



Analog, Mixed Signal and Power Management

MC33812

Multifunctional Ignition and Injector Driver

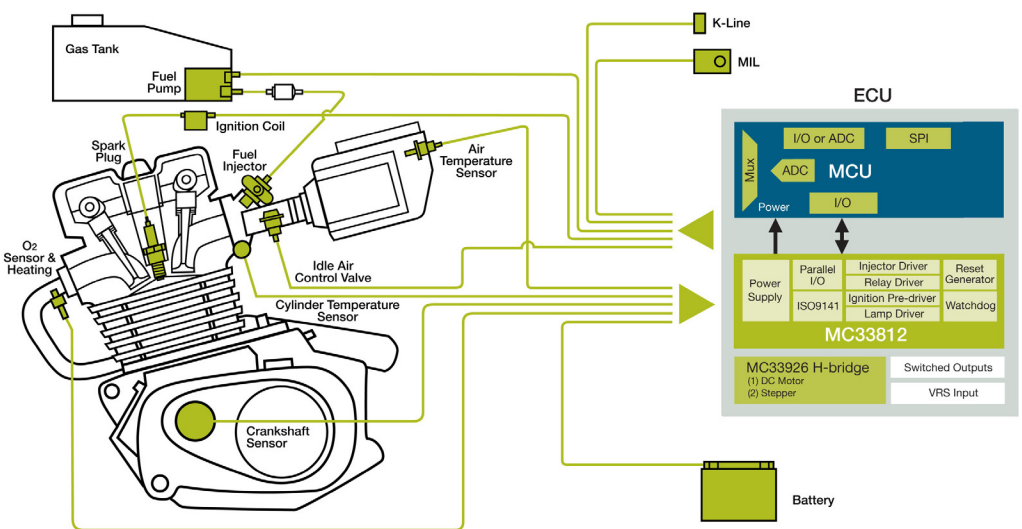
Overview

With increasing gas prices and worldwide emissions regulations, small engine applications face increasing pressure to be green.

In the automotive industry, Freescale has been on the forefront of the change from mechanical to electronic engine control. We are now leading the way to make this change in the small engine industry as well.

The 33812 is an engine control analog power IC intended for motorcycle and other single/dual cylinder small engine control applications. The IC consists of three integrated low side drivers, one pre-driver, 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 or another injector or fuel pump. The pre-driver is intended to drive either an Insulated Gate Bipolar Transistor (IGBT) or a bipolar Darlington transistor to control an ignition coil.

MC33812 Simplified Application Drawing



Applications

- Small Engine Control
- Lawn Mowers
- Scooters
- Small Motorcycles
- Lawn Trimmers
- Snow Blowers
- Chain Saws
- Gas-driven Electrical Generators
- Outboard Motors

Features

- Designed to operate over the range of $\sim 4.7\text{ V} \leq V_{PWR} \leq 36\text{ V}$
- Fuel injector driver - current limit - 4.0 A typical
- Ignition pre-driver can drive IGBT or Darlington bipolar junction transistors
- Ignition pre-driver has independent high and low side outputs
- Relay/injector/fuel pump driver - current limit - 4.0 A typical
- Lamp driver- current limit - 1.5 A typical
- All external outputs protected against short to battery and over-current
- All drivers protected against over-temperature
- Interfaces directly to MCU using 5.0 V parallel interface
- VCC voltage pre-regulator provides +5.0 V power for the MCU
- MCU Power On $\overline{\text{RESET}}$ generator
- MCU watchdog timer circuit with parallel refresh/time setting line
- Independent fault annunciation outputs for ignition, injection and relay
- ISO-9141 K-Line transceiver for communicating diagnostic messages
- Pb-free packaging designated by suffix code EK

