



DESCRIPTION

The AMS1070 is a monolithic synchronous buck regulator. The device integrates 100mΩ MOSFETS that provide 3A of continuous load current over a wide operating input voltage of 4.75V to 23V. 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 below 1μA.

This device, available in an 8-pin ESOP8 package, provides a very compact system solution with minimal reliance on external components.

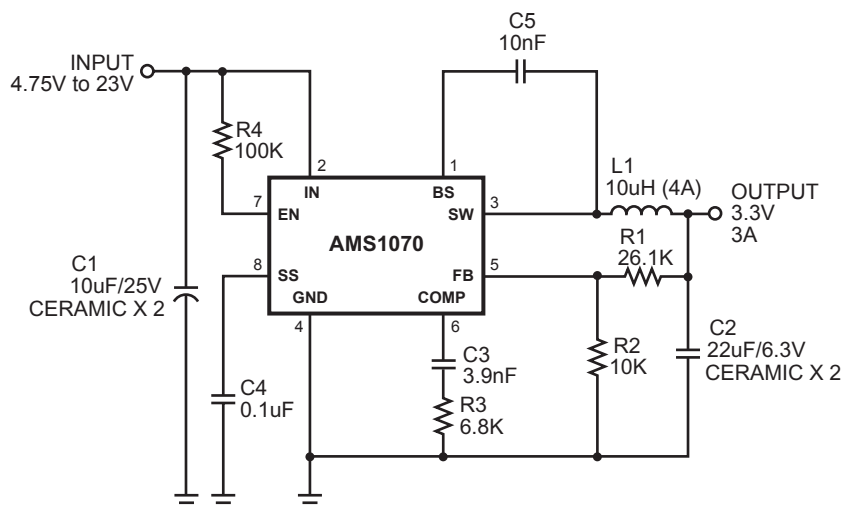
FEATURES

- 3A Continuous Output Current
4A Peak Output Current
- Wide 4.75V to 23V Operating Input Range
- Integrated 100mΩ Power MOSFET Switches
- Output Adjustable from 0.925V to 20V
- Up to 95% Efficiency
- Programmable Soft-Start
- Stable with Low ESR Ceramic Output Capacitors
- Fixed 380KHz Frequency
- Cycle-by-Cycle Over Current Protection
- Input Under Voltage Lockout
- Thermally Enhanced 8-Pin ESOP8 Package

APPLICATIONS

- Distributed Power Systems
- Networking Systems
- Notebook Computers

TYPICAL APPLICATION



**ABSOLUTE MAXIMUM RATINGS ⁽¹⁾**

Supply Voltage V_{IN} -0.3V to +26V
 Switch Voltage V_{SW} -1V to $V_{IN} + 0.3V$
 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 ⁽²⁾

Input Voltage V_{IN} 4.75V to 23V
 Output Voltage V_{OUT} 0.925V to 20V
 Ambient Operating Temp -40°C to +85°C

Notes:

- 1) Exceeding these ratings may damage the device.
 2) The device is not guaranteed to function outside of its operating conditions.

ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Condition	Min	Typ	Max	Units
Shutdown Supply Current		$V_{EN} = 0V$		1.0	3.0	μA
Supply Current		$V_{EN} = 2.0V$, $V_{FB} = 1.0V$		1.3	1.5	mA
Feedback Voltage	V_{FB}	$4.75V \leq V_{IN} \leq 23V$	0.900	0.925	0.950	V
Feedback Overvoltage Threshold				1.1		V
Error Amplifier Voltage Gain ⁽³⁾	A_{EA}			400		V/V
Error Amplifier Transconductance	G_{EA}	$\Delta I_C = \pm 10\mu A$		820		$\mu A/V$
High-Side Switch On-Resistance ⁽³⁾	$R_{DS(ON)1}$			100		m Ω
Low-Side Switch On-Resistance ⁽³⁾	$R_{DS(ON)2}$			100		m Ω
High-Side Switch Leakage Current		$V_{EN} = 0V$, $V_{SW} = 0V$		0	10	μA
Upper Switch Current Limit		Minimum Duty Cycle	4.0	5.8		A
Lower Switch Current Limit		From Drain to Source		0.9		A
COMP to Current Sense Transconductance	G_{CS}			5.2		A/V
Oscillation Frequency	F_{osc1}			380		KHz
Short Circuit Oscillation Frequency	F_{osc2}	$V_{FB} = 0V$		110		KHz
Maximum Duty Cycle	D_{MAX}	$V_{FB} = 1.0V$		90		%
Minimum On Time ⁽³⁾	T_{ON}			210		ns
EN Shutdown Threshold Voltage		V_{EN} Rising	1.1	1.5	2.0	V
EN Shutdown Threshold Voltage Hysteresis				220		mV



