24	4 Stepper	Vbat-Sense, Vsup-Sense	—	2		5.5 V to 18 V	C, V	144 LQFP	√
S12ZVHY64	32 MHz	64 KB	4 KB	2 KB	√	1	—	2	—	1	1	8-CH, 10-bit	8-CH, 10-bit	8-CH(8-bit), 4-CH(16-bit)	Two 8-CH x16-bit	4x40	24	2 Stepper	Vbat-Sense, Vsup-Sense	—	1		5.5 V to 18 V	C, V	100 LQFP, 144 LQFP	√
S12ZVHY32	32 MHz	32 MHz	2 KB	2 KB	√	1	—	2	—	1	1	8-CH, 10-bit	8-CH, 10-bit	8-CH (8-bit), 4-CH (16-bit)	Two 8-CH x 16-bit	4x40	24	2 Stepper	Vbat-Sense, Vsup-Sense	—	1		5.5 V to 18 V	C, V	100 LQFP, 144 LQFP	√
S12ZVHL64	32 MHz	64 KB	4 KB	2 KB	√	1	—	2	1	1	1	8-CH, 10-bit	8-CH, 10-bit	8-CH (8-bit), 4-CH (16-bit)	Two 8-CH x 16-bit	4x40	24	2 Stepper	Vbat-Sense, Vsup-Sense	—	1		5.5 V to 18 V	C, V	100 LQFP, 144 LQFP	√

S12 MagniV Mixed-signal MCUs (continued)

Device	Bus Frequency	Flash	RAM	EEPROM	ECC	CAN	CAN-PHY	SCI	LIN-PHY	SPI	I^2C	Ext. Analog (ADC)	Int. Analog (ADC)	PWM	Timer	LCD	KWU	Motor	High Voltage Input	Other Analog	Vreg	Ext. Supply	Operating Voltage	Temp. Range[1]	Package Options	In Production
S12ZVFP64	32 MHz	64 KB	4 KB	2 KB	√	1	—	2	1	1	1	8-CH, 10-bit	8-CH, 10-bit	8-CH (8-bit), 4-CH (16-bit)	Two 8-CH x 16-bit	4x40	24	—	Vbat-Sense, Vsup-Sense	—	1		5.5 V to 18 V	C, V	100 LQFP, 144 LQFP	√
S12ZVML128	50 MHz	128 KB	8 KB	512 B	√	1	—	2	1	1	—	4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit	—	6	BLDC/ PMSM	Vsup-Sense	6-CH Gate Drive Unit	2	—	3.5 V to 20 V	V, M, W	64 LQFP-EP	√
S12ZVMC128	50 MHz	128 KB	8 KB	512 B	√	1	—	2	—	1	—	4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit	—	6	BLDC/ PMSM	Vsup-Sense	6-CH Gate Drive Unit	2	—	3.5 V to 20 V	V, M, W	64 LQFP-EP	√
S12ZVML64	51 MHz	64 KB	4 KB	512 B	√	1	—	2	1	1	—	4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit	—	6	BLDC/ PMSM	Vsup-Sense	6-CH Gate Drive Unit	1	—	3.5 V to 20 V	V, M, W	64 LQFP-EP	√
S12ZVMC64	52 MHz	64 KB	4 KB	512 B	√	1	—	2	—	1	—	4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit	—	6	BLDC/ PMSM	Vsup-Sense	6-CH Gate Drive Unit	2	—	3.5 V to 20 V	V, M, W	64 LQFP-EP	√
S12ZVML32	50 MHz	32 KB	4 KB	512 B	√	1	—	2	1	1		4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit		6	BLDC/ PMSM	Vsup-Sense		1	5.0 V, 20 mA	3.5 V to 20 V	V, M, W	64 LQFP-EP	√
S12ZVM32	50 MHz	32 KB	4 KB	128 B	√		—	1		1		4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit		6	BLDC/ PMSM	Vsup-Sense	HV-PHY	1	5.0 V, 20 mA	3.5 V to 20 V	V, M, W	64 LQFP-EP, 48 LQFP-EP	
S12ZVM16	50 MHz	16 KB	2 KB	128 B	√			1		1		4+5-CH, 12-bit	8-CH, 12-bit	6-CH, 15-bit	4-CH, 16-bit		6	BLDC/ PMSM	Vsup-Sense	HV-PHY	1	5.0 V, 20 mA	3.5 V to 20 V	V, M, W	64 LQFP-EP, 48 LQFP-EP	

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40 °C to +140 °C, W = -40 to +150 °C

DIGITAL SIGNAL CONTROLLERS

56800E Core—The 56800E MCU+DSP core was architected specifically to provide users the ease of use of an MCU together with the performance of a DSP in a single core.

56F8300 High-Performance Flash Series—The MC56F8300 series of controllers combines the 56800E core with flash memory, motor control peripherals, and built-in safety features targeted specifically for automotive applications to provide 60 MIPS of performance over the full -40°C to 125°C temperature range.

Memory—On-board memory includes program flash and RAM, data flash and RAM, and BootFlash with EEPROM emulation capability. The modified Harvard architecture enables users to perform up to three simultaneous memory accesses.

Service—A full-range of services is offered for the controller devices including software, support, training, and internal and third-party development tools.

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56F8xxx Family

Product	ROM (KB)	RAM	Flash	Timer	Serial	GPIO (pins)	A/D	PWM	Operating Voltage (V)	Operating Frequency (MHZ)	Temperature	Packaging	Additional Information
56F8013	0	4K	16K	4 x 16-bit	1 SCI/LIN + 1 SPI + 1 I^2C	26	1 x 4-CH 12-bit	1 x 6-CH	3.3	32	C, M	32-pin LQFP	mcPWM with center alignment, 1 x 4 channel Quad Decoder
56F8355	n/a	20K	280K	16 x 16-bit	2 SCI/LIN + 2 SPI + 1 CAN + 1 I^2C	49	4 x 4-CH 12-bit	2 x 6-CH	3.3	60	C, M	128-pin LQFP	mcPWM with center alignment, 2 x 4 channel Quad Decoder

KINETIS MCUS BASED ON ARM® TECHNOLOGY

Kinetis MCU families for automotive are based on ARM® Cortex Technology and provide high scalability, cost-effective automotive-grade 32-bit portfolio for a wide range of automotive applications.

Designers will be benefited from the granted third party support for ARM technology and they will maximize hardware and software reuse.

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Kinetis MCUs based on ARM® Technology

Device	Core Platform	Program Flash	RAM	EEPROM	SCI	SPI	CAN	I^2C	Other Communications	Timer	Analog (ADC)	KBI	Additional Features	Operating Voltage	Temp Range	Debug	Package Options	In Production
KEAZN8	48 MHz	8 KB	1 KB	Emulate	1	1	0	1	-	FTM, PIT, PWT, RTC	12-CH, 12-bit	2x 8-bit	LVD, BME, ACMP, PMC, CRC	2.7 to 5.5	C, V, M	SWD	16 TSSOP, 24 QFN	√
KEAZN16	40 MHz	16 KB	2 KB	256 B	3	2	0	2	-	FTM, PIT, RTC	16-CH, 12-bit	2x 8-bit	LVD, BME, ACMP, PMC, CRC	2.7 to 5.5	C, V, M	SWD	32 LQFP, 64 LQFP	√
KEAZN32	40 MHz	32 KB	4 KB	256 B	3	2	0	2	-	FTM, PIT, RTC	16-CH, 12-bit	2x 8-bit	LVD, BME, ACMP, PMC, CRC	2.7 to 5.5	C, V, M	SWD	32 LQFP, 64 LQFP	√
KEAZN64	40 MHz	64 KB	4 KB	256 B	3	2	0	2	-	FTM, PIT, RTC	16-CH, 12-bit	2x 8-bit	LVD, BME, ACMP, PMC, CRC	2.7 to 5.5	C, V, M	SWD	32 LQFP, 64 LQFP	√
KEAZ64	48 MHz	64 KB	8 KB	Emulate	3	2	1	2	-	FTM, PIT, PWT, RTC	16-CH, 12-bit	2x 32-bit	LVD, BME, ACMP, PMC, CRC	2.7 to 5.5	C, V, M	SWD	64 LQFP, 80 LQFP	√
KEAZ128	48 MHz	128 KB	16 KB	Emulate	3	2	1	2	-	FTM, PIT, PWT, RTC	16-CH, 12-bit	2x 32-bit	LVD, BME, ACMP, PMC, CRC	2.7 to 5.5	C, V, M	SWD	64 LQFP, 80 LQFP	√

MAC57DXXX 32-BIT ARM®-BASED MCUS

The MAC57Dxxx family is the next-generation platform of devices specifically targeted at driver information systems (DIS) market using single and dual high resolution displays.

