

MC34931

5A H-bridge power integrated circuit

Overview

The MC34931 is a monolithic H-bridge power IC in a robust, thermally enhanced package, one that provides ultra-low thermal resistance. Automatic thermal back-off ensures high availability operation in demanding high-current, high-temperature industrial applications. It is designed primarily for DC brushed and servo motor driver applications.

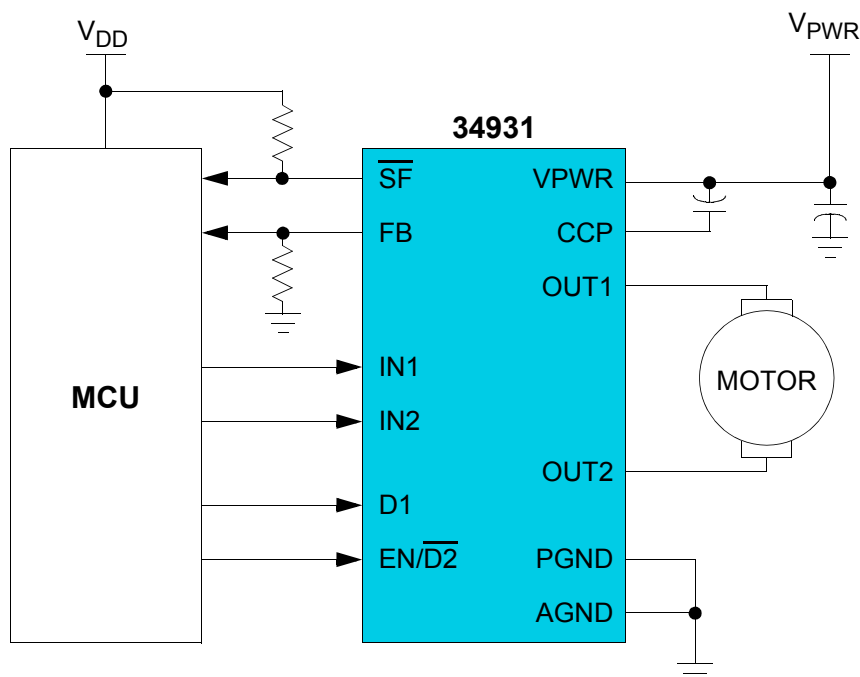
The MC34931 H-bridge is able to control inductive loads with currents up to 5.0 A peak. RMS current capability is subject to the degree of heat sinking provided to the device package. Internal peak-current limiting (regulation) is activated at load currents above $6.5\text{ A} \pm 1.5\text{ A}$. The MCU can pulse width modulate the load through the MC34931 at frequencies up to 20 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).

Target Applications

- DC motor control
- DC brushed and servo motor driver
- 3D printers
- Factory automation
- POS, ATM, vending kiosks
- Robotics
- Medical pumps and valves
- Ticketing, toll systems

Simplified Applications Drawing



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32-PIN SOICW-EP
98ARL10543D

Product Differentiation

Features	Benefits
Robust thermally enhanced SOIC package	Choice between smaller footprint or visual fillet inspection
Load current mirroring provides a proportional current output (0.24% of the load current)	Provides feedback to a microcontroller for control or protection
Temperature-dependant current-limit threshold reduction	Maintains operation at reduced current for continuous operation
Automatic maximum current regulation via pre-determined MOSFET shut-off times	Reduces safety and reliability risks
Integrated fault detection and interrupt flag for under-voltage, over-current, and over-temperature	Saves board space over discrete solution
Sleep mode with < 20 μ A current draw (each half with inputs floating or set to match default logic states)	Reduces power consumption
3.0 and 5.0 V TTL/CMOS logic compatible inputs	Design flexibility
5.0 to 36 V continuous operation (transient operation from 5.0 to 40 V)	Wide range of applications

Performance

Performance	Typical values
Outputs	2
$R_{DS(on)}$ at 25 $^{\circ}$ C	120 m Ω
Operating voltage	5.0 to 36 V
PMW MC34931EK	11 kHz (max)
PMW MC34931SEK	20 kHz (max)
ESD	$\pm$ 2000 V
Control/communication	Parallel

Documentation

Freescal Document Number	Title	Description
MC34931	5.0 A H-Bridge	Data sheet
SG1002	Analog Product Selector Guide	Selector guide
SG200	Analog and Power Management Industrial Selector Guide	Selector guide
AN2409	Small Outline Integrated Circuit (SOIC)—Fine Pitch Package	Application note

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