



## DESCRIPTION

The AMS1069 is a monolithic synchronous buck regulator. The device integrates two MOSFETs, and provides 2A of continuous load current over a wide input voltage of 4.75V to 18V. Current mode control provides fast transient response and cycle-by-cycle current limit.

An adjustable soft-start prevents inrush current at turn-on, and in shutdown mode the supply current drops to 1µA.

This device, available in an SOP8/ESOP8 package, provides a very compact solution with minimal external components.

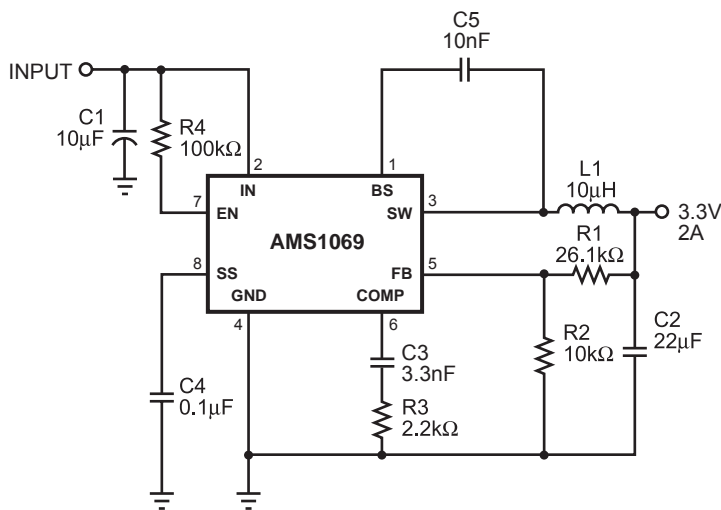
## FEATURES

- 2A Output Current
- Wide 4.75V to 18V Operating Input Range
- Integrated Power MOSFET Switches
- Output Adjustable from 0.905V to 15V
- Up to 93% Efficiency
- Programmable Soft-Start
- Stable with Low ESR Ceramic Output Capacitors
- Fixed 380KHz Frequency
- Cycle-by-Cycle Over Current Protection
- Input Under Voltage Lockout

## APPLICATIONS

- Distributed Power Systems
- Networking Systems
- FPGA, DSP, ASIC Power Supplies
- Green Electronics/ Appliances
- Notebook Computers

## TYPICAL APPLICATION

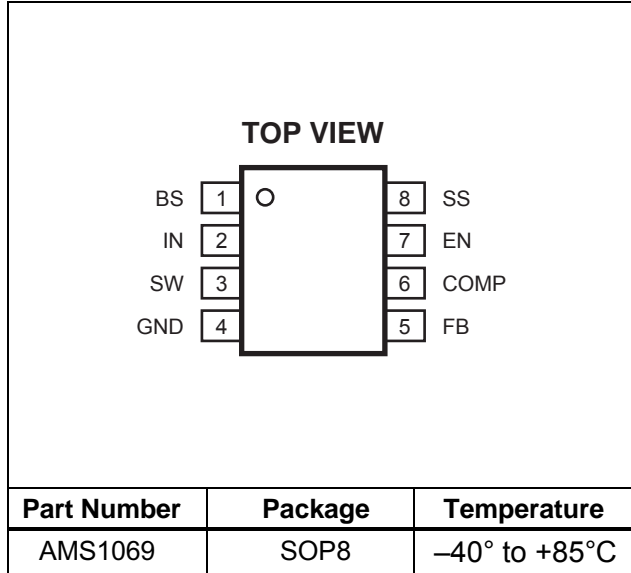


$$V_{OUT} = 0.905 \times \frac{R1 + R2}{R2}$$

R2 can be as high as 100kΩ, but a typical value is 10kΩ.



## PACKAGE REFERENCE



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage  $V_{IN}$  ..... -0.3V to +20V  
 Switch Node Voltage  $V_{SW}$  ..... 21V  
 Boost Voltage  $V_{BS}$  .....  $V_{SW} - 0.3V$  to  $V_{SW} + 6V$   
 All Other Pins ..... -0.3V to +6V  
 Junction Temperature ..... 150°C  
 Lead Temperature ..... 260°C  
 Storage Temperature ..... -65°C to +150°C

### Recommended Operating Conditions <sup>(2)</sup>

Input Voltage  $V_{IN}$  ..... 4.75V to 18V  
 Output Voltage  $V_{OUT}$  ..... 0.905V to 15V  
 Ambient Operating Temperature .... -40°C to +85°C

## ELECTRICAL CHARACTERISTICS

$V_{IN} = 12V$ ,  $T_A = +25^\circ C$ , unless otherwise noted.