ELECTRICAL CHARACTERISTICS *(continued)*

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

Parameter	Symbol	Condition	Min	Typ	Max	Units
EN Lockout Threshold Voltage			2.2	2.5	2.7	V
EN Lockout Hysteresis				210		mV
Input Under Voltage Lockout Threshold		V_{IN} Rising		4.3		V
Input Under Voltage Lockout Threshold Hysteresis				210		mV
Soft-Start Current		$V_{SS} = 0V$		6		μA
Soft-Start Period		$C_{SS} = 0.1\mu F$		15		ms
Thermal Shutdown ⁽³⁾				160		$^{\circ}C$

Note:

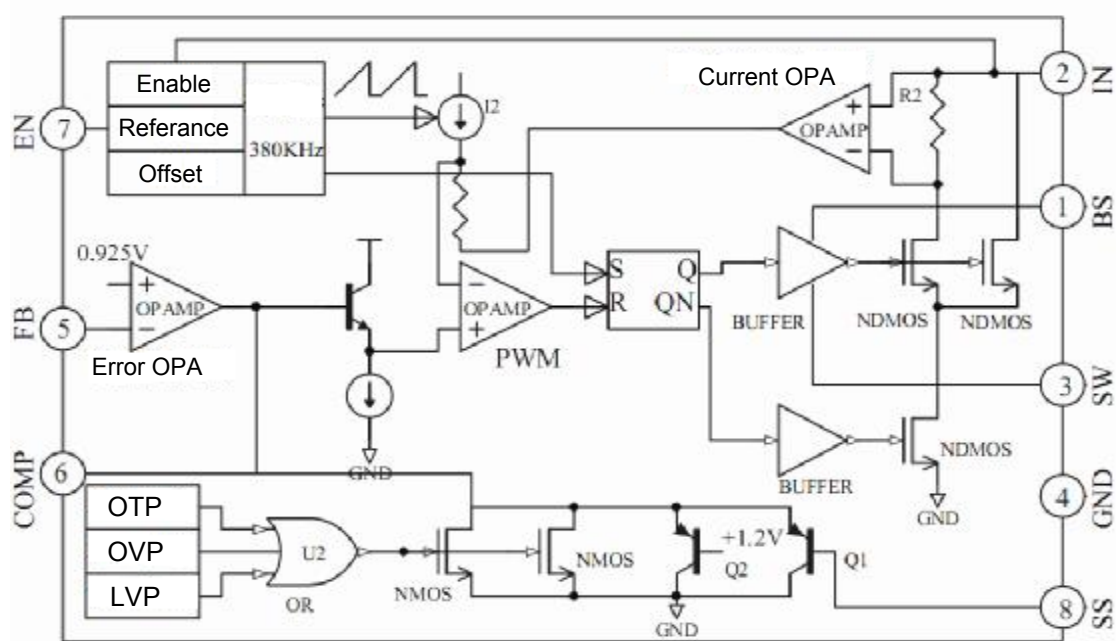
3) Guaranteed by design, not tested.



PIN FUNCTIONS

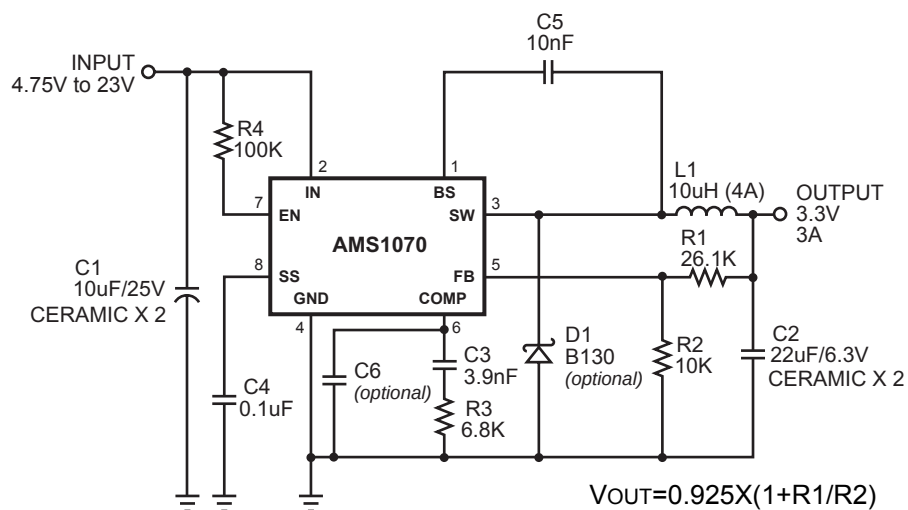
Pin #	Name	Description
1	BS	High-Side Gate Drive Boost Input. BS supplies the drive for the high-side N-Channel MOSFET switch. Connect a 0.01 μ F or greater capacitor from SW to BS to power the high side switch.
2	IN	Power Input. IN supplies the power to the IC, as well as the step-down converter switches. Drive IN with a 4.75V to 23V 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 (Connect the exposed pad to Pin 4).
5	FB	Feedback Input. FB senses the output voltage and regulates it. Drive FB with a resistive voltage divider connected to it from the output voltage. The feedback threshold is 0.925V.
6	COMP	Compensation Node. COMP is used to compensate the regulation control loop. Connect a series RC network from COMP to GND. 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; low to turn it off. Attach to IN with a 100k Ω pull up 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 μ F capacitor sets the soft-start period to 15ms. To disable the soft-start feature, leave SS unconnected.

