Applications Analog and Power Management

Making embedded systems better with robust reliable performance

Applications - Robust, Reliable, Performance

GENERIC SYSTEM DIAGRAMS

- MOTOR CONTROL — Regulates the speed, rotation, and torque of a motor
- MOTION CONTROL — Governs the physical displacement movement, location, or position of a mechanical assembly, driven by an intermittent duty motor
- STATIC LOAD CONTROL — Fully or partially powers-up the elements of a relatively constant load
- POWERTRAIN AND ENGINE MANAGEMENT — Provides functionality for controlling and monitoring engine and transmission system loads
- NETWORK COMMUNICATIONS — Provides device-to-device communication within a system
- EMBEDDED MCU PLUS POWER — Provides an integrated single package solution with MCU, Voltage Regulation, Power Actuation, and LIN bus transceiver
- BATTERY CHARGER — Provides high voltage accuracy over the full temperature range due to the different charging process
- RADAR SYSTEMS — Provides long- and mid-range functionality, allowing automotive systems to monitor the environment around the vehicle to help prevent crashes
- POWER MANAGEMENT — Converts system input power to the voltages and currents required by the MCU and DSP
- BATTERY MANAGEMENT — Provides highest performance and accuracy, as well as exceptional configuration flexibility
Motor control is the function of regulating the speed, rotation, and torque of a motor.

**TYPICAL APPLICATIONS:**
- Blowers
- Fans
- Vacuums
- Pumps
- Compressors
- Golf Carts
- Scooters
- Electric Wheelchairs
- Electric Boats
- Conveyors
- Shakers
- Vibrators
- Mixers
- Shredders
- Winches
- Elevators
- Treadmills
- Power Tools

**LOOP CONTROL SCHEMA:**
- Speed
- Torque/Current
- Voltage
- Rotation (CW/CCW)
- None (Open Loop)

**POWER CONTROL SCHEMA:**
- ON/OFF
- PWM
- Linear
- Volts/Hertz (V/f)
- Rotating Vector
- Phase Angle

**MOTOR TYPES:**
- DC Brush Commutator
- DC 3-Phase Brushless
- Universal
- AC Induction
- Switched Reluctance
- Stepper

Motion control is the function of governing the physical displacement, movement, location, or position of a mechanical assembly driven by an intermittent duty motor.

**TYPICAL APPLICATIONS:**
- CNC Machining
- Robotics
- HVAC Mix Louvers
- Hard Automation
- Power-Assisted
- Operator Controls
- Process Controls
- Autopilots
- Guidance/Steering
- Controls
- Servos and Radio
- Controls
- Antenna Rotors
- Dish Positioners
- Power Adjustable
- Beds
- Remote Pan and Tilt
- Mounts
- Printer Paper Handler
- Scanners
- Conveyors
- Shakers
- Consumer Portable Products
- Digital Cameras
- Printers
- Office Equipment
- Industrial Controller
- Force
- Spot Welding
- Fluid Coating
- Flight Simulator
- Temperature Control
- Brake Pressure
- Laser Cutting
- Bottle Moulding
- Filling Pressure

**LOOP CONTROL SCHEMA:**
- Rotation (CW/CCW)
- Position
- Step Count
- Operator (Open Loop)

**POWER CONTROL SCHEMA:**
- ON/OFF
- PWM
- Linear
- Stepper (Pulse & Hold)

**MOTOR TYPES:**
- DC Brush Commutator
- Brushless DC
- Stepper
- Linear
- Solenoid
- Servos

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**Consider:**
- S08
- S12
- i.MX6/7
- Qorivva 32-bit
- Kinetis

---

Static load control is the function of fully or partially powering-up the elements of a relatively constant load.

**TYPICAL APPLICATIONS:**
- Security Systems
- HVAC
- Water Heaters
- Charging Systems
- Lighting Displays
- Score Boards
- Irrigation Control
- Programmable Thermostats
- Gaming Machines
- Industrial Controls
- Automotive Body Electronics
- Large Building Automation
- White Goods Appliances
- Automotive Safety Systems
- LED Backlighting/Displays

**LOOP CONTROL SCHEMA:**
- Current
- Voltage
- Sensor Feedback
- Limit Switch (Bang-Bang)
- None (Open Loop)

**POWER CONTROL SCHEMA:**
- ON/OFF
- PWM
- PFM
- Linear
- Phase Angle

**STATIC LOAD TYPES:**
- Incandescent Lamps
- Heating Elements
- LEDs/Lasers
- Ultrasonic Transducers
- Piezo Transducers
- Induction Coils
- Sirens/Horns/Bells

**CONSIDER:**
- S08
- S12
- i.MX6/7
- Qorivva 32-bit
- Kinetics

Applications

Analog, Mixed-Signal, and Power Management

POWERTRAIN AND ENGINE MANAGEMENT SYSTEM DIAGRAM

These components represent devices that are designed to function in the automotive environment. They provide the functionality needed for controlling and monitoring engine and transmission systems loads and inputs. The functions available range from alternator voltage regulator control to Low-side switches, H-Bridge drivers, MOSFET/IGBT Pre-drivers, switch and solenoid monitoring, and more.

TYPICAL APPLICATIONS:
- Marine Engine
- Boat Motor
- Jet Ski Engine
- ATV / Motorcycle Engine
- Industrial Engines
- Heavy Equipment
- Automobile Engines (2-12 cylinders)

LOOP CONTROL SCHEMA:
- Current
- Voltage
- Sensor Feedback
- Limit Switch (Bang-Bang)
- None (Open Loop)

POWER CONTROL SCHEMA:
- ON/OFF
- PWM
- PFM
- Linear
- Phase Angle

LOAD TYPES:
- Incandescent Lamps
- Heating Elements
- LEDs/Lasers
- Ultrasonic
- Transducers
- Piezo Transducers
- Induction Coils
- Sirens/Horns/Bells

Powertrain Controller

Main MCU

Power Management IC

Injectors

Ignition Pre-drivers

H-Bridge Drivers

Safety Micro HC08, S08, S12

Output Drivers

COM ICs HS CAN LIN FlexRay Ethernet

33907
33908
33730
33909

Fuel Pump

Recirculation Valves

Gasoline Only

Gasoline and Diesel Injectors (up to 12)

Gasoline and Diesel Ignition Plugs (up to 12)

Gasoline Only Ignition Plugs (up to 12)

Diesel Only Glow Plugs (up to 12)

Gasoline Only Throttle Control

Diesel Only EGR Positioner, Valves Control

Gasoline and Diesel Relays

Tachometer Counter

Oxygen Heaters

Fuel Pump

Dashboard Lamps

Recirculation Valves

Gasoline Only

Cam Control

Fuel Tank Valves

Intake Control

Diesel Only

Fan Control

Rail Pressure Control

33810
33811
33812
33813
33814
33816
912_P812
912_S812
PT2000

12XS2
12XS3
12XS6
12XSB
12XSC
12XSF
24XS4
36XSD
33800
33810
33812
33937/34937
33899
33926
33931/34931
33932/34932

Analog / Digital Inputs

Gasoline and Diesel
Crank Speed
Cam Position
Clutch/Break
Speed

Timed Inputs

Gasoline and Diesel
Accelerator
Mass Air Flow
Battery
Temperatures
Oxygen Sensors
Gasoline Only
Throttle Position
Knock Sensor
Diesel Only
Cylinder Pressure
Rail Pressure

Signal Monitoring and Conditioning

CONSIDER:
- Kinetis
- S12XE
- S12P
- S12XS
- Qoriva

33811
33975/34975
33978/34978
912_637
9Z1_638
Network communication provides information between two or more devices in a system.

