Automotive HVAC Damper Motor Control



System Description

This TI reference design consists of a 1.6A, dual H-bridge motor driver and a small number of external components that can drive up to two brushed DC motors found in automotive HVAC damper motor applications. This design features off battery capabilities with 45V maximum operating supply voltage along with internal shutdown functions provided for overcurrent protection, short circuit protection, under voltage lockout and over temperature.

Featured Applications

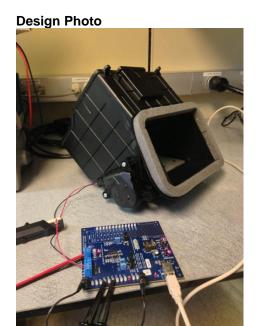
HVAC Damper Motor Controls

Design Resources

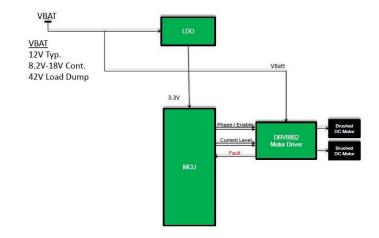
- Block Diagram and Schematic
- Test Data
- Gerber Files
- Design Files
- Bill of Materials
- Wiki Page

Design Features

- Wide Vin (42V Load Dump Capable)
- Simple, 2 pin control interface for motor operation
- On-chip protection enables higher system reliability
- Sleep function minimizes power consumption (battery drain)



Block Diagram





Jump start system design and speed time to market

Comprehensive designs include schematics or block diagrams, BOMs, design files and test reports by experts with deep system and product knowledge. Designs span TI's portfolio of analog, embedded processor and connectivity products and supports a board range of applications including industrial, automotive, medical, consumer, and more. To explore the designs, go to http://www.ti.com/tidesigns

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Associated Part Numbers

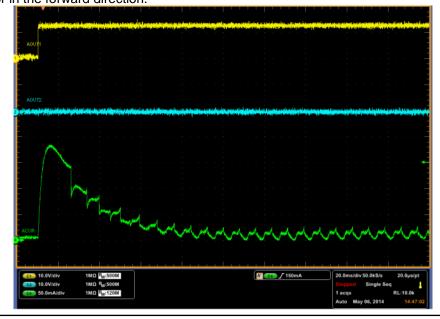
Part NumberPart DescriptionEVM LinkDRV88021.6A Dual Brushed DC Motor Driver with Inrush ProtectionEVMMSP430F161216-bit Ultra-Low-Power MCU , 55kB Flash, 5120B RAM, 12-Bit ADC, Dual DAC
Single Output LDO, 750 mA, Adj. (1.5 to 5.5V), Fast TransientEVM

Response

Design Considerations and Test Data:

- Wide Vin range devices were selected for this system since they are suitable for automotive applications in their ability to withstand load dump conditions.
- The DRV8802 has two H-bridge drivers, and is intended to drive DC motors found in an automotive damper motor controls.
- The advanced on-chip protection of the DRV8802 reduces design complexity and enables higher system reliability.
- The DRV8802's sleep function minimizes power consumption off of the car battery.
- Simple, 2 pin control interface for motor operation handled by the on-board MSP430 allows easy interfacing to controller circuits. (For automotive qualified MCU, the MSP430G2553 is planned to be automotive qualified Q1 2014)
- We are utilizing an LDO that can be powered directly off of the car battery to supply the MCU and other logic circuitry. (For automotive qualified LDO, we recommend the TPS7A6633-Q1)

The following waveforms illustrate AOUT1 voltage, AOUT2 voltage, and bridge A current during startup of the brushed DC motor in the forward direction.





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