

ANALOG PRODUCTS

MC33999 FACT SHEET



33999 16-OUTPUT SWITCH WITH SPI AND PWM CONTROL

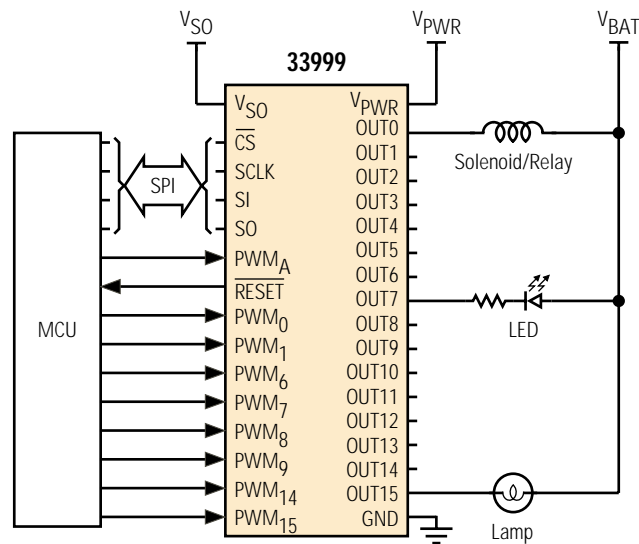
The 33999 is a 16-output low-side switch with 24-bit Serial Peripheral Interface (SPI). It is used in a variety of applications to control inductive, incandescent, and LED loads. The SPI provides both input control and diagnostic readout. Eight parallel inputs are also provided for direct Pulse Width Modulation (PWM) control of eight dedicated outputs. In addition, an output-programmable PWM_A 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 33999 directly interfaces with microcontrollers and is compatible with both 3.3 and 5.0 V CMOS logic levels. The 33999, in effect, serves as a bus expander and buffer with fault management features that reduce the MCU's fault management burden.

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

Simplified Application Diagram



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 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 trouble-shooting

Performance	Typical Values
Outputs	16
$R_{DS(on)}$ @ 25°C	0.45 Ω
Operating Voltage, V_{PWR}	9.0 – 26.5 V
Operating Voltage, V_{SO}	3.0 – 5.0 V
Peak Current	1.0 A each output
Control	SPI with PWM
Operating Temp	-40°C $\leq T_A \leq$ 125°C
Junction Operating Temp	-40°C $\leq T_J \leq$ 150°C

FEATURES

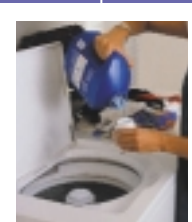
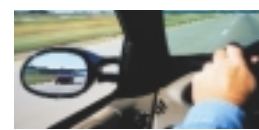
- Outputs current limited (1.0 A) and voltage clamped (45 V) for switching incandescent and inductive loads
- Output independent over temperature shutdown
- Programmed PWM of any combination of outputs plus parallel input control of 8 outputs
- Output ON short-to- V_{BAT} and OFF short-to-ground/open detection
- OFF open load detection current can be disabled for sensitive LED applications
- SPI diagnostic reporting
- Additional devices available for comparison in Analog Selector Guide SG1002/D

Protection	Detect	Limiting	Shut Down	Auto Retry	Status Reporting
Over Voltage	•		•	Program	•
Under Voltage	•		V_{SO}		
Over Current/SC	•	•	•	•	•
Over Temperature	•		•	•	•
Open Load	•			•	•

Ordering Information	Package	Ship Method	Motorola Part Number
	54 SOICWB	Rail T/R	**33999DWB **33999DWBR2
Data Sheet Order Number			MC33999/D
Contact Sales for Evaluation Kit Availability			
**Prefix Index: PC = Eng Samples; XC = In Qual; MC = Production			

QUESTIONS

- Need to reduce the complexity of controlling multiple loads?
- Need a single IC that can 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 that supports 3.3 and 5.0 V microcontrollers?



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Rev. 0