Leveraging the highly successful MPC56xxS product families, our next generation product families powered by ARM® processors, coupled with 2D graphics accelerators, Head Up Display (HUD) warping engines, high resolution displays, integrated stepper motor drivers with patented stepper stall detect offering leading-edge performance and scalability for cost-effective applications.

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MAC57Dxxx 32-bit ARM®-Based MCUs

Device	Multi Core Platform	Core Frequency	Program Flash	SRAM	Graphics RAM	eDMA	EEPROM	Display Resolution	Display Interfaces	Segment LCD	Graphics Accelerator	Digital Video Input	Stepper Motor Driver	I/O Processor	MLB	UART/ LIN	SPI	CAN (FD)	I^2C	Ethernet	Sound Generator	DRAM Support	Flash Support	Operating voltage	Temp Range	Debug	Security	Functional Safety	Package Options	In Production
MAC57D5xx	ARM Cortex-A5, ARM Cortex-M4, ARM Cortex-M0+	(A5)320 MHz, (M4)160 MHz, (M0+)80 MHz	4 MB	2 x 512 KB	1.3 MB	2 x 16 Ch	Emulated : 2 x (4 x 16 kB + 64 kB)	Up to 2 x WVGA	2 x dRGB, 1 x RSDS, 1 x LVDS	4x40	OpenVG 1.1	Yes	6	Yes	MLB 50	3	5	3	2	10/100 +AVB	Yes	16-bit SDR, 16/32-bit DDR2	2x Dual DDR Quad SPI	3.3, 5	V	JTAG, Trace	CSE2	ASIL-B	176 LQFP, 208 LQFP, 516 MAPBGA	

QORIVVA 32-BIT MCUS BASED ON POWER ARCHITECTURE® TECHNOLOGY

Power Architecture is the world's leading architecture for automotive powertrain control, body electronics, safety and chassis, and instrument cluster applications. Our automotive qualified 32-bit Qorivva processors built on Power Architecture technology deliver highly integrated single and multicore solutions for many automotive design needs. With Qorivva microcontrollers, you get a full range of performance and memory options so you can design scalable applications for more fuel-efficient, safer and secure automobiles.The Qorivva MPC56xx portfolio will continue to grow with devices that offer expanded sets of memory, connectivity and performance options.

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32-bit Qorivva MPC56xx and MPC57xx MCUs Built on Power Architecture® Technology

Device	Core Platform	Bus Frequency	Program Flash	SRAM	DMA	EEPROM	MPU/MMU	CTU	SCI (LINFlex)	DSPI	CAN	I^2C	FlexRay™	Ethernet (100BaseT)	MLB	Other Peripherals	eTPU	eMIOS	Motor Control Timers	PIT	Analog (ADC, DAC)	Operating Voltage	Temp. Range[1]	Debug	Package Options	In Production
MPC5775K	Dual Z7 Processor, lockstep Z4	Z7 cores at 266 Mhz, Z4 cores at 133 MHz	4 MB with ECC	1.5 MB with ECC	Safe DMA	No	No	No	4	4	4 of which 1 is FD	3	128 msg	1	No	SPT (Signal Processing Unit) for Radar Algorithms, 2xCross Trig Unit, 3xeTimers, 2xSENT, Temp Sensor	No	No	2xPWM	No	8xDelta Sigma @ 10 MHz; 4x12bit SAR @ 1Mz; 2M/s 8-bit DAC	3.3 V I/O, 1.2 V Core	-40 to 150 Tj	Nexus 3+	17x17 356 PBGA	
MPC5774K	Dual Z7 Processor, lockstep Z4	Z7 cores at 266 Mhz, Z4 cores at 133 MHz	3 MB with ECC	1.0 MB with ECC	Safe DMA	No	No	No	4	4	4 of which 1 is FD	3	128 msg	1	No	SPT (Signal Processing Unit) for Radar Algorithms, 2xCross Trig Unit, 3xeTimers, 2xSENT, Temp Sensor	No	No	2xPWM	No	8xDelta Sigma @ 10 MHz; 4x12bit SAR @ 1Mz; 2M/s 8-bit DAC	3.3 V I/O, 1.2 V Core	-40 to 150 Tj	Nexus 3+	17x17 356 PBGA	
MPC5744P	2 x e200z4	180 MHz	2.5 MB	384 KB	32-CH	Emulated in Program Flash	32 Entry	2	2	4	3		√						(3 x 6-ch., E-Timer), (2 x 12-ch, PWM)	4-CH	Quad, 25-ch. External, 12-bit	3.3	C, V, M	Nexus 3+, MDO and Aurora interface	144 LQFP, 257 MAPBGA	
MPC5746R	3 x e200z4	3 x 200 MHz	4 MB	320 KB	64-CH	288 KB	MPU		6	7	4	\	√	√		Zipwire, SENT	64-CH	32-CH		8	4 x SAR, 3 x SD	3.3, 5	M	Nexus 3+, JTAG	176 LQFP-EP 252 MAPBGA	
MPC5746M	4 x e200z4	4 x 200 MHz	4 MB	320 KB	64-CH	288 KB	Yes, No		5	7	3/1	1	√	√			120-CH				8 x SAR, 6 x SD	3.3, 5	M	Nexus 3+, Zipwire Aurora, JTAG	176 LQFP-EP 292 MAPBGA	
MPC5746G	Dual e200z7	2x180 MHz	6 MB	384 KB	96-CH	64 KB Data Flash	32 entry	√	3	10	8	4	√	√	√			Up to 96-CH, 16-bit		16	Up to 32-CH, 12-bit, 48-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	176 LQFP, 256 MApBGA, 324 MAPBGA	
MPC5747C	e200x4, e200x2	180 MHz, 80 MHz	4 MB	512 KB	32-CH	Emulated	24-CH MPU	√	Up to 16	10	8	4	√	√				Up to 96-CH, 16-bit		16	Up to 32-CH, 12-bit, 48-CH, 10-bi	3.3 V, 5.0 V	C, V, M	Nexus 3+	176 LQFP, 256 MApBGA, 324 MAPBGA	

32-bit Qorivva MPC56xx and MPC57xx MCUs Built on Power Architecture® Technology (continued)

