



Analog, Mixed Signal and Power Management

MC33931

5A Throttle Control H-Bridge Power Integrated Circuit

Overview

The MC33931 is a monolithic H-Bridge Power IC in a robust thermally enhanced package. It is designed primarily for automotive electronic throttle control, but is applicable to any low voltage DC servo motor control applications.

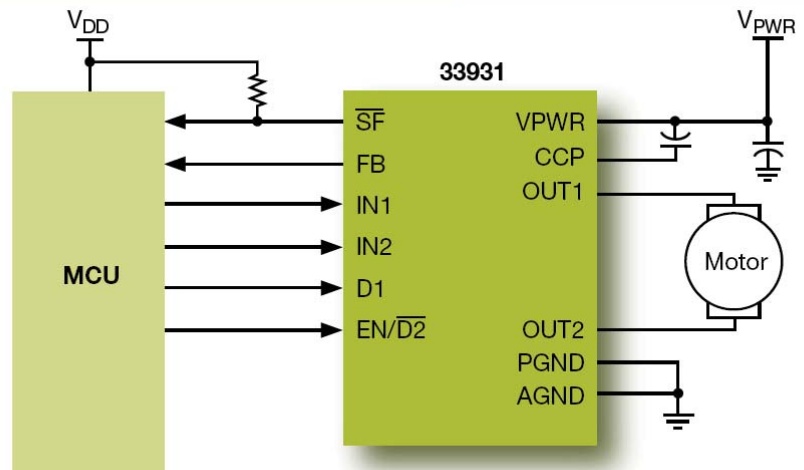
The MC33931 H-bridge is able to control inductive loads with currents up to 5.0 A peak. RMS current capability is subject to the degree of heatsinking provided to the device package. Internal peak-current limiting (regulation) is activated at load currents above $6.5\text{ A} \pm 1.5\text{ A}$. The MCU can pulse width modulate the load through the MC33931 at frequencies up to 11 kHz.. A load current feedback feature provides a proportional (0.24% of the load current) current output suitable for monitoring by a microcontroller's A/D input. A Status Flag output reports under-voltage, over-current and over-temperature fault conditions.

Two independent inputs provide polarity control of two half-bridge totem-pole outputs. The disable inputs are provided to force the H-bridge outputs to tri-state (high-impedance off-state).

Applications

- Electronic throttle control
- DC motor control
- Industrial motors and actuators

MC33931 Simplified Application Block Diagram



Features

- 5.0 V to 28 V continuous operation (transient operation from 5.0 V to 40 V)
- 3.0 V and 5.0 V TTL/CMOS logic compatible inputs
- Over-current limiting (regulation) via internal constant-off-time PWM
- Output short-circuit protection (short to V_{PWR} or GND)
- Temperature-dependant current-limit threshold reduction
- All inputs have an internal source/sink to define the default (floating input) states
- Sleep mode with current draw < 50 μ A

Benefits

- Robust solution for harsh environments
- Compact, easy-to-use package
- Protected against common failure conditions

Freescal Semiconductor is a leading provider for over 25 years of high-performance products that use SMARTMOS™ technology that combines digital, power and standard analog functions. The company supplies analog and power management ICs for the automotive, consumer, networking and industrial markets. Freescale's analog and power ICs complement our broad portfolio of microcontrollers, microprocessors, ZigBee® technology, digital signal processors, sensors, development tools and support to offer system solutions to customers.

Ordering Information

Part Number	Temp. Ranges (T_A)	Package
MC33931VW	-40 °C to +125 °C	44-pin HSOP
MC33931EK	-40 °C to +125 °C	32-pin SOICW-EP

Note: Add R2 Suffix for Tape and Reel

Performance

Parametric	Typical Values
Outputs	2
Outputs $R_{DS(ON)}$	120 m Ω
PWM	11 KHz
ESD	2 KV
Control/communication	Parallel
Operating voltage	8v to 28V)

Development Tools

Part Number	Description
KIT33932VWEVBE	Evaluation Kit - 33932VW, Dual 5.0 A Throttle Control H-Bridge
KIT33931EKEVBE *	Evaluation Kit - 33931EK, 5.0 A Throttle Control H-Bridge

* Contact Freescale Sales

Documentation

Document Number	Title	Description
MC33931	5.0 A Throttle Control H-Bridge	Datasheet
SG1002	Analog, Mixed-Signal and Power Management	Selector Guide
SG187	Automotive device comparison	Selector Guide
AN2388	Heatsink Small Outline Package (HSOP)	Application Note
AN2409	Small Outline Integrated Circuit - Fine Pitch Package (SOIC)	Application Note



98ARL10543D
32-PIN SOICW-EP
exposed heatsink



98ARH98330A
44-PIN HSOP
exposed/protruding heatsink

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