Functional Block Diagram





TYPICAL APPLICATION CIRCUIT



AMS1070 with 3.3V Output, 22uF/6.3V Ceramic Output Capacitor

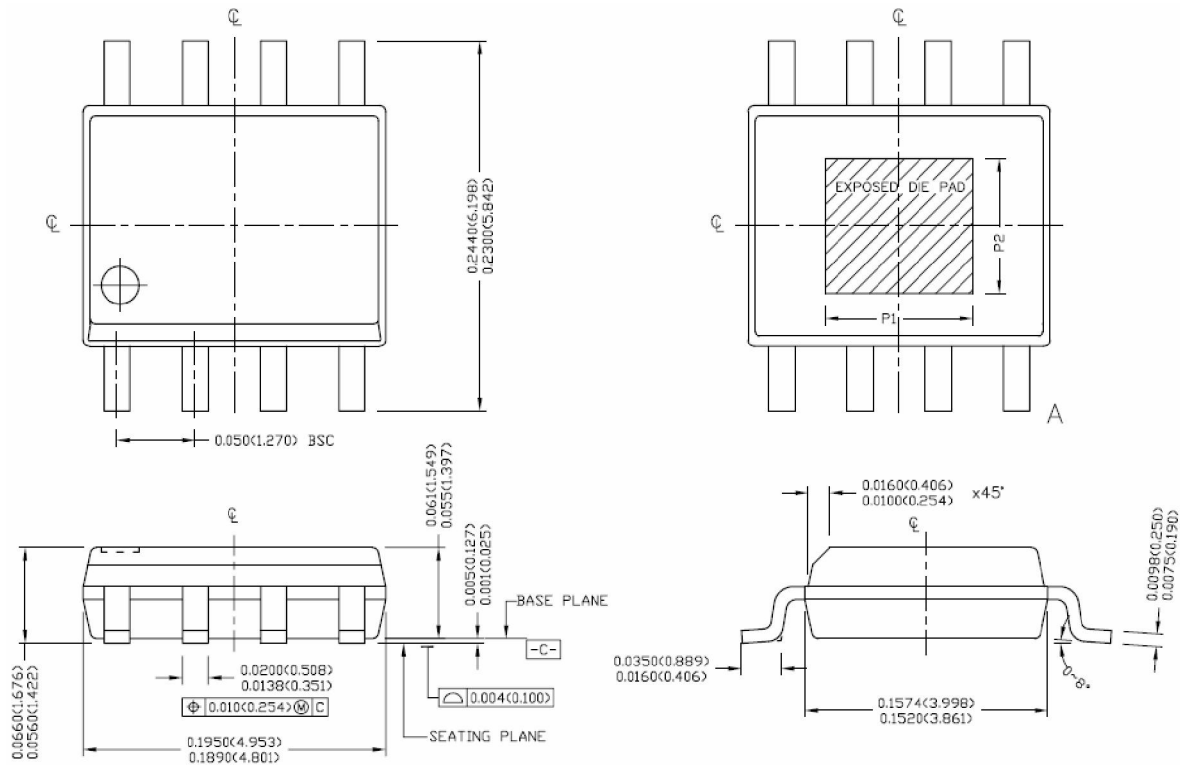
Recommended Resistance Values

VOUT	R1	R2
1.8V	9.53K	10K
2.5V	16.9K	10K
3.3V	26.1K	10K
5V	44.2K	10K
12V	121K	10K



Packaging

ESOP8



NOTE:

1) Control dimension is in inches. Dimension in bracket is millimeters.