Device	Core Platform	Bus Frequency	Program Flash	SRAM	DMA	EEPROM	MPU/ MMU	CTU	SCI (LINFlex)	DSPI	CAN	I^2C	FlexRay™	Ethernet (100BaseT)	MLB	Other Peripherals	eTPU	eMIOS	Motor Control Timers	PIT	Analog (ADC, DAC)	Operating Voltage	Temp. Range[1]	Debug	Package Options	In Production
MPC5747G	Dual e200x4, e200x2	180 MHz, 80 MH	4 MB	768 KB	32-CH	Emulated	32-CH MPU	√	Up to 18	10	8	4	√	√	√	USB		Up to 96-CH, 16-bit		16	Up to 32-CH, 12-bit, 48-CH, 10-bi	3.3 V, 5.0 V	C, V, M	Nexus 3+	176 LQFP, 256 MAPBGA, 324 MAPBGA	
MPC5748C	e200x4, e200x2	180 MHz, 80 MH	6 MB	768 KB	32-CH	Emulated	24-CH MPU	√	Up to 16	10	8	4	√	√				Up to 96-CH, 16-bit		16	Up to 32-CH, 12-bit, 48-CH, 10-bi	3.3 V, 5 V	C, V, M	Nexus 3+	176 LQFP, 256 MAPBGA, 324 MAPBGA	
MPC5748G	Dual e200x4, e200x2	180 MHz, 80 MH	6 MB	768 KB	32-CH	Emulated	32-CH MPU		Up to 18	10	8	4	√	√	√	USB		Up to 96-CH, 16-bit		16	Up to 32-CH, 12-bit, 48-CH, 10-bi	3.3V, 5V	C, V, M	Nexus 3+	176 LQFP, 256 MAPBGA, 324 MAPBGA	
MPC5777M	3 x e200z7 + 1 x e200z4	3 x 300 MHz + 1 x 200MHz	8 MB	596 KB	128-CH	8 x 64 KB	Yes, No		6	8	4/1	2	√	√			248-CH				12 x SAR, 10 x SD	3.3, 5	M	Nexus 3+, Zipwire Aurora, JTAG	416 PBGA, 512 PBGA	
MPC5676R	Dual e200z7	2x180 MHz	6 MB	384 KB	96-CH	64 KB Data Flash	32 entry		3	5	4		√				96-CH	Up to 32-CH, 16-bit			Up to 64-CH, 12-bit 12 xDEC Filters	3.3V, 5V	M	Nexus 3+	416 BGA, 516 BGA	
MPC5674F	e200z7	150, 200, 264 MHz	4 MB	256 KB	64-CH + 32-CH	Emulated in Program Flash	MPU+ 64 Entry MMU	√	3	4 (MSB)	4		√				2x32-CH	32-CH			Quad 64-CH	3.3 V, 5.0 V	M	Nexus 3+	324 BGA, 416 BGA, 516 BGA	√
MPC5673F	e200z7	150, 200, 264 MHz	3 MB	192 KB	64-CH + 32-CH	Emulated in Program Flash	MPU+ 64 Entry MMU	√	3	4 (MSB)	4		√				2x32-CH	32-CH			Quad 64-CH	3.3 V, 5 V	M	Nexus 3+	324 BGA, 416 BGA, 516 BGA	√
MPC5673K	Dual e200z7	2x180 MHz	1 MB	256 KB	2x 32-CH	64 KB	√	2	3	2	4	2	√	√					3 x PWM; 3 x ETIMER	1	4 x 12-bit,,34-CH	3.3 V, 1.2 V	C, V, M	Nexus 3+	257 MAPBGA, 473 MAPBGA	√
MPC5675K	Dual e200z7d	45 MHz	2 MB	512 KB	32-CH	Emulated in Program Flash	64 entry	2	4	3	4	3	opt.	√						4-CH	4-CH, 12-bit	3.3 V, 5 V	M, V	Nexus 3+	473 MAPBGA, 275 MAPBGA	√
MPC5674K	Dual e200z7d	180 MHz	1.5 MB	384 KB	2 x 32-CH	64KB	√	2	4	3	4	3	√	√					3 x PWM; 3 x ETIMER	4-CH	4 x 12-bit, 34-CH	3.3 V, 5.0 V	C, V, M	Nexus 3+	257 MAPBGA, 473 MAPBGA	√
MPC5668G	e200z6 + e200z0	116 MHz	2 MB	592KB	16-CH	64 KB			6	4	6	4	√	√	√			16-CH, 24-bit		8-CH	36-CH, 10-bit	3.3 V, 5.0 V	V	Nexus3 on z6 and Nexus 2+	208 MAPBGA	√

32-bit Qorivva MPC56xx and MPC57xx MCUs Built on Power Architecture® Technology (continued)

Device	Core Platform	Bus Frequency	Program Flash	SRAM	DMA	EEPROM	MPU/MMU	CTU	SCI (LINFlex)	DSPI	CAN	I^2C	FlexRay™	Ethernet (100BaseT)	MLB	Other Peripherals	eTPU	eMIOS	Motor Control Timers	PIT	Analog (ADC, DAC)	Operating Voltage	Temp. Range[1]	Debug	Package Options	In Production
MPC5668E	e200z0 + e200z0	116 MHz	2 MB	128 KB	32-CH	Emulated in Program Flash	16 entry	√	12	4	5	4						32-CH, 16-bit		8-CH	64-CH, 10-bit	3.3 V, 5.0 V	V, M	JTAG, Nexus3 onz6 and Nexus2+	208 MAPBGA, 256 MAPBGA only for devt.	√
MPC5604E	e200z0h	64 MHz	512 KB	96 KB	16-CH	64 KB	yes		2	3	1	3		√					1 x E-Timer	1	8-CH, 10-bit	3.0 V, 1.2 V	C, V, M	Nexus 2+	64 LQFP	√
MPC5634M	e200z3	60, 80 MHz	1.5M	94 KB	32-CH	Emulated in Program Flash	8 Entry		2	2	2	0					32-CH	16-CH, 24-bit		5-CH	Dual 34-CH, 12-bit	5.0 V	M	Nexus 2+ Wide trace port in Vertical Calibration System	144 LQFP, 176 LQFP, 208 MAPBGA	√
MPC5633M	e200z3	40, 60, 80 MHz	1M	64 KB	32-CH	Emulated in Program Flash	8 Entry		2	2	2	0					32-CH	16-CH, 24-bit		5-CH	Dual 34-CH, 12-bit	5.0 V	M	Nexus 2+ Wide trace port in Vertical Calibration System	100 LQFP, 144 LQFP, 176 LQFP, 208 MAPBGA	√
MPC5632M	e200z3	40, 60 MHz	768 KB	48 KB	32-CH	Emulated in Program Flash	8 Entry		2	2	2	0					32-CH	8-CH, 24-bit		5-CH	Dual 32-CH, 12-bit	5.0 V	M	Nexus 2+ Wide trace port in Vertical Calibration System	100 LQFP, 144 LQFP	√
MPC5643L	e200z4x2	80/120 MHz	1 MB	128 KB	16-CH	64 KB Data Flash	16 Entry	√	2	3	2	0	√						46-Ch. eTimer/ PWM/ STM	4-Ch.	Dual 16-Ch., 12-bit	3.3 V	M	Nexus 3+	144 LQFP, 257 MAPBGA	√
MPC5646C	e200z4 + e200z0	120 MHz, 60 MHz	3 MB	256 KB	16-CH	64 KB Data Flash	16 Entry	√	10	8	6	1	√	√				64-CH, 16-bit		Up to 8-CH	Up to 29-CH, 12-bit, Up to 33-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	256 BGA, 208 LQFP, 176 LQFP	√
MPC5646B	e200z4	120 MHz	3 MB	192 KB	16-CH	64 KB Data Flash	16 Entry	√	10	8	6	1	√					64-CH, 16-bit		Up to 8-CH	Up to 29-CH, 12-bit, Up to 33-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	256 BGA, 208 LQFP, 176 LQFP	√
MPC5645C	e200z4 + e200z0	120 MHz, 60 MHz	2 MB	256 KB	16-CH	64 KB Data Flash	16 Entry	√	10	8	6	1	√	√				64-CH, 16-bit		Up to 8-CH	Up to 29-CH, 12-bit, Up to 33-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	256 BGA, 208 LQFP, 176 LQFP	√
MPC5645B	e200z4	120 MHz	2 MB	160 KB	16-CH	64 KB Data Flash	16 Entry	√	10	8	6	1	√					64-CH, 16-bit		Up to 8-CH	Up to 29-CH, 12-bit, Up to 33-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	256 BGA, 208 LQFP, 176 LQFP	√
MPC5644C	e200z4 + e200z0	120 MHz, 60 MHz	1.5 MB	192 KB	16-CH	64 KB Data Flash	16 Entry	√	10	8	6	1	√	√				64-CH, 16-bit		Up to 8-CH	Up to 29-CH, 12-bit, Up to 33-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	256 BGA, 208 LQFP, 176 LQFP	√
MPC5644B	e200z4	120 MHz	1.5 MB	128 KB	16-CH	64 KB Data Flash	16 Entry	√	10	8	6	1	√					64-CH, 16-bit		Up to 8-CH	Up to 29-CH, 12-bit, Up to 33-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 3+	256 BGA, 208 LQFP, 176 LQFP	√

32-bit Qorivva MPC56xx and MPC57xx MCUs Built on Power Architecture® Technology (continued)