Parameter	Symbol	Condition	Min	Typ	Max	Units
Shutdown Supply Current		$V_{EN} = 0V$		1	3.0	$\mu A$
Supply Current		$V_{EN} = 2.0V$ ; $V_{FB} = 1.0V$		1.3	1.5	mA
Feedback Voltage	$V_{FB}$	$4.75V \leq V_{IN} \leq 18V$	0.885	0.905	0.925	V
Feedback Overvoltage Threshold				1.1		V
Error Amplifier Voltage Gain	$A_{EA}$			400		V/V
Error Amplifier Transconductance	$G_{EA}$	$\Delta I_C = \pm 10\mu A$		700		$\mu A/V$
High-Side Switch On Resistance	$R_{DS(ON)1}$			-		m $\Omega$
Low-Side Switch On Resistance	$R_{DS(ON)2}$			-		m $\Omega$
High-Side Switch Leakage Current		$V_{EN} = 0V$ , $V_{SW} = 0V$			10	$\mu A$
Upper Switch Current Limit		Minimum Duty Cycle		3.2		A
Lower Switch Current Limit		From Drain to Source		1.0		A
COMP to Current Sense Transconductance	$G_{CS}$			3.5		A/V
Oscillation Frequency	$F_{osc1}$			380		KHz
Short Circuit Oscillation Frequency	$F_{osc2}$	$V_{FB} = 0V$		100		KHz
Maximum Duty Cycle	$D_{MAX}$	$V_{FB} = 1.0V$		90		%
Minimum On Time				220		ns
EN Shutdown Threshold Voltage		$V_{EN}$ Rising	1.1	1.5	2.0	V
EN Shutdown Threshold Voltage Hysteresis				210		mV
EN Lockout Threshold Voltage			2.2	2.5	2.7	V
EN Lockout Hysteresis				210		mV



## ELECTRICAL CHARACTERISTICS *(continued)*

$V_{IN} = 12V$ ,  $T_A = +25^{\circ}C$ , unless otherwise noted.

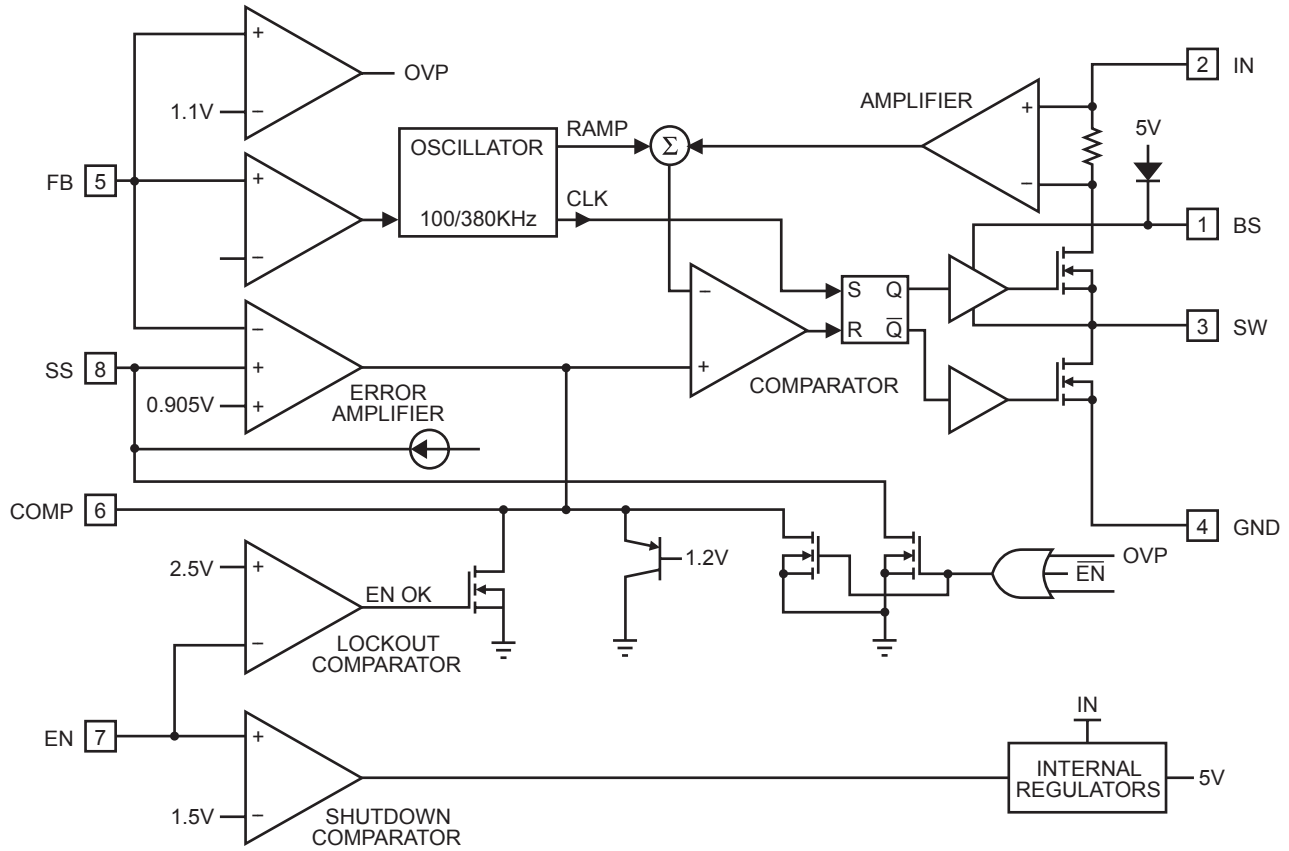
Parameter	Symbol	Condition	Min	Typ	Max	Units
Input Under Voltage Lockout Threshold		$V_{IN}$ Rising		4.30		V
Input Under Voltage Lockout Threshold Hysteresis				210		mV
Soft-Start Current		$V_{SS} = 0V$		6		$\mu A$
Soft-Start Period		$C_{SS} = 0.1\mu F$		15		ms
Thermal Shutdown				160		$^{\circ}C$

