

MC33887

5.0 A H-Bridge with Load Current Feedback

Applications

- Automotive Systems
- DC Motor Control in Industrial and Robotic Systems
- DC Motor and Actuator Control in Boats, RVs, and Marine Systems
- Appliance and White Goods Electrical Actuators
- Powered Machine and Hand Tools
- Antenna Rotors and Dish Positioning Systems

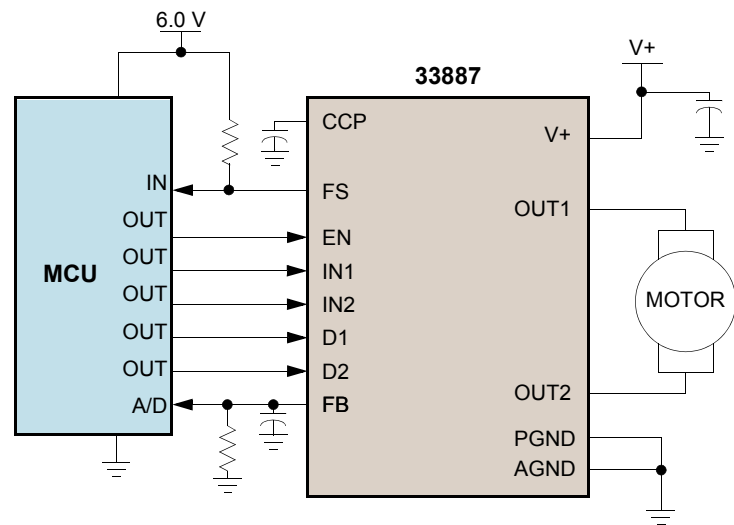
Overview

The 33887 is a monolithic H-Bridge Power IC with a load current feedback feature making it ideal for closed-loop DC motor control. The IC incorporates internal control logic, charge pump, gate drive, and low $R_{DS(ON)}$ MOSFET output circuitry. The 33887 is able to control inductive loads with continuous DC load currents up to 5.0 A, and with peak current active limiting between 5.2 A and 7.8 A. Output loads can be pulse-width modulated (PWM-ed) at frequencies up to 10 kHz. The load current feedback feature provides a proportional (1/375th of the load current) constant-current output suitable for monitoring by a microcontroller's A/D input. This feature facilitates the design of closed-loop torque/speed control as well as open load detection.

A Fault Status output terminal reports under-voltage, short-circuit, and over-temperature conditions. Two independent inputs provide polarity control of two half-bridge totem pole outputs. Two disable inputs force the H-Bridge outputs to tri-state (exhibit high-impedance).

The IC can also be operated up to 28 V with derating of the specifications.

MC33887 Simplified Application Drawing



Performance	Typical Values
Outputs	2
RMS Current	5.0 A
$R_{DS(ON)}$ @ 25 °C	120 mΩ
Operating Voltage	5.0 V to 40 V
Switching Time	5.0 μs
ESD	± 2000 V
Operating Temp	-40 °C ≤ T _A ≤ 125 °C
Junction Operating Temp	-40 °C ≤ T _J ≤ 150 °C

Features

- TTL/CMOS compatible inputs
- PWM frequencies up to 10 kHz
- Active current limiting (regulation) via internal constant OFF-time PWM (with temperature-dependent threshold reduction)
- Output short-circuit protection (short to V+ or short to GND)
- Under-voltage shutdown
- Fault status reporting
- Sleep mode with current draw $\leq 50 \mu\text{A}$ (inputs floating or set to match default logic states)
- Additional devices available for comparison in Analog Product Selector Guide SG1002 and Automotive Product Selector Guide SG187

Customer Benefits

- Easy MCU interfacing to a single H-Bridge
- Integral thermal and under-voltage protection
- Enhance device-load status reporting
- H-Bridge operation to 28 V @ 5.0 A
- Low $R_{DS(ON)}$ H-Bridge maximizes current to load
- Integral charge pump for a simpler design
- Sleep mode for reduced power consumption
- Current feedback for Servo control use
- Reduced design time

Questions

- Do you need to control a DC-motor via microprocessor?
- Are you designing a DC-motor controller for motors up to 5.0 A and up to 28 V DC?
- Do you need to drive a motor in both forward and reverse or a solenoid in both push and pull?
- Do you need to incorporate PWM speed and torque control?
- Do you need to provide active braking and freewheeling?

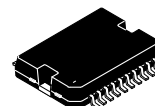
Protection	Detect	Limiting	Shut Down	Auto Retry	Status Reporting
Under-voltage	•		•	•	•
Current Regulation	•	•		•	
Over-temperature	•	•	•		•
Short to GND	•		•		•
Short to V_{PWR}	•		•		•

Ordering Information		
Device	Temperature Range	Package
MC33887APVW/R2		20 HSOP
MC33887PFK/R2	-40 to 125°C	36 PQFN
MC33887PEK/R2		54 SOICW-EP

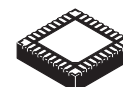
Evaluation Board	
KIT33887EKEVBE	Evaluation Board

Documentation	
MC33887	Data sheet order number
SG1002	Analog Product Selector Guide
SG 187	Automotive Product Selector Guide

20 HSOP, 36 PQFN, 54 SOICW-EP



1.27 mm Pitch
16 x 11 mm Body
12.2 x 6.9 mm Exposed Pad



Bottom View

0.8 mm Pitch
9.0 x 9.0 x 2.1 mm Body
6.0 x 6.0 mm Exposed Pad



0.65 mm Pitch
7.5 x 15.8 mm Body
4.6 x 4.6 mm Exposed Pad

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