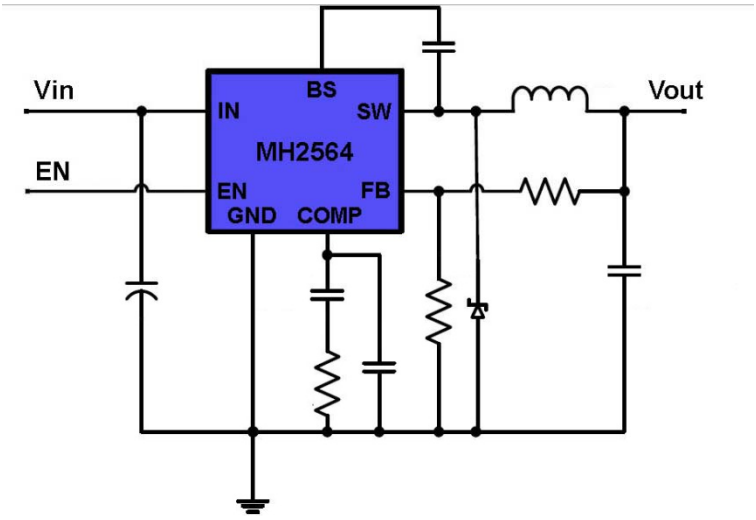
Description

The MH2564 is current-mode step-down DC-DC converter that generates up to 2A outputcurrent. consuming only 8μA in shut down mode,
The MH2564 is highly efficient with peak efficiency at 95% when in operation. Protection features include cycle-by-cycle current limit, the rmal shut down, and frequency fold back at short circuit.
The MH2564 is available in SOP-8 Package and requires very few external devices for operation.

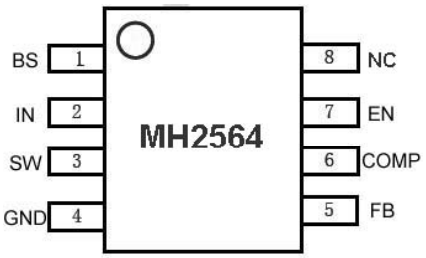
Features

2A Output Current
Up to 95% Efficiency
Up to 18V Input Range
8μA Shutdown Supply Current
Up to 95% Efficiency
Fixed 210KHz Frequency
Adjustable Output Voltage
Cycle-by-Cycle OverCurrent Protection
Thermal Shutdown Protection
Frequency Fold Back at ShortCircuit
Stability with WideRange of Capacitors
Thermally Enhanced 8-Pin SOP Package

Typical Application



Package



Pin Assignment

Pin No.	Pin Name	Descripition
1	BS	Bootstrap. This pin acts as the positive rail for the high-side switch's gate driver. Connect a 10nF between this pin and SW.
2	IN	Input Supply. Bypass this pin to G with a low ESR capacitor. See Input Capacitor in Application Information section.
3	SW	Switch Output. Connect this pin to the switching end of the inductor.
4	GND	Ground
5	FB	Feedback Input. The voltage at this pin is regulated to 1.22V. Connect to the resistor divider between output and ground to set output voltage.
6	COMP	Compensation Pin. See Compensation Technique in Application Information section.
7	EN	Enable Input. When higher than 1.3V, this pin turns the IC on. When lower than 0.7V, this pin turns the IC off. Output voltage is discharged when the IC i s off. This pin has a small internal pull up current to a high level voltage when pin is not connected.
8	NC	Not Connected.

Absolute Maximum Ratings

PARAMETER	Value	Unit
IN Supply Voltage	- 0.3 ~ 18	V
SW Voltage	- 1 ~ VIN + 1	V
BS Voltage	VSW – 0.3 to VSW + 8	V
EN,FB,COMP Voltage	– 0.3 ~ + 6	V
Continuous SW Current	Internally limited	A
Junction to Ambient Thermal Resistance(θJA)	105	℃/W
Operating Junction Temperature	-40 ~ 150	℃
Storage Temperature	-55 ~150	℃
Lead Temperature (Soldering,10sec)	270	℃

Electronic Characteristics

VIN=12V,TA = +25℃, unless otherwise noted.

Parameter	Symbo	Test Condition	Min	Typ	Max	Unit
Input Voltage	Vin	VOUT = 5V,ILOAD = 1A	6		18	V
Input UVLO				4.0		V
Feedback Voltage	VFB	VCOMP = 1.5V	1.196	1.22	1.244	V
High-Side Switch On Resistance	RONH			0.3		Ω
Low- Side Switch On Resistance	RONL			8		Ω
SW Leakage		VEN = 0		0	10	uA
Current Limit	ILIM		3	3.3		A
COMP to Current Limit Transconductance	GCOMP			1.8		A/V
Error Amplifier Transconductance	GEA	ΔICOMP = ±10μA		550		uA/V
Error Amplifier DC Gain	AVEA			4000		V/V
Switching Frequency	fSW		190	225	240	KHz
Short Circuit Switching Frequency		VFB = 0		50		KHz
Maximum Duty Cycle	DMAX	VFB = 1.1V		92		%
Minimum Duty Cycle		VFB = 1.3V			0	%
Enable Threshold Voltage		Hysteresis = 0.2V	0.5	1	1.3	V
Enable PullUp Current		Pin pulled up to 4.5V typically when left unconnected		1		uA
Supply Currentin Shutdown		VEN = 0		8	2.0	uA
IC Supply Currentin Operation		VEN = 3V,VFB = 1.3V		0.7		mA
Soft-start Period				10		ms
Thermal Shutdown				150		℃

