

MC33999

16 Output Switch with SPI and PWM Control

Applications

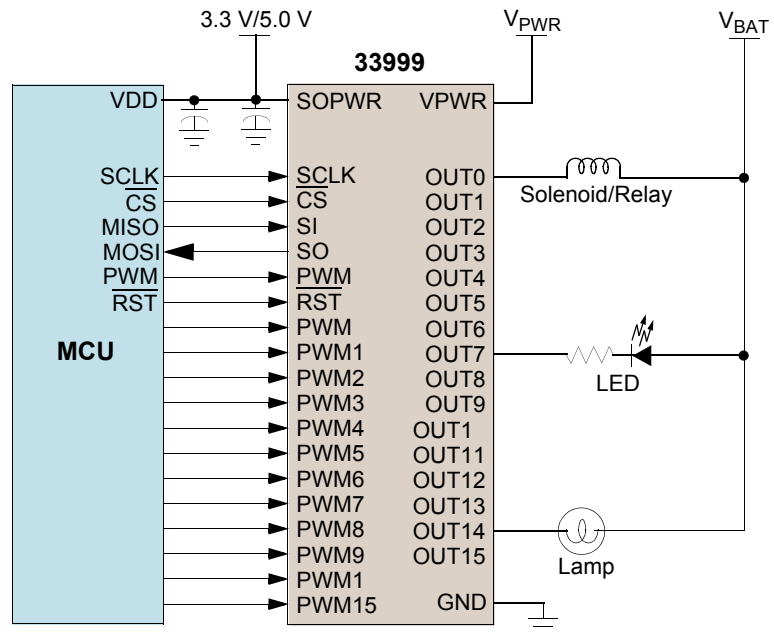
- Aircraft Systems
- Automotive Systems
- Marine Applications
- Robotic Systems
- Farm Equipment
- Actuator Control
- Small DC Motor Control
- LED and Incandescent Lamp Control
- Other Applications where Low Side Switch Control is Required

Overview

The MC33999 is a 16 output low side switch, with a 24-bit serial input control. It is designed for a variety of applications including inductive, incandescent, and LED loads. The Serial Peripheral Interface (SPI) provides both input control and diagnostic readout. Eight parallel inputs are also provided for direct Pulse Width Modulation (PWM) control of eight dedicated outputs. Additionally, an output-programmable PWM input provides PWM of any combination of outputs. A dedicated reset input provides the ability to clear all internal registers and turn all outputs off.

The MC33999 directly interfaces with microcontrollers and is compatible with both 3.3 V and 5.0 V CMOS logic levels. The MC33999, in effect, serves as a bus expander and buffer with fault management features that reduce the MCU's fault management burden.

MC33999 Simplified Application Diagram



Performance	Typical Values
Outputs	16
$R_{DS(ON)}$ @ 25 °C	0.55 Ω
Operating Voltage, SOPWR	3.1 V – 5.5 V
Peak Current	0.9 A each output
Control	SPI & direct PWM
Operating Temperature	-40 °C $\leq T_A \leq$ 125 °C
Junction Operating Temp	-40 °C $\leq T_J \leq$ 150 °C

Features

- Designed to operate 5.0 V < VPWR < 27 V
- 24-bit SPI for control and fault reporting,
- 3.3 V/5.0 V compatible
- Outputs are current limited (0.9 A to 2.5 A) to drive incandescent lamps
- Output voltage clamp of +50 V during inductive switching
- ON/OFF control of open load detect current (LED application)
- VPWR standby current < 10 μ A
- RDS(on) of 0.55 Ω at 25 $^{\circ}$ C typical
- Independent over-temperature protection
- Output selectable for PWM control
- Output ON short-to-VBAT and OFF short-to-ground/open detection
- 54-pin exposed pad package for thermal performance
- Pb-free packaging designated by suffix code EK
- Additional devices available for comparison in the Analog Product Selector Guide, SG1002 and Automotive Product Selector Guide, SG187

Customer Benefits

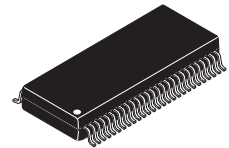
- Control of up to 16 loads using a single IC and few external components
- Simple to hook up
- Can directly interface with either 3.3 V or 5.0 V microcontrollers using SPI
- Reduced PC board space resulting in enhanced application reliability and lower costs
- Outputs controlled via SPI and multiple direct PWM inputs
- Diagnostic capability making for easy system troubleshooting

Questions

- Do you need to reduce the complexity of controlling multiple loads?
- Do you need a single IC able to switch up to 16 incandescent lamp or inductive loads?
- Do you require a "smart" switch with internal protection features and fault diagnostic reporting?
- Do some or all of your multiple loads need PWM control?
- Do you need an IC able to support 3.3 V and 5.0 V microcontrollers?

Protection					
Protection	Detect	Limiting	Shut Down	Auto Retry	Status Reporting
Over-voltage	●		●	Program	●
Under-voltage	●		●		
Over-current/SC	●	●	●	●	●
Over-temperature	●		●	●	●
Open Load	●		●	●	●

54 SOICW - EP



0.65 mm Pitch
7.5 mm x 17.9 mm Body
4.6 mm x 4.6 mm Expose ad

Ordering Information		
Device	Temperature Range	Package
MCZ33999EK/R2	-40 to 125 $^{\circ}$ C	32 SOICW-EP
KIT33999EKEVB	Evaluation board	
MC33999	Data sheet order number	
SG1002	Analog Product Selector Guide	
SG 187	Automotive Product Selector Guide	
Contact sales for evaluation kit availability		

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