**TYPICAL APPLICATIONS:**
- Aircraft Systems
- Antenna Controllers
- Appliances
- Automotive Body Electronics
- Automotive Safety Systems
- Conveyors
- Elevators
- Gaming Machines
- Heating & Cooling
- Irrigation Control
- Lighting
- Machinery/Robotics
- Score Boards
- Security Systems
- Vending Machines
- Watercraft Systems
- Water Heaters

**COMMUNICATIONS SCHEMA:**
- Bidirectional
- Combined Power & Signaling
- Error Detection
- Fault Tolerant
- Full/Half Duplex
- Hi/Med/Low Speed
- Predictive
- Single Ended/Differential
- Single/Multi Master
- Single/Multi Slave
- Timing Critical
- Voltage/Current Signaling

**TYPICAL APPLICATIONS:**
- Aircraft Systems
- Antenna Controllers
- Appliances
- Automotive Body Electronics
- Automotive Safety Systems
- Conveyors
- Elevators
- Gaming Machines
- Heating & Cooling
- Irrigation Control
- Lighting
- Machinery/Robotics
- Score Boards
- Security Systems
- Vending Machines
- Watercraft Systems
- Water Heaters

**CONSIDER:**
- S08
- S12
- Qorivva 32-bit
- Kinetis
Motor control is the function of regulating the speed, rotation and torque of a motor.

**TYPICAL APPLICATIONS:**
- Blowers
- Fans
- Pumps
- Power Seats
- Power Windows
- Power Door Locks
- HVAC Doors/Vents
- Power Sunroof
- Side-view Mirrors
- Keypad
- Light Leveling
- Adaptive Lighting

**LOOP CONTROL SCHEMA:**
- Speed
- Torque/Current
- Voltage
- Rotation (CW/CCW)
- None (Open Loop)

**POWER CONTROL SCHEMA:**
- ON/OFF
- PWM
- Linear
- Volts/Hertz

**MOTOR TYPES:**
- DC Brush Commutator
- DC 3-Phase Brushless
- Universal
- 2-Phase Stepper
BATTERY CHARGER

Portable Navigation Devices (PNDs) are expanding their reach to be embedded in everything from smartphones to auto infotainment systems. Battery Charger provides flexible solutions to develop innovative navigation devices with wide range of features.

TYPICAL APPLICATIONS:
- Internet of Things (IoT)
- Handheld consumer devices
- Wearable market
- PoS terminals
- Medical portable equipment
- Consumer tablets

CHARGE CURRENT TYPES:
- Constant Charge Current
- Constant Charge Voltage
- Pre-charge
- Trickle

![Diagram of Battery Charger with USB, MCU, Battery, and Application connections]
RADAR SYSTEMS

77 GHz radar systems support adaptive cruise control, pre-crash protection and collision warning systems with and without automatic steering and braking intervention. In a collision warning system, the radar chipset can detect and track objects, automatically adjusting the vehicle’s speed and distance in response to the traffic ahead and triggering a driver warning of an imminent collision and initiate emergency braking intervention.

TYPICAL APPLICATIONS:

**Automotive**
- Adaptive Cruise Control (ACC)
- Blind-spot Detection (BSD)
- Emergency Braking
- Forward Collision Warning (FCW)
- Headway Alert
- Mitigation and Brake Support
- Pre-crash Detection
- Rear Collision Protection (RCP)
- Stop & Go

**Industrial**
- Robotics
- Industrial Automation precision monitor
- Industrial Surveillance and Security Systems
- Millimeter Wave Backhaul Systems
- Industrial Safety
- Precision Distance Measurement Systems

CONSIDER:
- Qorivva 32-bit

![Diagram of radar system components and applications](image-url)
Embedded power regulation is the function of converting system input power to the voltages and currents required by the MCU or DSP as well as DDR (Double Data Rate) memory.

**POWER MANAGEMENT GENERIC SYSTEM DIAGRAM**

**TYPICAL APPLICATIONS:**
- Industrial Controls
- Embedded Control Modules
- Consumer Appliances
- Marine Electronics
- Engine/Generator Control
- Network Equipment
- Set-Top Box
- Battery Chargers
- Travel Chargers

**LOOP CONTROL SCHEMA:**
- Voltage Mode Feedback
- Current Mode Feedback

**POWER CONTROL SCHEMA:**
- Linear Regulators
- Switching Regulators
- Battery Management

**CONSIDER:**
- S08
- S12
- i.MX6/7

**INPUT FILTERING**

**INTER-MODULE COMMUNICATION**

**NETWORK TRANCEIVERS**

**POWER MANAGEMENT (POWER CONVERSION and REGULATION)**

**MCU or DSP**
BATTERY MANAGEMENT GENERIC SYSTEM DIAGRAM

For lead acid batteries, an intelligent sensor combines the requirements of accurate measurement sensing with logic capability to bring decision making to the sensing solution.