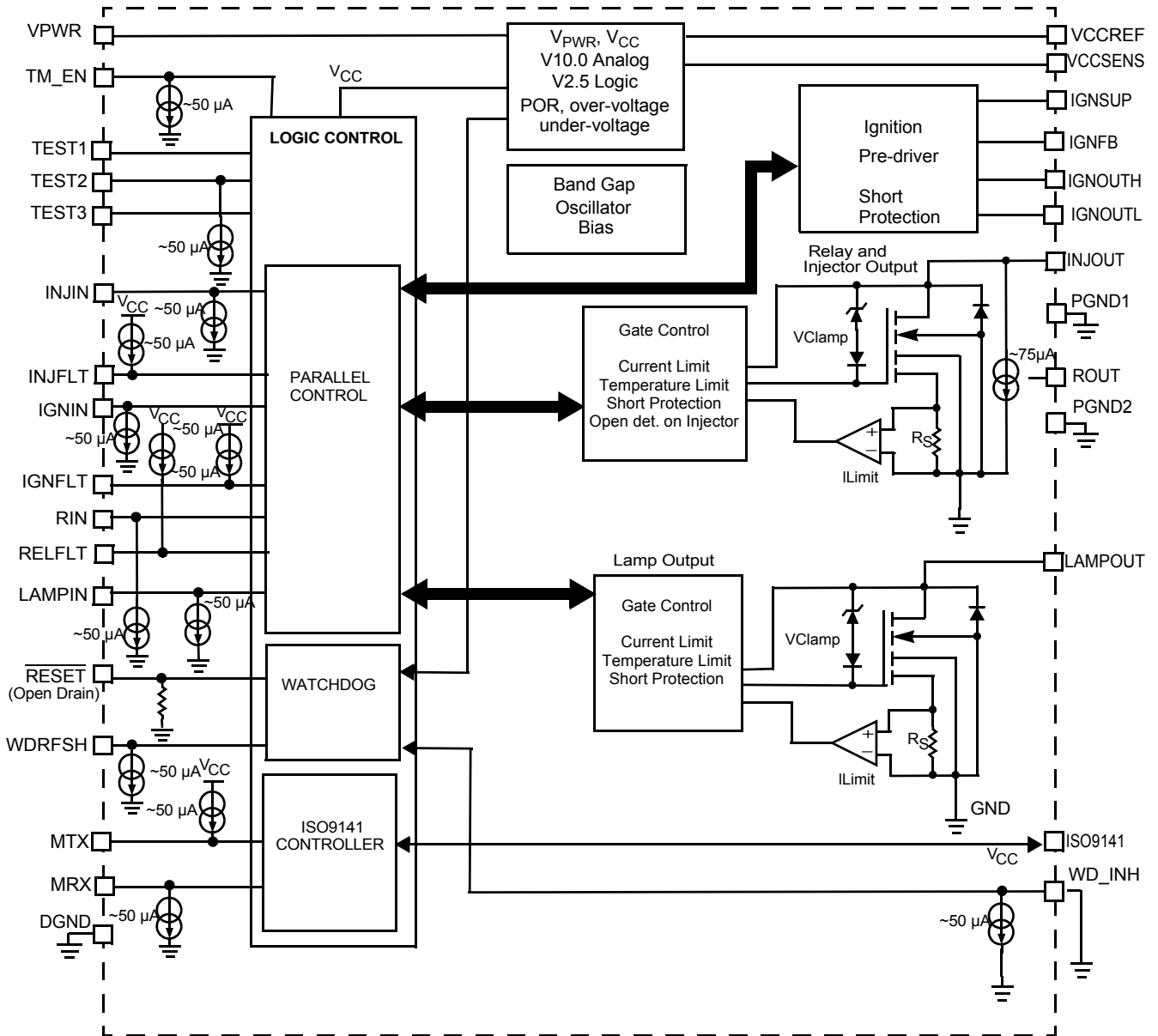
Benefits

- Increased fuel efficiency when converting from a mechanical system to an electrical system
- Improved emissions using electrical system of this IC compared to a mechanical system
- Easiest way to interface a micro controller to DC loads
- Simplified system design
- Reduced board space
- Reduce number of components
- Enhanced reliability

Performance	
Performance	Typical Values
Outputs	3 Drivers, 2 Pre-drivers, 1 Bidirectional
RDS_{ON} @ 25°C	0.2Ω
Operating Voltage	-0.3 to 45 V
Continuous Current	2.0 A for Injector Drivers (1.0A for lamp drivers)
Control	Parallel
ESD, HBM	±2000V
Operating Temperature (T_A)	-40°C to +125°C
Junction Operating Temperature (T_J)	-40°C to +150°C

Protection					
Protection	Detect	Limiting	Shut Down	Auto Retry	Status Reporting
Over-voltage	●		●	●	
Over-current/SC	●	●	●		●
Over-temperature	●		●	●	●
Open Load	●				●

Simplified Internal Block Diagram



*Note: Pull up and pull down current sources are $\sim 50 \mu A$ unless otherwise noted

Why you need Freescale!

- Are you designing an application for a small engine?
- Is your local government planning to issue environmental regulations regarding small engines?
- Are you planning to move from a mechanical to an electrical engine control system?
- Do you need a reference design for a transition from mechanical to an electrical engine control system?
- Are you limited for space in your current electronically controlled small engine?
- Are you looking to consolidate/integrate multiple functions into a single IC?

Ordering Information

Part Number	Temperature Range	Package
MCZ33812EK/R2	-40°C to +125°C	32 SOICW-EP
* MCZ33812AEK/R2	-40°C to +125°C	32 SOICW-EP

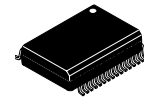
Development Tools

Part Number	Description
KIT33812EKEVBE	Evaluation Board Kit
KIT33812ECUEVME	Reference Design with BDM multi-link

Contact Sales for Evaluation Kit Availability

Document Number	Title	Description
MC33812	Data Sheet	Presents the specifications for the product
SG187	Selector Guide	Automotive Selector Guide
SG1002	Selector Guide	Analog and Mixed Signal Selector Guide

* Note: AEC qualified for automotive applications



32 SOICW-EP
0.65 mm Pitch
11.0 mm x 7.5 mm Body
4.7 mm x 4.7 mm Exposed Pad

Learn More: For current information about Freescale products, please visit www.freescale.com.

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