Application Information

1. Setting the Output Voltage

The output voltage is set using a resistive voltage divider from the output voltage to FB (see Typical Application circuit on page1).The voltage divider divides the output voltage down by the ratio : $R_{FB1} = R_{FB2} \times$（Vout /1.22V -1）

2. Inductor

The inductor is required to supply constant current to the output load while being driven by the Switched input voltage. A larger value inductor will resultin less ripple current that will result In lower output ripple voltage. However, the larger value inductor will have a larger physical size, higher series resistance, and /or lower saturation current. A good rule for determining the Inductance to use is to allow the peak-to-peak ripple current in the inductor to be approximately 30% of the maximum switch current limit. Also, make sure that the peak inductor current is Below the maximum switch current limit. The inductance value can be calculated by:

$$L = \frac{V_{OUT}}{f_S \times \Delta I_L} \times \left(1 - \frac{V_{OUT}}{V_{IN}}\right)$$

Where VOUT is the output voltage, VIN is the input voltage,fSisthe switching frequency, and ΔIL is the peak-to-peak inductor ripple current.

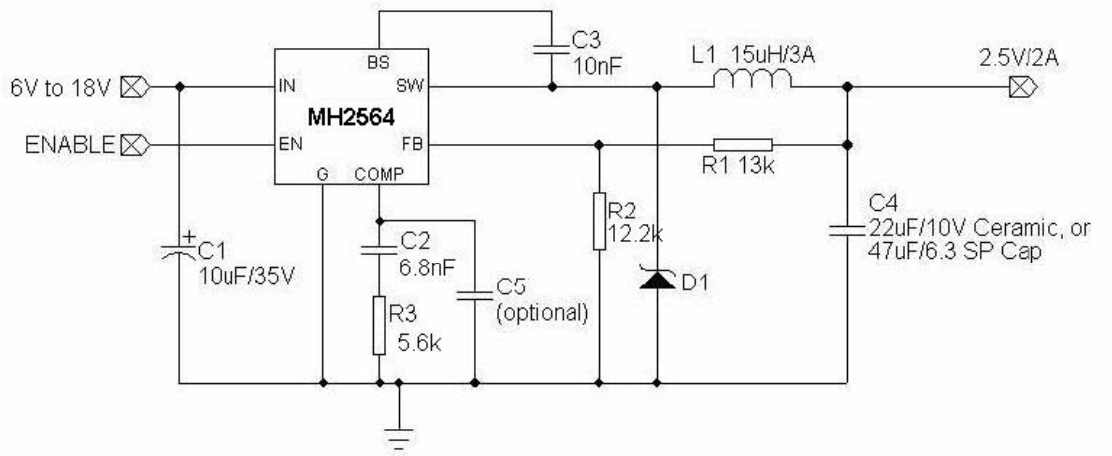
Typical Inductor Values

Vout	1.5V	1.8V	2.5V	3.3V	5V
L	10uH	10uH	15uH	22uH	33uH

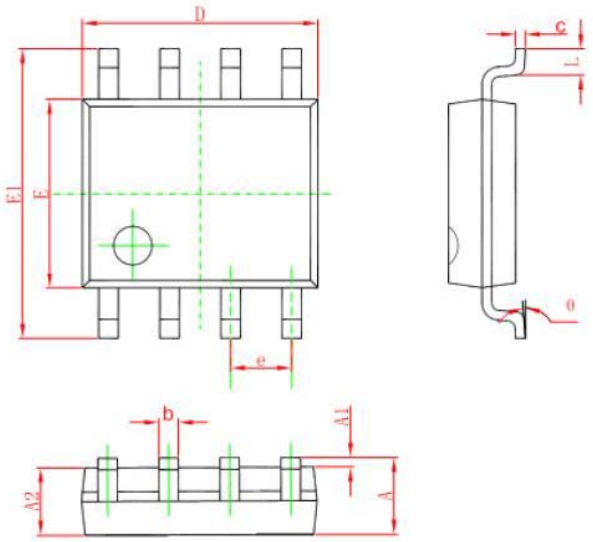
Output Voltages and Output Capacitors

Vout	Cout	Rcom	Ccomp	Ccomp2
2.5V	22μF Ceramic	5.6 kΩ	6.8 nF	None
3.3V	22μF Ceramic	7.2 kΩ	2.2 nF	None
5V	22μF Ceramic	10 kΩ	1.5 nF	None
2.5V	47μF SPCap	15 kΩ	1.5 nF	None
3.3V	47μF SPCap	15 kΩ	1.8 nF	None
5V	47μF SPCap	15 kΩ	2.7 nF	None
2.5V	470μF/6.3V/30m	15 kΩ	15 nF	1 nF
3.3V	470μF/6.3V/30m	15 kΩ	22 nF	1 nF
5V	470μF/6.3V/30m	15 kΩ	27 nF	None

Typical Application Circuits



SOP8 Package Outline



Symbol	Dimensions In Millimoters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270（BSC）		0.050（BSC）	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°