**TYPICAL APPLICATIONS:**
For mission critical battery operations:

**Automotive**
- 12 V Lead Acid, 14V Li-Ion
- HV Battery Junction Box
- Multi-Battery Applications

**Trucks and Utilities**
- 24 V Lead Acid

**Industrial**
- Energy Storage Systems (ESS)
- UPS
- Industrial Automation precision monitor
- eBike
- Power tools Network Equipment
- Set-Top Box
- Battery Chargers
- Travel Chargers

**LOOP CONTROL SCHEMA:**
- Voltage
- Temperature Current

**POWER CONTROL SCHEMA:**
- Linear Regulators

**BATTERY TYPES:**
- 12 V Lead Acid Battery
- 14 V Li-Ion Battery
- Lead Acid Multi-battery

**CONSIDER:**
- S12G
- MPC5748G
- MPC56xB

![Diagram of battery management system](image-url)
### ANALOG DEVICES FOR POWER ACTUATION, POWER MANAGEMENT, NETWORK TRANSCEIVERS, SIGNAL CONDITIONING, AND RADAR

<table>
<thead>
<tr>
<th>Freescale Part Number</th>
<th>Description</th>
<th>Main Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12XS2</strong></td>
<td>12 V Multipurpose Low $R_{DS(on)}$ eXtreme Switch</td>
<td>The eXtreme switch MC12XS2 family consists of very low $R_{DS(on)}$ devices in single or dual high-side configuration to replace electromechanical relays or discrete devices, in power management applications and DC motor control. The devices are designed for harsh environments, and it includes self-recovery features. The devices are suitable for loads with high inrush current, as well as motors and all types of resistive and inductive loads.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th># of outputs</th>
<th>$R_{DS(on)}$ (mOhm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC33981</td>
<td>Single</td>
<td>1 X 4.0</td>
</tr>
<tr>
<td>MC33982</td>
<td>Single</td>
<td>1 X 2.0</td>
</tr>
<tr>
<td>MC33984</td>
<td>Dual</td>
<td>2 X 4.0</td>
</tr>
<tr>
<td>MC33988</td>
<td>Dual</td>
<td>2 X 8.0</td>
</tr>
</tbody>
</table>

| **12XS3**         | 12 V Automotive eXtreme Switch | The eXtreme Switch Gen3 12 V devices are SPI-Controlled smart high-side switches providing diagnostics for the switch, light source and wiring harness, as well as comprehensive fault management and control of the loads without complex software. The devices use a programmable multi-step latched overcurrent shutdown protection. |

<table>
<thead>
<tr>
<th>Product</th>
<th># of outputs</th>
<th>$R_{DS(on)}$ (mOhm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC06XS3517</td>
<td>Penta</td>
<td>3 X 6.0, 2 X 17.0</td>
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<tr>
<td>MC07XS3200</td>
<td>Dual</td>
<td>2 X 7.0</td>
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<tr>
<td>MC09XS3400</td>
<td>Quad</td>
<td>4 X 9.0</td>
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<tr>
<td>MC10XS3412</td>
<td>Quad</td>
<td>2 X 10.0, 2 X 12.0</td>
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<tr>
<td>MC10XS3425</td>
<td>Quad</td>
<td>2 X 10.0, 2 X 25.0</td>
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<tr>
<td>MC10XS3435</td>
<td>Quad</td>
<td>2 X 10.0, 2 X 35.0</td>
</tr>
<tr>
<td>MC10XS3535</td>
<td>Penta</td>
<td>3 X 10.0, 2 X 35.0</td>
</tr>
<tr>
<td>MC15XS3400</td>
<td>Quad</td>
<td>4 X 15.0</td>
</tr>
<tr>
<td>MC35XS3400</td>
<td>Quad</td>
<td>4 X 35.0</td>
</tr>
<tr>
<td>MC35XS3500</td>
<td>Penta</td>
<td>5 X 35.0</td>
</tr>
</tbody>
</table>

| **12XS6**         | External Automotive Lighting Multichannel Scalable eXtreme Switch | The Gen4 eXtreme Switch is the latest achievement in automotive lighting drivers. It belongs to an expanding family to control and diagnose bulbs and also the light emitting diodes (LEDs) with enhanced diagnostic precision. It combines flexibility through daisy chainable SPI at 5.0 MHz, extended digital and analog feedbacks, safety and robustness. Its low $R_{DS(on)}$ and high integration allows power and space saving at the module level. It is also compliant with an Asil-B module design. This family is packaged in a Pb-Free power-enhanced SOIC package with exposed pad, which is ELV compliant. |

<table>
<thead>
<tr>
<th>Product</th>
<th># of outputs</th>
<th>$R_{DS(on)}$ (mOhm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC07XS6517</td>
<td>Penta</td>
<td>3 X 7.0, 2 X 17.0</td>
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<tr>
<td>MC08XS6421</td>
<td>Quad</td>
<td>2 X 8.0, 2 X 21.0</td>
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<tr>
<td>MC10XS6200</td>
<td>Dual</td>
<td>2 X 10.0</td>
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<tr>
<td>MC10XS6225</td>
<td>Dual</td>
<td>1 X 10.0, 1 X 25.0</td>
</tr>
<tr>
<td>MC10XS6325</td>
<td>Triple</td>
<td>2 X 10.0, 1 X 25.0</td>
</tr>
<tr>
<td>MC17XS6400</td>
<td>Quad</td>
<td>4 X 17.0</td>
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<tr>
<td>MC17XS6500</td>
<td>Penta</td>
<td>5 X 17.0</td>
</tr>
<tr>
<td>MC25XS6300</td>
<td>Triple</td>
<td>3 X 25.0</td>
</tr>
<tr>
<td>MC40XS6500</td>
<td>Penta</td>
<td>5 X 40.0</td>
</tr>
</tbody>
</table>
These devices are part of a 24 V high-side switch product family with integrated control, and a high number of protective and diagnostic functions. It is designed for truck, bus, and 24 V based transportation systems. The low $R_{DS(on)}$ channels can control different load types; lamps, solenoids, or DC motors. Control, device configuration, and diagnostics are performed through a 16-bit serial peripheral interface (SPI), allowing easy integration into existing applications.

<table>
<thead>
<tr>
<th>Product</th>
<th># of outputs</th>
<th>$R_{DS(on)}$ (mOhm)</th>
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<td>MC06XS4200</td>
<td>Dual</td>
<td>2 X 6.0</td>
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<tr>
<td>MC10XS4200</td>
<td>Dual</td>
<td>2 X 10.0</td>
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<tr>
<td>MC20XS4200</td>
<td>Dual</td>
<td>2 X 20.0</td>
</tr>
<tr>
<td>MC22XS4200</td>
<td>Dual</td>
<td>2 X 22.0</td>
</tr>
<tr>
<td>MC50XS4200</td>
<td>Dual</td>
<td>2 X 50.0</td>
</tr>
</tbody>
</table>

The 12 V eXtreme Switch family consists of very low $R_{DS(on)}$ devices in single high-side configuration, to replace electromechanical relays or discrete devices in industrial power management applications and DC motor control. The devices are designed for harsh environments, and include self-recovery features. The devices are suitable for loads with high inrush current, as well as motors and all types of resistive and inductive loads.

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<tr>
<th>Product</th>
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<td>MC34982</td>
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</tr>
<tr>
<td>MC34984</td>
<td>Dual</td>
<td>2 X 4.0</td>
</tr>
<tr>
<td>MC34988</td>
<td>Dual</td>
<td>2 X 8.0</td>
</tr>
</tbody>
</table>

The eXtreme switch devices are SPI-controlled smart high-side switches for Industrial applications, providing diagnostics, as well as comprehensive fault management and control of the loads without complex software. The devices use a programmable multi-step latched overcurrent shutdown protection. This technique is preferable to the current limit method because it minimizes the thermal stress within the device during an overload condition, greatly reducing the junction temperature rise and vastly improving reliability.