Device	Core Platform	Bus Frequency	Program Flash	SRAM	DMA	EEPROM	MPU/ MMU	CTU	SCI (LINFlex)	DSPI	CAN	I^2C	FlexRay™	Ethernet (100BaseT)	MLB	Other Peripherals	eTPU	eMIOS	Motor Control Timers	PIT	Analog (ADC, DAC)	Operating Voltage	Temp. Range[1]	Debug	Package Options	In Production
MPC5607B	e200z0	64 MHz	1.5 MB	96 KB	16-CH	64 KB Data Flash	8 Entry	√	Up to 10	6	6	1						64-CH, 16-bit			16-CH, 10/12-bit & up to 32-Ch., 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208MAPBGA Emul. Only Package) JTAG	100 LQFP, 144 LQFP, 176 LQFP	√
MPC5606B	e200z0	64 MHz	1 MB	80KB	16-CH	64 KB Data Flash	8 Entry	√	Up to 8	Up to 6	6	1						64-CH, 16-bit			16-CH, 10/12-bit & up to 32-Ch., 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208MAPBGA Emul. Only Package) JTAG	100 LQFP, 144 LQFP, 176 LQFP	√
MPC5605B	e200z0	64 MHz	768 KB	64KB	16-CH	64 KB Data Flash	8 Entry	√	Up to 8	Up to 6	6	1						64-CH, 16-bit			16-CH, 10/12-bit & up to 32-Ch., 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208MAPBGA Emul. Only Package) JTAG	100 LQFP, 144 LQFP, 176 LQFP	√
MPC5604B	e200z0	64 MHz	512 KB	32KB		64 KB Data Flash	8 Entry	√	4	3	3	1						56-CH, 16-bit		up to 6-CH	up to 36-CH, 10-bit	3.3V, 5.0 V	C, V, M	Nexus 2+ (208MAPBGA Emul. Only Package) JTAG	100 LQFP, 144 LQFP,	√
MPC5603B	e200z0	64 MHz	384 KB	28KB		64 KB Data Flash	8 Entry	√	4	3	3	1						56-CH, 16-bit		up to 6-CH	up to 36-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208 MAPBGA Emul. Only Package) JTAG	100 LQFP, 144 LQFP	√
MPC5602B	e200z0	64 MHz	256 KB	24KB		64 KB Data Flash	8 Entry	√	3	3	2	1						56-CH, 16-bit		up to 6-CH	up to 36-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208 MAPBGA Emul. Only Package) JTAG	100 LQFP, 144 LQFP	√
MPC5604C	e200z0	64 MHz	512 KB	48 KB		64 KB Data Flash	8 Entry	√	4	3	6	1						28-CH, 16-bit		3-CH	28-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208 MAPBGA Emul. Only Package) JTAG	100 LQFP	√
MPC5603C	e200z0	64 MHz	384 KB	40 KB		64 KB Data Flash	8 Entry	√	4	3	6	1						28-CH, 16-bit		3-CH	28-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208 MAPBGA Emul. Only Package) JTAG	100 LQFP	√
MPC5602C	e200z0	64 MHz	256 KB	32 KB		64 KB Data Flash	8 Entry	√	4	3	6	1						28-CH, 16-bit		3-CH	28-CH, 10-bit	3.3 V, 5.0 V	C, V, M	Nexus 2+ (208 MAPBGA Emul. Only Package) JTAG	100 LQFP	√
MPC5601D	e200z0	48 MHz	128 KB	12 KB	16-CH	64 KB Data Flash		√	3	2	1							Up to 28-CH, 16-bit		Up to 4-CH	Up to 33-CH, 12-bit	3.3 V, 5.0 V	C, V, M	JTAG	100 LQFP, 64 LQFP	√
MPC5602D	e200z0	48 MHz	256 KB	16 KB	16-CH	64 KB Data Flash		√	3	2	1							Up to 28-CH, 16-bit		Up to 4-CH	Up to 33-CH, 12-bit	3.3 V, 5.0 V	C, V, M	JTAG	100 LQFP, 64 LQFP	√
MPC5604P	e200z0	40/64 MHz	512 KB	40 KB	16-CH	64 KB Data Flash		√	2	4	2	0	√						20-CH eTimer/ PWM	4-CH	Dual 13-CH, 10-bit	3.3 V, 5.0 V	M	Nexus 2+	100 LQFP, 144 LQFP	√
MPC5603P	e200z0	40/64 MHz	384 KB	36 KB	16-CH	64 KB Data Flash		√	2	4	2	0	√						20-CH eTimer/ PWM	4-CH	Dual 13-CH, 10-bit	3.3 V, 5.0 V	M	Nexus 2+	100 LQFP, 144 LQFP	√

Device	Core Platform	Bus Frequency	Program Flash	SRAM	DMA	EEPROM	MPU/MMU	CTU	SCI (LINFlex)	DSPI	CAN	I^2C	FlexRay™	Ethernet (100BaseT)	MLB	Other Peripherals	eTPU	eMIOS	Motor Control Timers	PIT	Analog (ADC, DAC)	Operating Voltage	Temp. Range[1]	Debug	Package Options	In Production
MPC5602P	e200z0	40/64 MHz	256 KB	20 KB	16-CH	64 KB Data Flash		√	2	3	2	0							14-CH eTimer/ PWM	4-CH	16-CH, 10-bit	3.3 V, 5V	M	Nexus 1 (Emulation with MPC5604P)	64 LQFP, 100 LQFP	√
MPC5601P	e200z0	40/64 MHz	192 KB	12 KB	16-CH	64 KB Data Flash			1	1	1	0							6-CH eTimer	4-CH	11-CH, 10-bit	3.3 V, 5V	M	Nexus 1 (Emulation with MPC5604P)	64 LQFP, 100 LQFP	√
MPC5644A	e200z4	120, 132, 150 MHz	4 MB	192 KB	64-CH	Emulated in Program Flash	24 entry MMU		3	3(MSB)	3		√				32-CH	24-bit		5-CH	Dual 40-CH, + 2 DECFIL	3.3 V, 5V	M	Nexus3+ Vertical Calibration system	176 QFP, 208 MAPBGA, 324 MAPBGA	√
MPC5643A	e200z4	120, 132, 150 MHz	3 MB	192 KB	64-CH	Emulated in Program Flash	24 entry MMU		3	3(MSB)	3		√				32-CH	24-bit		5-CH	Dual 40-CH, + 2 DECFIL	3.3 V, 5.0 V	M	Nexus3+ Vertical Calibration system	176 QFP, 208 MAPBGA, 324 MAPBGA	√
MPC5642A	e200z4	120, 132, 150 MHz	2 MB	192 KB	64-CH	Emulated in Program Flash	24 entry MMU		3	3(MSB)	3		√				32-CH	24-bit		5-CH	Dual 40-CH, + 2 DECFIL	3.3 V, 5.0 V	M	Nexus3+ Vertical Calibration system	176 QFP, 208 MAPBGA, 324 MAPBGA	√
MPC5645S	e200z4d	125 MHz	2 MB	64 KB	16-CH	4 x 16 KB	Up to 2 Display Control Unit (DCU) with Parallel Data Interface (PDI)	Up to 6 gauges w/ Stepper Stall Detect (SSD)	Up to 6	Up to 3	3	4		√	Quad SPI		16 Entry		RTC, API, 8-ch, 32-bit PIT and S/W Watchdog Timer		Up to 20-CH, 10-bit	3.3 V and 5.0 V	C, V	Nexus 3+	176 LQFP, 208 LQFP, 416 TEPBGA	√
MPC5606S	e200z0h	64 MHz	1 MB	48 KB + 160 KB Graphics RAM	16-CH	4x16 KB	Display Control Unit (DCU) with Parallel Data Interface (PDI)	6 gauges w/ Stepper Stall Detect (SSD)	2	3	2	4	40x4	Yes (using eMIOS)	QuadSPI		12 entry	2-CH	Real Time Counter (RTC), Autonomous Periodic Interrupt (API), 4-CH 32-bit PIT and S/W watchdog timer.		16-CH, 10-bit	3.3 V and 5.0 V	C, V, M	Nexus 2+	144 LQFP, 176 LQFP	√
MPC5604S	e200z0h	64 MHz	512 KB	48 KB	16-CH	4x16 KB	No	6 gauges w/ Stepper Stall Detect (SSD)	2	2	2	2	64x6	√			12 entry	2-CH	Real Time Counter (RTC), Autonomous Periodic Interrupt (API), 4-CH 32-bit PIT and S/W watchdog timer.		16-CH, 10-bit	3.3 V and 5.0 V	C, V, M	Nexus 1	100 LQFP, 144 LQFP	√
MPC5602S	e200z0h	64 MHz	256 KB	24 KB	16-CH	4x16 KB	No	6 gauges w/ Stepper Stall Detect (SSD)	2	3	1	2	64x6	√			12 entry	2-CH	Real Time Counter (RTC), Autonomous Periodic Interrupt (API), 4-CH 32-bit PIT and S/W watchdog timer.		16-CH, 10-bit	3.3 V and 5.0 V	C, V, M	Nexus 1	100 LQFP, 144 LQFP	√

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40 °C to +140°C, W = -40 °C to +150 °C

Image Cognition Processors

Device	Primary Core Platform	Core Frequency	Secondary Core Platform	SRAM	DMA	Video Accelerator	Graphics Accelerator	Image Processor	Camera Input	Display Interface	DRAM Support	Flash Support	USB 2.0	PCi express	I2S	I^2C	SPI	UART	Timers	ADC	PIT	3.3 V GPIO	Voltage	Temp. Range[1]	Package Options	In Production
SCP2201	ARM926	350 MHz	APEX - SMD Array, Slave ARM926	16 MB DRAM					PDI	LCD/ WVGA		NAND, Serial NOR flash	HS OTG + HS Phy		1	2	1	4				√	1	C	236 BGA	√
SCP2207	ARM926	350 MHz	APEX - SMD Array, Slave ARM926	64 MB DRAM					PDI	LCD/ WVGA		NAND, Serial NOR flash	HS OTG + HS Phy		1	2	1	4				√	1	C	236 BGA	√

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40 °C to +140 °C, W = -40 °C to +150 °

I.MX 32-BIT APPLICATIONS PROCESSORS

The AEC-Q100 automotive-qualified i.MX applications processors are based on ARM9 and ARM11 CPU cores coupled with a wide rage of connectivity peripherals and hardware accelerators. Target automotive applications include infotainment, navigation, hands-free calling, telematics and fully configurable Instrumentation clusters.

