

# MC33981

## High-Frequency, High-Current, Self-Protected High-Side Switch (4.0 mΩ up to 60 kHz)

### OVERVIEW

The 33981 is a high-frequency, self-protected 4.0 mΩ  $R_{DS(ON)}$  high-side switch used to replace electromechanical relays, fuses, and discrete devices in power management applications.

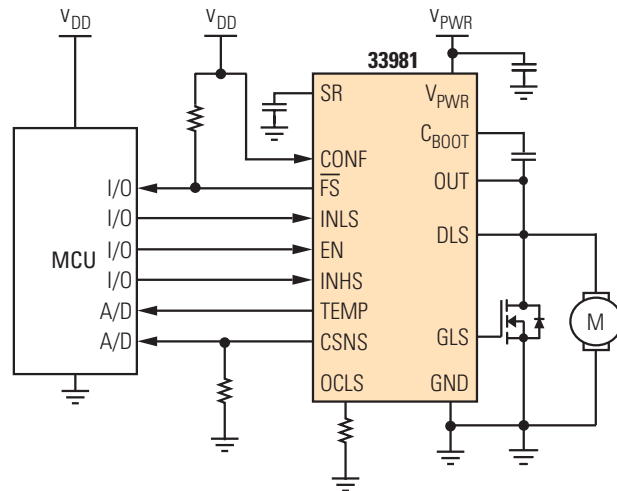
The 33981 has pulse width modulation (PWM) capability up to 60 kHz. It is designed for harsh environments, and has self-recovery features. The 33981 is suitable for loads with high inrush current, as well as motors, and all types of resistive and inductive loads.

The 33981 is packaged in a 12 x 12 nonlead power-enhanced Power QFN package with exposed tabs.

### PERFORMANCE

PERFORMANCE	TYPICAL VALUES
Outputs	1
$R_{DS(ON)}$ @ 25°C	4.0 mΩ
Operating Voltage	6.0 V to 27 V
Extended Operating Voltage	4.5 V
Peak Current	100 A
PWM Input Control	60 kHz
ESD	± 2000 V
Operating Temp	-40°C ≤ T <sub>A</sub> ≤ 125°C
Junction Operating Temp	-40°C ≤ T <sub>J</sub> ≤ 150°C

33981 Simplified Application Diagram



### APPLICATIONS

- Automotive Systems
- Robotic Systems
- Marine Equipment
- Farm Equipment
- Actuator Controls
- Fractional Horsepower DC-Motor Controls
- Applications where high-side switch control is required

### CUSTOMER BENEFITS


- Economical high-current switch requiring few external parts and simple hook-up
- Can be used by microprocessors in high-side applications
- High efficiency, low ON resistance switching
- Reduced PC board space resulting in enhanced application reliability and lower costs
- Numerous internal protections
- Current sense accuracy versus temperature
- Slew rate control to optimize EMC behavior

POWER ACTUATION SOLUTIONS  
HIGH-SIDE SWITCH

## FEATURES

- Single 4.0 mΩ R<sub>DS(ON)</sub> maximum high-side switch
- PWM capability up to 60 kHz with duty cycle from 5% to 100%
- Very low standby current
- Slew rate control with external capacitor
- Overcurrent and overtemperature protection, undervoltage shutdown, and fault reporting
- Reverse battery protection, output current monitoring, and temperature feedback
- Gate drive signal for external low-side N-channel MOSFET with protection features
- Additional devices available for comparison in Analog Selector Guide SG1002

Protection	Shut Detect	Auto Down	Retry	Status Reporting
Undervoltage	•	•	•	•
Overcurrent/SC	•	•		•
Overtemperature	•	•	•	•
Short to GND	•	•		•
Short to V <sub>PWR</sub>	•	•		•

Ordering Information	Package	Ship Method	Freescle Part Number
	16 PQFN	Rail T/R	**33981PNA **33981PNAR2
Data Sheet Order Number		MC33981	
Contact Sales for Evaluation Kit Availability			
**Prefix Index: PC = Eng Samples; MC = Production			

## QUESTIONS

- Do you need a high-side switch capable of typically switching 30 A?
- Do you have limited PC board space available for load control?
- Do you need an easy-to-design high-side switch capable of high-speed PWM switching?



Communicating



Protecting



Controlling