<table>
<thead>
<tr>
<th>Product</th>
<th># of outputs</th>
<th>$R_{DS(on)}$ (mOhm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC06XSC517</td>
<td>Penta</td>
<td>3 X 6.0</td>
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<tr>
<td></td>
<td></td>
<td>2 X 17.0</td>
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<tr>
<td>MC07XSC200</td>
<td>Dual</td>
<td>2 X 7.0</td>
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<tr>
<td>MC09XSC400</td>
<td>Quad</td>
<td>4 X 9.0</td>
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<td>MC10XSC412</td>
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<td>MC35XSC400</td>
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<tr>
<td>MC35XSC500</td>
<td>Penta</td>
<td>5 X 35.0</td>
</tr>
</tbody>
</table>
The eXtreme switch products are the latest achievement in DC motors and industrial lighting drivers. They belong to an expanding family to control and diagnose various types of loads, such as incandescent bulbs or light emitting diodes (LEDs), with enhanced precision. The products combine flexibility through daisy chainable SPI at 5.0 MHz, extended digital and analog feedbacks, which supports safety and robustness. This new generation of Freescale's high-side switch products family facilitates electronic control unit designs supported by the use of compatible MCU software and PCB footprints, for each device variant.

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<thead>
<tr>
<th>Freescale Part Number</th>
<th>Description</th>
<th>Main Characteristics</th>
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<tbody>
<tr>
<td>12XSF</td>
<td>External Industrial Lighting Multichannel Scalable eXtreme Switch</td>
<td>The eXtreme switch products are the latest achievement in DC motors and industrial lighting drivers. They belong to an expanding family to control and diagnose various types of loads, such as incandescent bulbs or light emitting diodes (LEDs), with enhanced precision. The products combine flexibility through daisy chainable SPI at 5.0 MHz, extended digital and analog feedbacks, which supports safety and robustness. This new generation of Freescale's high-side switch products family facilitates electronic control unit designs supported by the use of compatible MCU software and PCB footprints, for each device variant.</td>
</tr>
<tr>
<td></td>
<td>Product</td>
<td># of outputs</td>
</tr>
<tr>
<td></td>
<td>MC07XSF517</td>
<td>Penta</td>
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<td>MC17XSF500</td>
<td>Penta</td>
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<td></td>
<td>MC25XSF300</td>
<td>Triple</td>
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<tr>
<td></td>
<td>MC40XSF500</td>
<td>Penta</td>
</tr>
<tr>
<td>36XSX</td>
<td>36 V Multipurpose Industrial Low RDS(on) Intelligent eXtreme Switch</td>
<td>Freescale’s family of intelligent, dual high-side eXtreme switches for 36 V systems offers devices with current capability ranging from one to 12 A DC that are fully compatible in footprint and software within the PQFN sub family. Each output can be programmed to be used for any kind of loads, including lamps, LEDs, motors or solenoids. This allows customers to design a flexible module which can become specific and optimized for a given application through software. Freescale’s 36 V eXtreme switch solution provides robust design, intelligence and safety needed for industrial applications up to 36 V supply voltage.</td>
</tr>
<tr>
<td></td>
<td>Product</td>
<td># of outputs</td>
</tr>
<tr>
<td></td>
<td>MC06XSD200</td>
<td>Dual</td>
</tr>
<tr>
<td></td>
<td>MC10XSD200</td>
<td>Dual</td>
</tr>
<tr>
<td></td>
<td>MC16XSD200</td>
<td>Dual</td>
</tr>
<tr>
<td></td>
<td>MC22XSD200</td>
<td>Dual</td>
</tr>
<tr>
<td></td>
<td>MC50XSD200</td>
<td>Dual</td>
</tr>
<tr>
<td>33399</td>
<td>Local Interconnect Network (LIN) Physical Interface</td>
<td>LIN Transceiver with Wake and Enable Inputs, Inhibit Output</td>
</tr>
<tr>
<td>33660</td>
<td>ISO K Line Serial Link Interface</td>
<td>A serial link bus interface device designed to provide bi-directional half-duplex communication interfacing in automotive diagnostic applications. It is designed to meet the automotive diagnostic systems ISO9141 specification.</td>
</tr>
<tr>
<td>33661</td>
<td>Enhanced LIN Transceiver</td>
<td>Selectable Slew Rate for Operations at 10, 20, and 100 kbps; Bus Short to Ground Fail-safe; Excellent EMC Behavior</td>
</tr>
<tr>
<td>33662</td>
<td>LIN 2.1 / SAEJ2602-2, LIN Physical Layer Transceiver</td>
<td>The 33662s are physical Layer components dedicated to automotive LIN sub-bus applications. They features either a 20 kbps baud rate or a 10 kbps baud rate. The 33662s integrate fast baud rate for test and programming modes, and provide excellent ESD robustness, immunity against disturbance, and radiated emission performance.</td>
</tr>
<tr>
<td>33663</td>
<td>LIN 2.1 / SAEJ2602-2 Dual LIN Physical Layer</td>
<td>The 33663 product line integrates two physical layer LIN bus dedicated to automotive LIN sub-bus applications. The MC33663LEF and MC33663SEF devices offer normal baud rate (20 kbps) and the MC33663JEF slow baud rate (10 kbps). Both devices integrate fast baud rate (above 100 kbps) for test and programming modes.</td>
</tr>
<tr>
<td>33664</td>
<td>Isolated Network High-speed Transceiver Physical Layer (TPL)</td>
<td>The 3364TL is a transceiver physical layer transformer driver designed to conveniently interface a microcontroller to a high-speed isolated communication network.</td>
</tr>
</tbody>
</table>
### Analog Devices for Power Actuation, Power Management, Network Transceivers, Signal Conditioning, and Radar (continued)