For additional information, visit:

Freescale Semiconductor Documentation, Tool, and Product Libraries
www.freescale.com

Automotive Home Page
www.freescale.com/automotive

i.MX Applications Processors

Device	Core Platform	CPU Frequency	Cache	SRAM	DMA	Video Accelerator	Graphics Accelerator	Image Processor	Camera Input	Display Interface	DRAM Support	Flash Support	USB (2.0)	CAN	MLB	SD/MMC SDIO	I^2C	SPI	UART	Ethernet (100BaseT)	HDD Interface	SSI/I2S	Sample Rate Converter	SPDIF I/O	PIT	3.3V GPIO	Voltage	Temp. Range [1]	Package Options	In Production
i.MX 6Q	Quad ARM Cortex®-A9	852 MHz 1 GHz	L1: 32 KB/ 32 KB I/D L2: 512 KB Unified	256 KB	32-Ch.	Multi-Format 1080p Encode and Decode (only on i.MX6Q6)	OpenVG 1.1 (3D Core) OpenGLES 2.0, 3.0 Display Composition	√	MIPI, CCIR656	Up to 4x WXGA	x64 DDR3, LV-DDR3 LP-DDR2	x16 NOR x8 SLC/ MLC NAND	HS OTG+HS PHY HS Host+HS PHY x2 HSIC	2	25/ 50/ 150	4	4	5	5	1 GB with IEEE® 1588	SATA	3+ ESAI	Yes, Asynchronous	Yes	3	√	1.275 to 1.50	C	625 Flip Chip BGA	√
i.MX 6D	Dual ARM Cortex-A9	852 MHz 1 GHz	L1: 32 KB/ 32 KB I/D L2: 512 KB Unified	256 KB	32-Ch.	Multi-Format 1080p Encode and Decode (only on i.MX6D6)	OpenVG 1.1 (3D Core) OpenGLES 2.0, 3.0 Display Composition	√	MIPI, CCIR656	Up to 4x WXGA	x64 DDR3, LV-DDR3 LP-DDR2	x16 NOR x8 SLC/ MLC NAND	HS OTG+HS PHY HS Host+HS PHY x2 HSIC	2	25/ 50/ 150	4	4	5	5	1 GB with IEEE 1588	SATA	3+ ESAI	Yes, Asynchronous	Yes	3	√	1.275 to 1.50	C	625 Flip Chip BGA	√
i.MX 6U	Dual ARM Cortex-A9	800 MHz	L1: 32 KB/ 32 KB I/D L2: 512 KB Unified	128 KB	32-Ch.	Multi-Format 1080p Encode and Decode (only on i.MX6U6)	OpenVG 1.1 (3D Core) OpenGLES 2.0, 3.0 Display Composition	on i.MX6U6 only	MIPI, CCIR656 (not in i.MX 6U1)	Up to 2x WXGA	x64 DDR3, LV-DDR3 LP-DDR2	x16 NOR x8 SLC/ MLC NAND	HS OTG+HS PHY HS Host+HS PHY x2 HSIC	2	25/ 50/ 150	4	4	4	5	1 GB with IEEE 1588		3+ ESAI	Yes, Asynchronous	Yes	3	√	1.275 to 1.50	C	625 Flip Chip BGA	√
i.MX 6S	ARM Cortex-A9	800 MHz	L1: 32 KB/ 32 KB I/D L2: 512 KB Unified	128 KB	32-Ch.	Multi-Format 1080p Encode and Decode	OpenVG 1.1 (3D Core) OpenGLES 2.0, 3.0 Display Composition (not in i.MX 6S1)	√ (not in i.MX 6S1)	MIPI, CCIR656 (not in i.MX 6S1)	Up to 2x WXGA (not in i.MX 6S1)	x32 DDR3, LV-DDR3 LP-DDR2	x16 NOR x8 SLC/ MLC NAND	HS OTG+HS PHY HS Host+HS PHY x2 HSIC	2	25/ 50/ 150	4	4	4	5	1 GB with IEEE 1588		3+ ESAI	Yes, Asynchronous	Yes	3	√	1.275 to 1.50	C	625 Flip Chip BGA	√
i.MX53	ARM Cortex®-A8 with VPU and NEON	800 MHz	L1: 32 KB/ 32 KB I/D, L2: 256 KB Unified	128 KB	32-Ch.	HD720 Encode, HD1080 Decode (not in i.MX534)	OpenVG 1.1, OpenGL ES2.0	√	MIPI, CCIR656	UXGA, Dual TFT	DDR2 DDR3 LP-DDR2	NOR, SLC NAND MLC NAND	HS OTG+HS PHY HS Host+FS PHY and 2x HS Host	2	25/ 50/	4	3	3	5	10/100 with IEEE 1588	SATA, PATA	3+ ESAI	Yes, Asynchronous	Yes	3	√	0.95 to 1.1	C	529 MAP-BGA	√
i.MX35	ARM1136™ with Vector Floating Point	532MHz	L1: 16 KB/ 16 KB I/D, L2: 128 KB Unified	128 KB	32-Ch.		OpenVG 1.1 (only in i.MX356)	√ (not in i.MX351)	MIPI, CCIR656 (not in i.MX351)	TFT up to SVGA (not in i.MX351)	SDRAM, mDDR, DDR2	NOR, SLC NAND MLC NAND	HS OTG+HS PHY HS Host+FS PHY or Ext. HS PHY	2	25/ 50/	3	3	2	3	10/100	ATA-6	2+ ESAI	Yes, Asynchronous	Yes	3	√	1.22 to 1.47	C	400 MAP-BGA	√
i.MX28	ARM926™	454 MHz	L1: 16 KB/ 32 KB I/D	128 KB	32-Ch.					TFT up to WVGA (not in i.MX281)	mDDR, DDR2	SLC NAND, MLC NAND, QSPI Flash	HS OTG+HS PHY HS Host+HS PHY or Ext. HS PHY	2		x3	x2	x3	x6	10/100 x1 GMII or x2 RMII with IEEE 1588		x3		Tx	8	√	Internally Generated	C	289 MAP-BGA	√
I.MX25	ARM926	400 MHz	L1: 16 KB/ 16 KB I/D	128 KB	32 Ch				MIPI, CCIR656 (not in i.MX251)	Up to VGA (640 x 480) (not in i.MX251)	SDRAM, mDDR, DDR2	NOR, SLC NAND MLC NAND	HS OTG+HS PHY HS Host+HS PHY or Ext. HS PHY	2		2	3	3	5	10/100	ATA-6	2+ ESAI			4	√	1.38 to 1.52	C	400 MAP-BGA	√

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40 °C to +140 °C, W = -40 °C to +150 °C

32-bit Vybrid Controller Solutions

Device	Core Platform	CPU Frequency	Cache	SRAM	DMA	Video Accelerator	Graphics Accelerator	Image Processor	Camera Input	Display Interface	DRAM Support	Flash Support	USB (2.0)	CAN	MLB	SD/MMC SDIO	I²C	SPI	UART	Ethernet (100BaseT)	HDD Interface	I2S	Sample Rate Converter	SPDIF I/O	PIT	3.3V GPIO	Voltage	Temp. Range [1]	Package Options	In Production
Vybrid SVFxxxR	ARM® Cortex®-A5/M4	400 MHz	L1: 32 KB/32 KB I/D L2: 512 KB Up to 1.5 MB	Up to 1.5 MB	√.		OpenVG 1.1		18-bit Composite (4 to 1) + VADC	2 (Up to WVGA) + Segment Display (40 x 4)	DDR3 LP-DDR2	Dual Quad SPI, NAND, FlexBus	2x USB OTG HS + Phy	50	√	2	4	4	6	2x 10/100		4x SAI 1x ESAI	yes	yes			3.0 V to 3.6 V	C	176 LQFP 364 BGA	√