## PIN FUNCTIONS

Pin #	Name	Description
1	BS	High-Side Gate Drive Boost Input. BS supplies the drive for the high-side N-Channel MOSFET switch. Connect a 10nF or greater capacitor from SW to BS to power the high side switch.
2	IN	Power Input. IN supplies the power to the IC, as well as the step-down converter switches. Drive IN with a 4.75V to 18V power source. Bypass IN to GND with a suitably large capacitor to eliminate noise on the input to the IC.
3	SW	Power Switching Output. SW is the switching node that supplies power to the output. Connect the output LC filter from SW to the output load. Note that a capacitor is required from SW to BS to power the high-side switch.
4	GND	Ground.
5	FB	Feedback Input. FB senses the output voltage to regulate that voltage. Drive FB with a resistive voltage divider from the output voltage. The feedback threshold is 0.905V.
6	COMP	Compensation Node. COMP is used to compensate the regulation control loop. Connect a series RC network from COMP to GND to compensate the regulation control loop. In some cases, an additional capacitor from COMP to GND is required.
7	EN	Enable Input. EN is a digital input that turns the regulator on or off. Drive EN high to turn on the regulator, drive it low to turn it off. Pull up with 100k $\Omega$ resistor for automatic startup.
8	SS	Soft-Start Control Input. SS controls the soft start period. Connect a capacitor from SS to GND to set the soft-start period. A 0.1 $\mu F$ capacitor sets the soft-start period to 15ms. To disable the soft-start feature, leave SS unconnected.



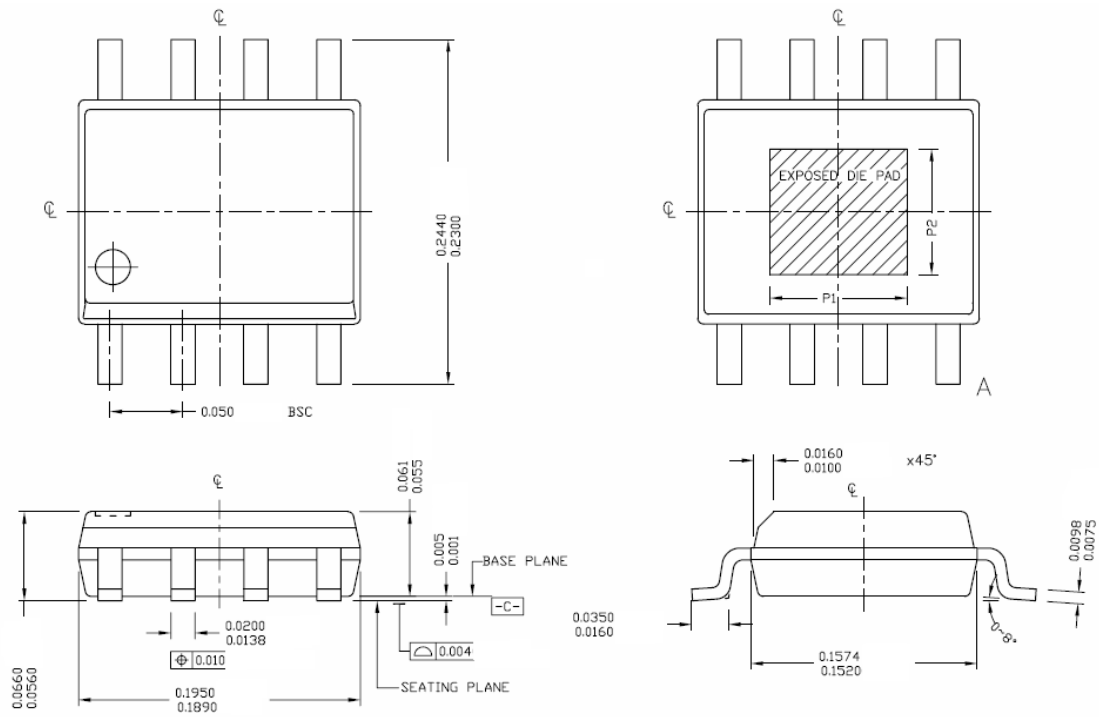
## Functional Block Diagram





# PACKAGE INFORMATION

## SOP8



**NOTE:**  
ALL DIMENSIONS ARE IN INCHS