<table>
<thead>
<tr>
<th>Freescale Part Number</th>
<th>Description</th>
<th>Main Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>33730</td>
<td>Switch Mode Power Supply with Multiple Linear Regulators</td>
<td>The 33730 is a multiple output power supply integrated circuit for automotive applications. The integrated circuit (IC) incorporates a switching regulator which operates over a wide input voltage range from +4.5 V to +26.5 V. The step-down switching regulator uses a fixed frequency PWM voltage mode control. It has a 3.5 A current limit (typical) and the slew-rate is adjustable via a control pin to reduce switching noise. The linear regulators can be configured either as two normal mode regulators (VDD3, VDDL) and one standby regulator (VKAM), or as one normal mode linear regulator (VDDL) and two standby regulators (VKAM and VDD3 Standby).</td>
</tr>
<tr>
<td>33742</td>
<td>System Basis Chip with Enhanced High-speed CAN Transceiver</td>
<td>SBC, Dual V_{EEG} Enhance HS CAN with Bus Failure Diagnostic Capability, 4 Wake-up Inputs</td>
</tr>
<tr>
<td>33771</td>
<td>Battery Cell Controller IC (BCC)</td>
<td>The 33771 is a lithium ion Battery Cell Controller IC designed for automotive applications, such as hybrid electric (HEV) and electric vehicle (EV) systems as well as industrial applications, such as energy storage systems (ESS) and uninterruptible power supply (UPS) systems.</td>
</tr>
<tr>
<td>33780</td>
<td>Dual DBUS Master with Differential Drive and Frequency Spreading</td>
<td>The 33780 is a master device for two differential DBUS buses. It contains the logic to interface the buses to a standard serial peripheral interface (SPI) port and the analog circuitry to drive data and power over the bus as well as receive data from the remote slave devices.</td>
</tr>
<tr>
<td>33781</td>
<td>Quad DBUS Master with Differential Drive and Frequency Spreading</td>
<td>The 33781 is a master device for four differential DBUS buses. It contains the logic to interface the buses to a standard serial peripheral interface (SPI) port and the analog circuitry to drive data and power over the bus as well as receive data from the remote slave devices.</td>
</tr>
<tr>
<td>33784</td>
<td>Distributed System Interface (DSI) Sensor Interface</td>
<td>2-Channel, 10-Bit A-to-D, 5.0 V Regulated Output, DSI Bus, 3 Configurable I/O, Fault Tolerant, High Drive Output</td>
</tr>
<tr>
<td>33789</td>
<td>Airbag System Basis Chip (SBC) with Power Supply and PSI5 Sensor Interface</td>
<td>The 33789 offers an industry standard serial peripheral interface (SPI) and four PSI5 master interfaces. The 33789 has a dedicated safing state machine that complements an airbag’s MCU hardware/ software safing approach. Also included are a diagnostic - self protection capability.</td>
</tr>
<tr>
<td>33790</td>
<td>Two-Channel Distributed System Interface (DSI) Physical Interface Device</td>
<td>The 33790 is a dual channel physical layer interface IC for the Distributed System Interface (DSI) bus. It is designed to meet automotive requirements. It can also be used in non automotive applications. It supports bidirectional communication between slave and master ICs. Some slave devices derive a regulated 5.0 V from the bus, which can be used to power sensors, thereby eliminating the need for additional circuitry and wiring.</td>
</tr>
<tr>
<td>33793</td>
<td>Distributed System Interface (DSI) Share Interface Sensor</td>
<td>4-Channel, 8-Bit A-to-D, 5.0 V Regulated Output, DSI Bus, Configurable I/O, Fault Tolerant</td>
</tr>
<tr>
<td>33800</td>
<td>Engine Control Integrated Circuit (IC)</td>
<td>16 Channel low-side and gate driver IC. Provides 8 low-side switches, 2 constant current low-side switches, and 6 external MOSFET gate drivers.</td>
</tr>
<tr>
<td>33810</td>
<td>Eight Channel Ignition and Injector Driver</td>
<td>8 Channel load driver. Comprised of 4 low-side output drivers and 4 external MOSFET, or IGBT gate drivers</td>
</tr>
<tr>
<td>33811</td>
<td>Solenoid Monitor Integrated Circuit (IC)</td>
<td>A 5 Channel solenoid monitor IC. Provides verification of solenoid operation by monitoring the solenoid current waveform.</td>
</tr>
<tr>
<td>33812</td>
<td>Multifunction Ignition and Injector Driver</td>
<td>Three low-side drivers, one pre-driver, a +5.0 V voltage pre-regulator, an MCU watchdog circuit and a ISO 9141 K-Line interface, for single/ dual cylinder engine control.</td>
</tr>
<tr>
<td>PT2000</td>
<td>Programmable Solenoid Controller</td>
<td>The PT2000 is a SMARTMOS programmable gate driver IC for precision solenoid control applications, which makes the component very flexible and relieves the main microcontroller from the heavy task of the actuator control.</td>
</tr>
<tr>
<td>33879</td>
<td>Configurable Octal Serial Switch with Open Load Detect Current Disable</td>
<td>An 8-output hardware-configurable, high-side/low-side switch, with a 16-bit serial (SPI) input control. 0.75 Ohm R_{DS(on)}</td>
</tr>
<tr>
<td>33880</td>
<td>Configurable Eight Output Control Switch with SPI (0.55 Ohm R_{DS(on)})</td>
<td>8-output hardware configurable high-side/low-side switch with 8-bit serial input control</td>
</tr>
<tr>
<td>33882</td>
<td>Output Switch with SPI and Parallel Input Control (0.3 Ohm R_{DS(on)}).</td>
<td>Fully protected, 6 x 1.0 a (SPI and parallel control) + 2 x 30 ma (parallel control) switches, and SPI diagnostics</td>
</tr>
<tr>
<td>33886</td>
<td>H-Bridge Driver (5.0 A H-Bridge)</td>
<td>Monolithic H-Bridge ideal for fractional horsepower DC motor and bidirectional thrust solenoid control</td>
</tr>
</tbody>
</table>
### Freescale Part Number | Description | Main Characteristics
--- | --- | ---
33887 | H-Bridge with Load Current Feedback (5.0 A H-Bridge) | Supports forward, reverse, freewheeling, 10 kHz PWM, status, disable inputs, and load current feedback
33889 | System Basis Chip with Low Speed Fault Tolerant CAN | 2x regulator, high-side switched power, LS CAN, SPI, wake-up inputs, window watchdog, reset, and interrupt
33897 | Single Wire CAN Transceiver | Carrier sense multiple access/collision resolution (CSMA/CR) data link, and bus activity sleep/wake-up
33899 | Programmable H-Bridge Power Integrated Circuit (IC) | Programmable H-Bridge controller for a DC motor or two solenoids. Parallel inputs as well as a SPI interface provided control and diagnostic reporting, including PWM'ed outputs.
33CM0902/34CM0902 | Dual CAN High-Speed Transceiver | The CM0902 Dual CAN high-speed physical layer is Freescale's cost-effective product designed to target standard CAN high-speed applications requiring multiple transceivers.
33901/34901 | High-Speed CAN Transceiver | The 33/34901 is the latest standard cost-effective product designed to target CAN FD (flexible data) operation up to 2 Mbps and used to convert digital protocol information into analog CAN communication. The device supports long-length CAN node interconnects for industrial applications.
33903/34903 | System Basis Chip Gen2 with High-Speed CAN and LIN Interface | The 33/34903 is the second generation family of System Basis Chips which combine several features and enhance present module designs. The device works as an advanced power management unit for the MCU and additional integrated circuits such as sensors, CAN transceivers. It has a built-in enhanced high-speed CAN Interface (ISO11898-2 and -5), and may include zero, one or two LIN 2.0 interfaces.
33904/34904 | System Basis Chip Gen2 with High-speed CAN and LIN Interface | The 33/34904 is the second generation family of System Basis Chips which combine several features and enhance present module designs. The device works as an advanced power management unit for the MCU and additional integrated circuits such as sensors, CAN transceivers. It has a built-in enhanced high-speed CAN Interface (ISO11898-2 and -5).
33905/34905 | System Basis Chip Gen2 with High-speed CAN and LIN Interface | The 33/34905 is the second generation family of System Basis Chips which combine several features and enhance present module designs. The device works as an advanced power management unit for the MCU and additional integrated circuits such as sensors, CAN transceivers. It has a built-in enhanced high-speed CAN Interface (ISO11898-2 and -5), and may include one or two LIN 2.0 interfaces.
33910/34910 | System Basis Chip (SBC) with LIN Transceiver - Low End | SBC device combines a 5.0 V, 60 mA LDO, LIN transceiver, a high-side switch output, one analog/logic input and a watchdog timer, with SPI and PWM control.
33911/34911 | System Basis Chip (SBC) with LIN Transceiver - Medium End | SBC device combines a 5.0 V, 60 mA LDO, LIN transceiver, one high-side switch output, two low-side switch outputs, two analog/logic inputs and a watchdog timer, with SPI and PWM control.
33912/34912 | System Basis Chip (SBC) with LIN Transceiver - High End | SBC device combines a 5.0 V, 60 mA LDO, a switched 5.0 V output, LIN transceiver, two high-side switch outputs, two low-side switch outputs, four analog/logic inputs and a watchdog timer, with SPI and PWM control.
33926/34926 | 5.0 A throttle Control H-Bridge Power Integrated Circuit (IC) | This device drives a DC motor or 2 solenoids for actuator control. Parallel input control of outputs and fault reporting.
33931/34931 | 5.0 A Throttle Control H-Bridge | The 33/34931 is a monolithic H-Bridge power IC in a robust thermally enhanced package. It is designed for automotive electronic throttle control, but is applicable to any industrial low-voltage DC servo motor control application.
33932/34932 | 5.0 A Throttle Control H-Bridge (Dual) | The 33/34932 is a monolithic H-Bridge power IC in a robust thermally enhanced package. The 33/34932 has two independent monolithic H-Bridge Power ICs in the same package. They are designed for automotive electronic throttle control, but is applicable to any industrial low-voltage DC servo motor control application.
33937/34937 | Three Phase Field Effect Transistor Pre-driver | The 33/34937 is a field effect transistor (FET) pre-driver designed for three phase motor control and similar applications. The IC contains three high-side FET pre-drivers and three low-side FET pre-drivers. Three external bootstrap capacitors provide gate charge to the high-side FETs.
### Applications