1. C = -40 °C to +85 °C, V = -40 °C to +105 °C, M = -40 °C to +125 °C, J = -40 °C to +140 °C, W = -40 °C to +150 °C

— Definitions —

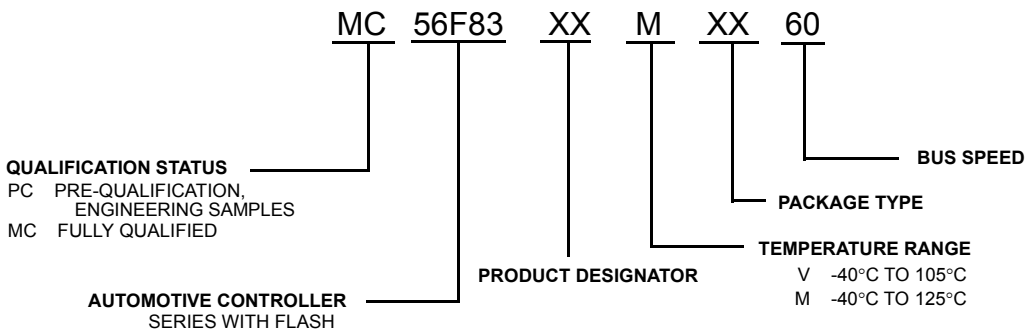
ADC — Analog-to-Digital Converter
ASK — Amplitude Shift Keying Modulation
BDM — Background Debug Mode
CAN — Controller Area Network
CDIP — Ceramic Dual In-Line Package
CLCC — Ceramic Leaded Chip Carrier
COP — Computer Operating Properly (Watchdog Timer)
CPU16 — 16-bit Central Processor Unit (HC11 Compatible)
CPU32 — 32-bit Central Processor Unit (68000 Compatible)
CTM — Configurable Timer Module (Various Hardware Options)
DAB — Digital Audio Broadcasting
DIP — Dual In-line Package
DSPI — Deserial Peripheral Interface
EBI — External Bus Interface
ECT — Enhanced Capture Timer
eDMA — Enhanced Direct Memory Access Controller
eTPU — Enhanced Timing Processor Unit
eMIOS — Enhanced Modular Input Output System
eQADC — Enhanced Queued Analog-to-Digital Converter
eSCI — Enhanced Serial Communications Interface
FSK — Frequency Shift Keying Modulation
GPT — General-Purpose Timer Module (4 IC, 5 OC, 2 PWM)
HQFP — Heatsink Quad Flat Package
HSOP — Heatsink Small Outline Package
i — Input-Only Port Pins
i/o — Bidirectional Input and Output Port Pins
I^2C — Inter-Integrated Circuit
IC — Input Capture
ISPI — Interval Serial Peripheral Interface
LQFP — Low-Profile Quad Flat Package (1.4mm thick)
LVI — Low-Voltage Interrupt
LVR — Low-Voltage Reset
MCCI — Multi-Channel Communication Interface (2 SCI, SPI)
MFT — Multi-Function Timer
MUX — Multiplexed
OC — Output Compare
OOK — On-Off Keying
PBGA — Plastic Ball Grid Array
PDIP — Plastic Dual In-Line Package
PEEP — Personality EEPROM
PEP — Personality EPROM
PLCC — Plastic Leaded Chip Carrier
PLL — Phase-Locked Loop
PQFP — Plastic Quad Flat Pack
PWM — Pulse-Width Modulation
QADC — Queued Analog-to-Digital Converter (10-bit)
PQFN — Quad Flat No-Lead Package
QFN — Quad Flat No-Lead Package
QFP — Quad Flat Package
QSM — Queued Serial Module (SCI + QSPI)
QSPI — Queued SPI
RTI — Real-Time Interrupt
SCI — Serial Communication Interface
SCIE — Enhanced SCI
SCIM — Single-Chip Integration Module
SDIP — Shrink Dual In-line Package
SIM — System Integration Module
SIML — Low-Power System Integration Module
SIOP — Simple Serial I/O Port
SOICN — Small Outline Package Narrow Body
SOICW — Small Outline Package Wide Body
SPI — Serial Peripheral Interface
ESPI — Enhanced SPI
SRAM — Standby RAM Module
SSOP — Shrink Small Outline Package
TPU — Time Processor Unit (16 Programmable Channels)
TPURAM — Standby RAM Module with TPU Emulation Capability
TQFP — Thin Quad Flat Package (1.0mm thick)
TSSOP — Thin Shrink Small Outline Package
UART — Universal AsynchroNous Receiver/Transmitter
UDFN— Ultra-thin dual flat no-lead package
USB — Universal Serial Bus

— Package Designators —

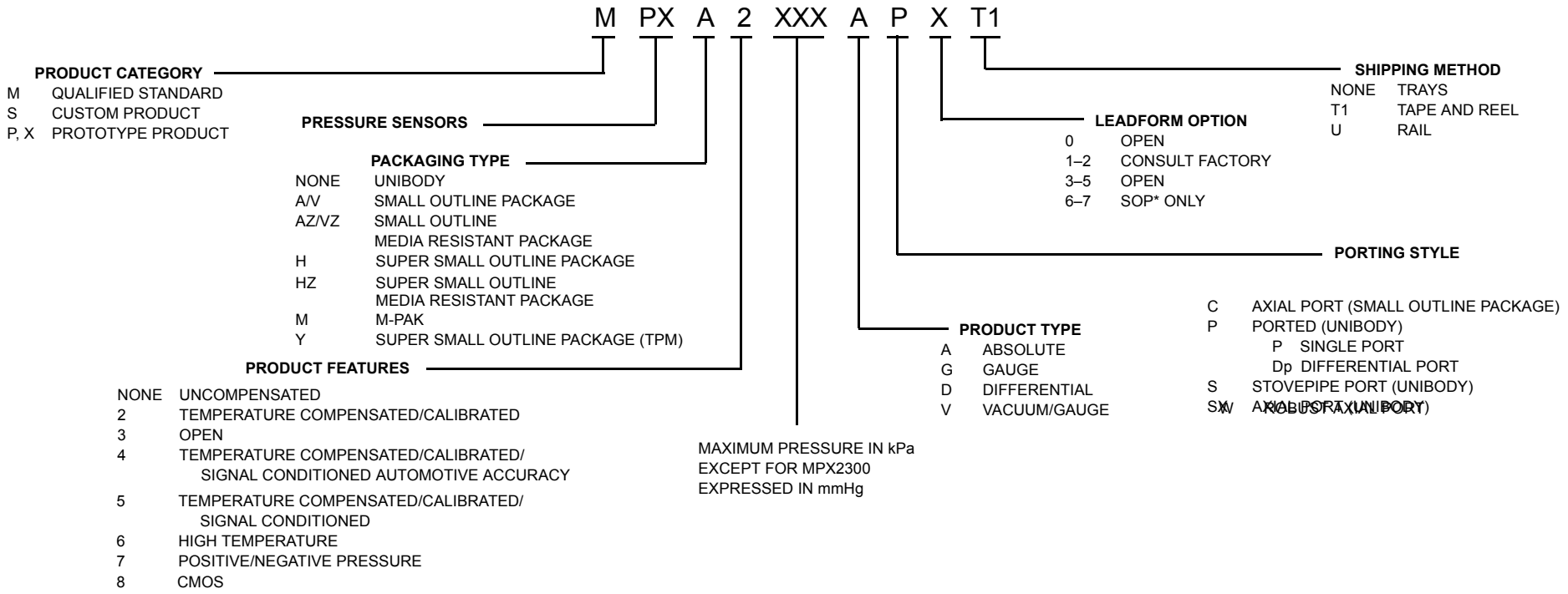
B — Shrink DIP (70 mil spacing)
DW — Small Outline (Wide-Body SOIC)
DWB — Small Outline (Wide body SDIB) 0.65 pitch
FA — 7 x 7 mm Quad Flat Pack (QFP)
FB — 10 x 10 mm Quad Flat Pack (QFP)
FC — QFN Quad Flat Pack
FE — CQFP (windowed) — Samples Only
FN — Plastic Quad (PLCC)
FS — CLCC (windowed) — Samples Only
FT — 28 x 28 mm Quad Flat Pack (QFP)
FU — 14 x 14 mm Quad Flat Pack (QFP)
FZ — CQFP (windowed) — Samples Only
K — Cerdip (windowed) — Samples Only
L — Ceramic Sidebraze
P — Dual in-Line Plastic
PNA — PQFN Power QFN
PNB — PQFN Power QFN
PNC — PQFN Power QFN
PU — 14 x 14 mm Low-Profile Quad Flat Pack (LQFP)
PV — 20 x 20 mm Low-Profile Quad Flat Pack (LQFP)
S — Cerdip (windowed) — Samples Only
TM — Mechatronics Connector
VR — Plastic Ball Grid Array (PBGA) with PB-free solder balls
ZP — 27 x 27 mm Plastic Ball Grid Array (PBGA)

