



Analog, Mixed-signal and Power Management

MC33730

Switch mode power supply with multiple linear regulators

Applications

- Automotive Power Train
- Engine Control
- Transmission Control
- Electronic Power Steering
- Industrial

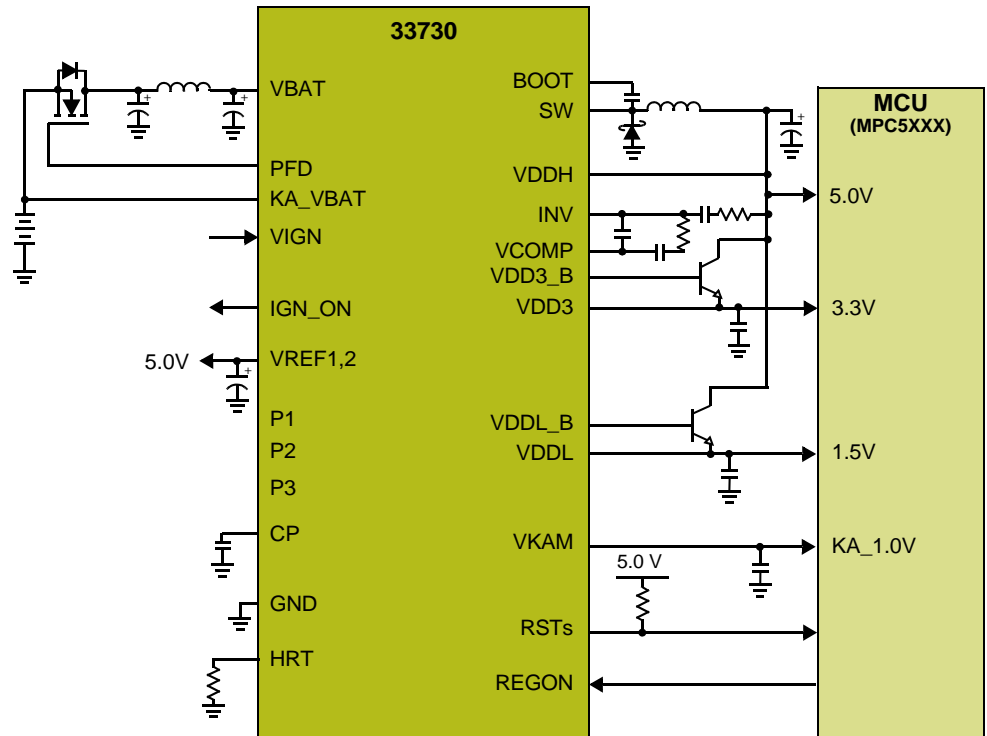
Overview

The 33730 is a multiple output power supply integrated circuit for automotive applications. The integrated circuit (IC) incorporates a switching regulator, which operates over a wide input voltage range, from +4.5 to +26.5 V.

The step-down switching regulator utilizes a fixed frequency PWM voltage mode control. It has a 3.5 A current limit (typ.) and the Slew-rate is adjustable via a control pin, to reduce the switching noise. The switching regulator has an adjustable frequency oscillator, which allows the user to optimize its operation over a wide range of input voltages and component values.

The linear regulators can be configured either as two normal mode regulators V_{DD3} , V_{DDL} and one standby regulator V_{KAM} , or as one normal mode linear regulator (V_{DDL}) and two standby regulators (V_{KAM} and V_{DD3} Standby). Two protected outputs V_{REF} (1, 2) are used to provide power to the external sensors.

MC33730 Simplified Application Drawing



Features

- Provides all regulated voltages for Freescale's 32-bit microcontroller families
- Wide operating input voltage range of buck regulator up to +35 V
- Adjustable frequency switching buck regulator with slew-rate control
- Power sequencing
- Programmable voltages VDDL, VDD3 - $\pm 3\%$ accuracy
- Programmable standby regulator VKAM - $\pm 15\%$ accuracy, operating down to 4.5 V at KA_VBAT pin
- VDD3 can be programmed as an optional second standby regulator with $\pm 15\%$ accuracy
- Provides two 5.0 V Protected supplies for sensors
- Low quiescent current $I_Q = 500 \mu\text{A}$ maximum over temperature.
- Provides gate drive for a reverse battery protection FET
- Provides necessary MCU monitoring and fail-safe support

Questions

- Q. Why use a switching regulator?
 - A. *To increase efficiency, wasting less power as heat.*
- Q. Are the different output voltages programmable?
 - A. *Yes. There are eight different combinations of voltages for the VDDL, VDD3 and VKAM.*
- Q. Can the MCU keep the MC33730 enabled even when the ignition input is turned off.
 - A. *Yes. The enable input, from the MCU can override the ignition input to allow the MCU to stay powered until it is ready to shut down.*
- Q. Does this IC have applications anywhere else besides Automotive ECUs.
 - A. *Yes. The MC33730 is a general purpose switching power supply that can be used in many other commercial, industrial and consumer applications.*

Parametric Table

Part Number	Max Input Voltage	Output Current	Temperature Range	Package
MC33730EK/R2	40 V	2.0 A	-40 °C to 125 °C	32 SOICW-EP
MCZ33730EK/R2				

Development Tools

Part Number	Description
KIT33730EKEVBE	Evaluation board to demonstrate the key features of the MC33730

Documentation

Document Number	Title	Description
MC33730	Data Sheet	Presents the specifications for the product
SG1002	Selector Guide	Analog and power management device comparison
SG187	Selector Guide	Automotive device comparison

Benefits

- System solution for the electronic control module
- Supports 32-bit and other microcontroller families
- Low system cost
- High performance, improved efficiency
- Protection and safety features
- Automotive temperature range & reliability

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