#### Analog, Mixed-Signal, and Power Management

<table>
<thead>
<tr>
<th>Freescale Part Number</th>
<th>Description</th>
<th>Main Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>33972, 34972</td>
<td>Multiple Switch Detection Interface with Suppressed Wake-up</td>
<td>Multiple switch detection interface with suppressed wake-up designed to detect closing and opening of up to 22-switch contacts.</td>
</tr>
<tr>
<td>33975, 34975</td>
<td>Multiple Switch Detection Interface with Suppressed Wake-up and 32 mA Wetting Current</td>
<td>22 inputs contact monitoring (14 GND, 8 configurable), and selectable wake-up on change of state.</td>
</tr>
<tr>
<td>33978, 34978</td>
<td>Configurable IO - Multiple Switch Detection Interface</td>
<td>The MC33978/MC34978 configurable I/O is an analog switch interface used to translate 22 I/Os onto a single MCU SPI bus, with low power auto-wake modes and programmable wetting currents.</td>
</tr>
<tr>
<td>33989</td>
<td>System Basis Chip with High-speed CAN</td>
<td>2x regulator, high-side switched power, SPI, wake-up inputs, window watchdog, interrupt, and CAN transceiver</td>
</tr>
<tr>
<td>33996</td>
<td>16 Output Switch with SPI Control (0.55 Ohm R(_{DS(on)}))</td>
<td>A 16-output low-side switch with a 24-bit serial input control (SPI), for control and diagnostics. Outputs are current limited (0.9 to 2.5 A). Output voltage clamp of +50 V during inductive switching. Selectable PWM control of outputs. Protection circuits</td>
</tr>
<tr>
<td>33999</td>
<td>16 Output Switch with SPI and PWM Control (0.55 Ohm R(_{DS(on)}))</td>
<td>A 16-output low-side switch with a 24-bit serial control (SPI). The SPI provides both input control and diagnostic readout. Eight parallel inputs also provide direct pulse width modulation (PWM) control of eight dedicated outputs. Reset input.</td>
</tr>
<tr>
<td>MR2001</td>
<td>77 GHz Radar Transceiver Chipset</td>
<td>The MR2001 is a high-performance 77 GHz radar transceiver chipset scalable for multi-channel operation enabling a single radar platform with electronic beam steering and wide field of view to support long-range radar (LRR), mid-range radar (MRR) and short-range radar (SRR) applications.</td>
</tr>
<tr>
<td>34671</td>
<td>600 mA High Input Voltage Charger for Single-cell Li-Ion and Li-Polymer Batteries</td>
<td>The MC34671 is a cost-effective fully integrated battery charger for Li-Ion or Li-Polymer batteries. It tolerates an input voltage up to 28 V, which eliminates the input over-voltage protection circuit required in handheld devices. A charge cycle includes trickle, constant-current (CC) and constant-voltage (CV) charge modes.</td>
</tr>
<tr>
<td>34673</td>
<td>1.2 A High Input Voltage Charger for Single Cell Li-Ion and Li-Polymer Batteries</td>
<td>The MC34673 is a cost-effective fully-integrated battery charger for Li-Ion or Li-Polymer batteries. It tolerates an input voltage up to 28 V, which eliminates the input over-voltage protection circuit required in handheld devices. A charge cycle includes trickle, constant-current (CC) and constant-voltage (CV) charge modes.</td>
</tr>
<tr>
<td>34674</td>
<td>High Input Voltage Travel Charger for Single Cell Li-Ion and Li-Polymer Batteries</td>
<td>The MC34674 is a fully integrated single-cell Li-Ion and Li-Polymer battery charger optimized for travel charger applications. The few external components required include a dual color LED for charge status indication, a negative temperature coefficient (NTC) thermistor circuit for setting the charge temperature window, and two decoupling capacitors. The MC34674 tolerates an input voltage up to 28 V, which allows low cost AC/DC converters to be used for further system cost reduction. A charge cycle of the MC34674 includes trickle, constant current (CC) and constant voltage (CV) charge modes. The CC-mode current is selectable from 50 mA to 1.05 A, with 10% accuracy and the constant-output voltage in the CV-mode is fixed at 4.2 V.</td>
</tr>
<tr>
<td>BC3770</td>
<td>2.0 A Switch-Mode Li-ion/Li-polymer Battery Charger</td>
<td>The BC3770 is a fully programmable switching charger with dual-path output for single-cell Li-Ion and Li-Polymer battery. This dual-path output allows mobile applications with a fully discharged battery to boot up the system.</td>
</tr>
<tr>
<td>34676</td>
<td>Dual 28 V Input Voltage Charger with Linear Regulator</td>
<td>The 34676 is a dual 28 V input voltage and fully-integrated single cell Li-Ion battery charger targeting smart handheld applications. One of the inputs is optimized for charging with a USB port and the second is optimized for an AC/DC adapter power source. The charger has two 28 V power devices to eliminate the needs of any external power-source selection and input over-voltage-protection circuitry. Each of the power devices independently controls the charge current from the input and behaves as an independent charger. Only one of the two chargers operates at a time. The AC charger current and the USB charger current are programmable up to 1.2 A and 400 mA with an external resistor respectively.</td>
</tr>
<tr>
<td>34700</td>
<td>9-18 V Four Output, Multi-Purpose Switching Power Supply</td>
<td>The 34700 is a compact, high efficiency power supply, with on-chip power MOSFETs that feature three step down switching regulators and one low dropout linear regulator. The switching regulators utilize voltage mode control with external compensation, allowing flexibility in optimizing the performance of the 34700 for a given application.</td>
</tr>
</tbody>
</table>
### Freescale Part Number | Description | Main Characteristics
--- | --- | ---
34704 | Multi-channel Power Management IC (PMIC) | The 34704 is a multi-channel power management IC (PMIC) used to address power management needs for various multimedia application microprocessors. Its ability to provide either 5 or 8 independent output voltages with a single input power supply (2.7 and 5.5 V) together with its high efficiency, make it ideal for portable devices powered up by Li-Ion/polymer batteries or for USB powered devices as well.
34708 | Power Management Integrated Circuit (PMIC) for the i.MX50/53 Families | The 34708 is the PMIC designed specifically for use with the Freescale i.MX50 and i.MX53 processor families. As the companion PMIC on several i.MX reference designs, it is a proven solution, which enables a faster time to market with fewer resources.
34709 | Power Management Integrated Circuit (PMIC) for the i.MX50/53 Families | The 34709 is the Power Management Integrated Circuit (PMIC) designed primarily for use with the Freescale i.MX50 and i.MX53 families. It offers a low cost solution targeting embedded applications that do not require a battery charger.
34VR500 | Power Management Integrated Circuit for QorIQ LS1 networking communications processors | The 34VR500 is a high performance, highly integrated, multi-output, SMARTMOS, DC/DC regulator solution, with integrated power MOSFETs ideally suited for the LS1 family of communication processors.
PF0100 | 14 Channel Configurable Power Management Integrated Circuit | The PF0100 Power Management Integrated Circuit (PMIC) provides a highly programmable/configurable architecture, with fully integrated power devices and minimal external components. With up to six buck converters, six linear regulators, RTC supply, and coin-cell charger, the PF0100 can provide power for a complete system, including applications processors, memory, and system peripherals, in a wide range of applications.
PF0200 | 12 Channel Configurable Power Management Integrated Circuit | The PF0200 Power Management Integrated Circuit (PMIC) provides a highly programmable/configurable architecture, with fully integrated power devices and minimal external components. With up to four buck converters, one boost regulator, six linear regulators, RTC supply, and coin-cell charger, the PF0200 can provide power for a complete system, including applications processors, memory, and system peripherals, in a wide range of applications.