— Pb-free —
AA — Pb-free 44 to 100 pin QFP
AB — Pb-free 112 to 288 pin QFP
AC — Pb-free 16 to 44 pin LQFP
AE — Pb-free 48 to 64 pin LQFP
AF — Pb-free 68 to 100 pin LQFP
AG — Pb-free 108 to 144 pin LQFb
AH — Pb-free 80 to 100 pin TQFP
AI — Pb-free FQFP
AJ — Pb-free CQFP
AE — Pb-free 22 to 64 pin PDIP
ED — Pb-free 6 yo 20 pin PDIP
EE — Pb-free PSDIP
EF — Pb-free 8 to 16 in SOIC
EG — Pb-free 16 to 28 pin SOIC WIDE
EH — Pb-free 132 pin PQFP
EI — Pb-free PLCC
EJ — Pb-free 8 to 24 pin TSSOP
EK — Pb-free 32 to 54 pin SOIC WIDE
EL — Pb-free 26 to 56 pin TSSOP
EN — Pb-free 8 to 24 pin SSOP
EO — Pb-free 26 to 56 pin SSOP
EP — Pb-free QFN & MLF (Exposed Pad)
ER — Pb-free CATV
ES — Pb-free SENSOR
ET — Pb-free RF (POWER CHIPS)
EU — Pb-free MAC PAAC
EV — Pb-free MFP (SOEIAJ)
FC — Pb-free QFN & MLF (Regular)
FE — Pb-free CerQuads
VK — Pb-free MAPBGA <=1.3mm (THINMAP) <.7mm Pitch
VL — Pb-free MAPBGA <=1.3mm (THINMAP) >.7mm Pitch
VM — Pb-free MAPBGA 1.6mm > .7mm Pitch
VN — Pb-free MAPBGA 1.6mm < .7mm Pitch
VO — Pb-free MAPBGA 1.35mm < .7mm Pitch
VP — Pb-free MAPBGA 1.36mm > .7mm Pitch
VR — Pb-free PBGA
VS — Pb-free FC-HiTCE LGA (without C5 sphere)
VT — Pb-free FC PBGA
VU — Pb-free FC-HiTCE
VV — Pb-free TBGA
VW — Pb-free HSOP
VX — Pb-free SMT
VY — Pb-free UNIBODY

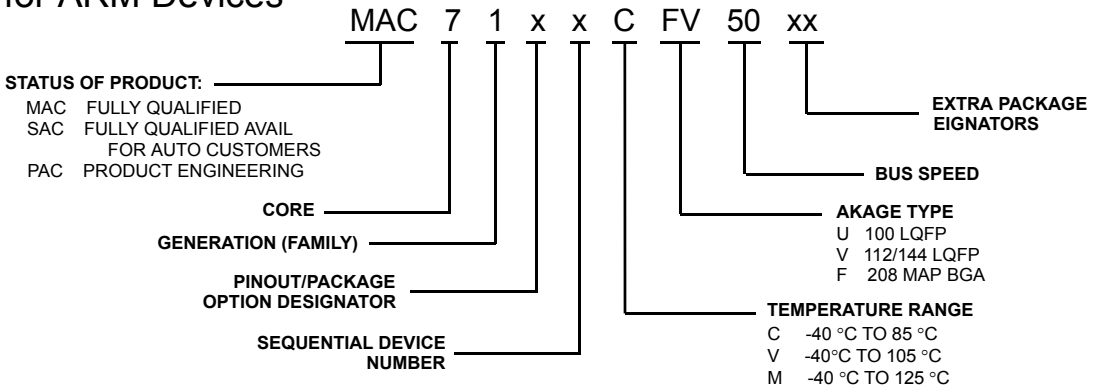
Product Numbering System for MC56F8300 Digital Signal Controllers



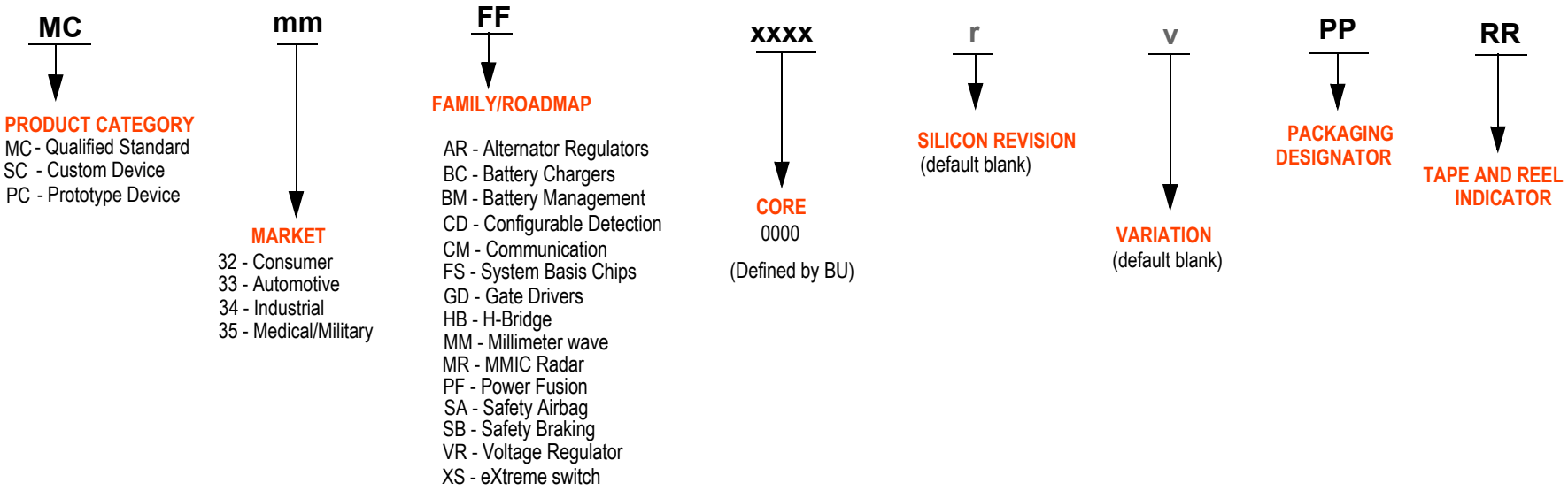
Product Numbering System for Pressure Sensors