PF3000 | Power Management Integrated Circuit (PMIC) for i.MX 7 & i.MX 6 DL/SL/SX | The PF3000 is a Power Management Integrated Circuit (PMIC) designed specifically for use with the Freescale i.MX 7 and i.MX 6 DL/SL/SX application processors.
34713 | Single Synchronous Buck Switching Regulator (5.0 A) | Synchronous buck switching regulator with adjustable output and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz.
34716 | Dual Synchronous Buck Switching Regulators (5.0 A, +/-3.0 A) | Synchronous buck switching regulators with adjustable outputs and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz.
34717 | Dual Synchronous Buck Switching Regulators (5.0 A, 5.0 A) | Synchronous buck switching regulators with adjustable outputs and an accuracy of ±2% and a programmable switch frequency of 200 KHz to 1.0 MHz.
34844 | 10 Channel LED Backlight Driver with Integrated Power Supply | The 34844 is a high efficiency, LED driver for use in backlighting LCD displays from 10” to 20”+. Operating from supplies of 7.0 to 28 V, the 34844 is capable of driving up to 160 LEDs in 10 parallel strings.
FS6407 | 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.
FS6408 | 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.
33909 | System Basis Chip with Multiple Switch-to-Ground Interface | The 33909/34FS4409 integrates the common functionality of system basis chips with switch detection inputs. The device works as an advanced power management unit for the MCU and additional integrated circuits such as sensors, CAN transceivers, and eXtreme switches.
FS4409 | 1.4 A Dual H-Bridge Driver Compatible with 3.0 V Logic | The 34933 is a two channel H-Bridge driver aimed at the digital camera market. There are a variety of applications containing bipolar step motors and/or brush DC motors, such as Auto Focus control for the digital camera lens. The 34933 uses Freescale’s proprietary SMOS8 Bi CMOS process to deliver a low power device, with a maximum quiescent current of 100 µA for the motor drive supply and 400 µA for the Control Logic supply.
<table>
<thead>
<tr>
<th>Freescale Part Number</th>
<th>Description</th>
<th>Main Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>908E621</td>
<td>Integrated Quad Half-bridge and Triple High-side with Embedded MCU and LIN for High End Mirror</td>
<td>A high performance HC08 microcontroller with a SMARTMOS analog control IC. The analog control die provides four half-bridges and three high-side outputs with diagnostic functions, Hall Effect sensor input, analog inputs, voltage regulator, window watchdog, and local interconnect network (LIN) physical layer.</td>
</tr>
<tr>
<td>908E622</td>
<td>Integrated Quad Half-bridge, Triple High-side and EC Glass Driver with Embedded MCU and LIN for High End Mirror</td>
<td>A high performance HC08 microcontroller with a SMARTMOS analog control IC. The analog control die provides four half-bridge and three high-side outputs with diagnostic functions, EC glass driver circuit, Hall Effect sensor input, analog inputs, voltage regulator, window watchdog, and local interconnect network (LIN) physical layer.</td>
</tr>
<tr>
<td>908E624</td>
<td>Integrated Triple High-side Switch with Embedded MCU and LIN Serial Communication for Relay Drivers</td>
<td>A high performance HC08 microcontroller with a SMARTMOS analog control IC. The analog control die provides three high-side outputs with diagnostic functions, voltage regulator, watchdog, current sensor operational amplifier, and local interconnect network (LIN) physical layer.</td>
</tr>
<tr>
<td>908E625</td>
<td>Integrated Quad Half H-Bridge with Power Supply, Embedded MCU, and LIN Serial Communication</td>
<td>A high performance HC08 microcontroller with a SMARTMOS analog control IC. The analog control die provides fully protected H-Bridge/high-side outputs, voltage regulator, autonomous watchdog with cyclic wake-up, and local interconnect network (LIN) physical layer.</td>
</tr>
<tr>
<td>908E626</td>
<td>Integrated Stepper Motor Driver with Embedded MCU and LIN Serial Communication</td>
<td>The analog control die provides fully protected H-Bridge outputs, voltage regulator, autonomous watchdog, and local interconnect network (LIN) physical layer.</td>
</tr>
<tr>
<td>912_634</td>
<td>Integrated S12 Based Relay Driver products with LIN, with 32/48/64 kB Flash memory</td>
<td>The MM912_634 products are integrated single package solutions that integrate an HCS12 microcontroller with a SMARTMOS analog control IC, which combine a system base chip and application specific functions, including a Local Interconnect Network (LIN) transceiver</td>
</tr>
<tr>
<td>912_637</td>
<td>Battery Sensor with LIN for 12 V Lead-acid Batteries</td>
<td>The MM912_637 is an integrated single package solution that integrates an HCS12 microcontroller, a SMARTMOS analog control IC containing system base chip and application specific functions, including a LIN transceiver</td>
</tr>
<tr>
<td>9Z1_638</td>
<td>Battery Sensor with CAN and LIN</td>
<td>The MM9Z1_638 enables precision measurement of key battery parameters in automotive and other applications. The device integrates an S12Z microcontroller and a SMARTMOS analog control IC into a single package solution.</td>
</tr>
<tr>
<td>912_P812</td>
<td>S12P MCU and Multifunctional Ignition and Injector Driver System In Package (SiP)</td>
<td>The MM912_P812 is an engine control IC combining an MCU (S12P) and analog control die (MC33812) intended for motorcycle and other single/dual cylinders small engine control applications.</td>
</tr>
<tr>
<td>912_S812</td>
<td>S12XS MCU and Multifunctional Ignition and Injector Driver System In Package (SiP)</td>
<td>The MM912_S812 is an engine control IC combining an MCU (S12XS) and analog control die (MC33812) intended for motorcycle and other single/dual cylinders small engine control applications.</td>
</tr>
<tr>
<td>17510</td>
<td>0.45 Ohm (TYP) H-Bridge Motor Driver</td>
<td>The 17510 is a monolithic H-Bridge that is ideal in portable electronic applications to control small brush DC motors such as digital still and single lens cameras.</td>
</tr>
<tr>
<td>17529</td>
<td>0.7 Ohm TYP Dual H-Bridge Motor Driver</td>
<td>The 17529 is a monolithic dual H-Bridge that is ideal in portable electronic applications to control bipolar stepper motors and brush DC motors such as found in camera lens shutters, optical disk drivers and other head positioners.</td>
</tr>
<tr>
<td>17531</td>
<td>700 mA Dual H-Bridge Motor Driver with 3.0 V Compatible Logic I/O</td>
<td>The 17531 is a monolithic dual H-Bridge driver IC with integrated charge pump and protection.</td>
</tr>
<tr>
<td>17533</td>
<td>0.7 Ohm (TYP) Dual H-Bridge Motor Driver</td>
<td>The 17533 is a monolithic dual H-Bridge IC that is ideal in portable electronic applications for controlling stepper or brush DC-motors for example, camera lens shutters and optical disk drives.</td>
</tr>
<tr>
<td>17C724</td>
<td>0.4 Amp Dual H-Bridge Motor Driver IC</td>
<td>A dual-channel H-Bridge power IC is ideal for portable electronic applications containing bipolar stepper motors or brush DC motors, like those in cameras.</td>
</tr>
<tr>
<td>33HB2000</td>
<td>10 A H-Bridge, Programmable Brushed DC Motor Driver</td>
<td>The 33HB2000 is a monolithic H-Bridge Power IC, enhanced with SPI configurability and diagnostic capabilities.</td>
</tr>
<tr>
<td>33HB2001</td>
<td>10 A H-Bridge, Programmable Brushed DC Motor Driver</td>
<td>The 33HB2001 is a monolithic H-Bridge Power IC, enhanced with SPI configurability and diagnostic capabilities.</td>
</tr>
<tr>
<td>33GD3000</td>
<td>Three Phase Field Effect Transistor Pre-driver</td>
<td>The GD3000 is a field effect transistor (FET) pre-driver designed for three phase motor control and similar applications.</td>
</tr>
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### Freescale Part Number Description Main Characteristics