Product Numbering System for ARM Devices

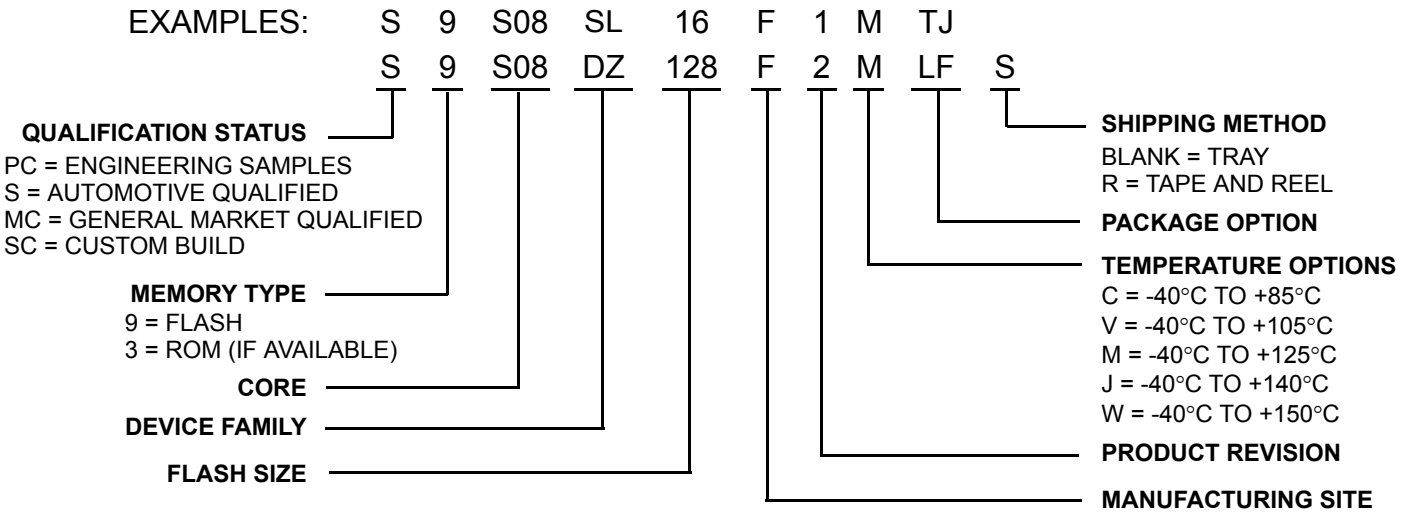


Product Numbering — Analog Auto and Power Management Devices



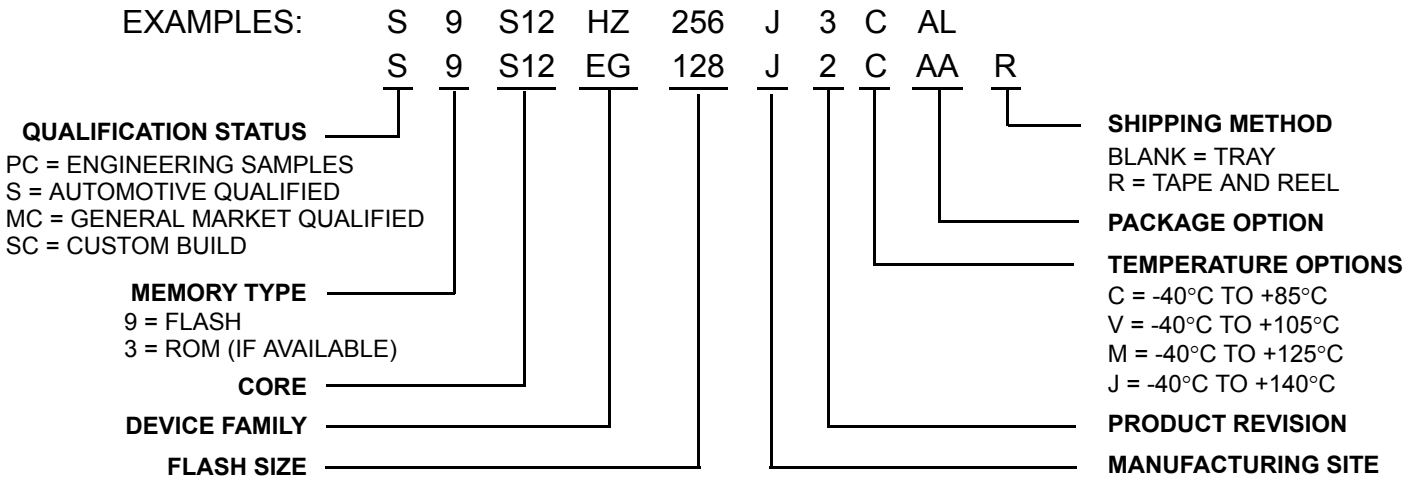
Legacy product numbering is available in ANALOGPN on www.freescale.com

8-Bit Automotive Microcontroller Part Numbering System*



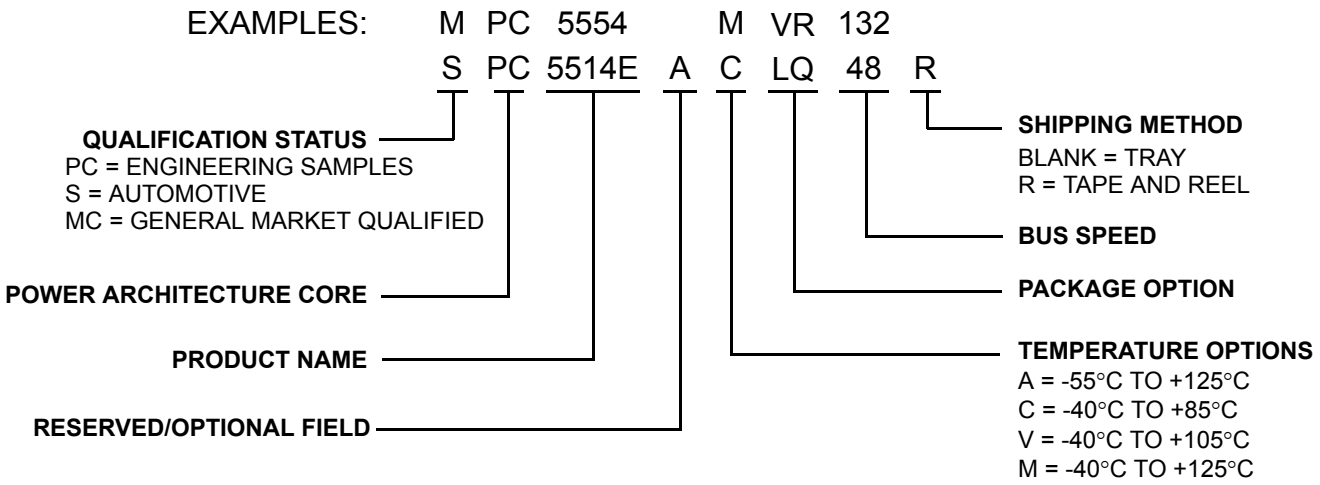
***NOTE:** Freescale's automotive part numbering system has evolved over time, so the decoder scheme shown above may not be relevant for the prior generations.

16-Bit Automotive Microcontroller Part Numbering System*



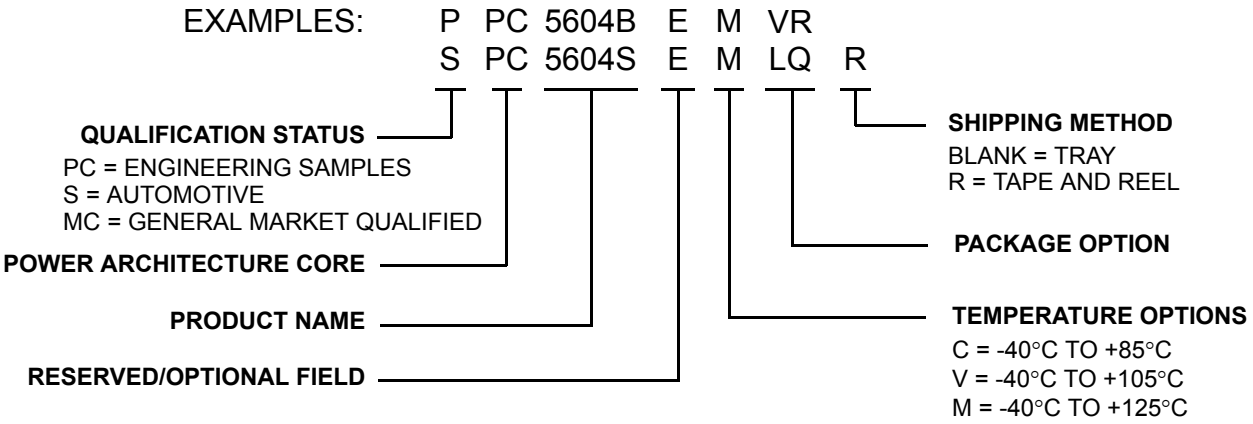
***NOTE:** Freescale's automotive part numbering system has evolved over time, so the decoder scheme shown above may not be relevant for the prior generations.

32-Bit Automotive Microcontroller Part Numbering System for Qorivva 55xx Devices*



***NOTE:** Freescale's automotive part numbering system has evolved over time, so the decoder scheme shown above may not be relevant for the prior generations.

32-Bit Automotive Microcontroller Part Numbering System for Qorivva 56xx Devices*



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