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<tr>
<th>Freescale Part Number</th>
<th>Description</th>
<th>Main Characteristics</th>
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<tr>
<td>SB0400</td>
<td>Two-Wheel Antilock Braking (ABS) Controller for Motorcycles</td>
<td>The MC33SB0400 motorcycle antilock brake (ABS) controller has two high current low-side drivers for solenoid valves, two configurable wheel speed sense inputs for active sensors, and high-side gate drivers for controlling two external N-channel MOSFETs.</td>
</tr>
<tr>
<td>SB0401</td>
<td>One-Wheel Antilock Braking (ABS) for Motorcycles</td>
<td>The MC33SB0401 motorcycle antilock brake (ABS) controller has four high current low-side drivers for solenoid valves, two configurable wheel speed sense inputs for handling active sensors, and high-side gate drivers for controlling two external N-channel MOSFETs.</td>
</tr>
<tr>
<td>34SB0410</td>
<td>Quad Valve Controller System on Chip</td>
<td>The Quad Valve Controller system on a chip (SoC), with integrated pump driver, consists of four regulated low-side drivers and a high-side driver to control a DC motor.</td>
</tr>
<tr>
<td>34SB0800</td>
<td>Octal Valve Controller System on Chip</td>
<td>The Octal Valve Controller system on a chip (SoC), with integrated pump driver, consists of four regulated low-side drivers and four digital low-side driver, plus a high-side driver to control a DC motor.</td>
</tr>
<tr>
<td>References</td>
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Communicating

Controlling

Protecting