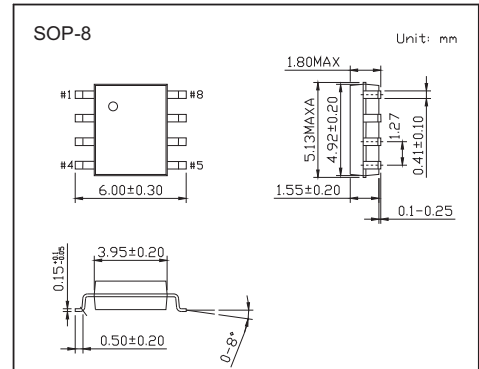


2A, 18V Synchronous Rectified Step-Down Converter

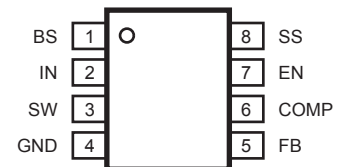
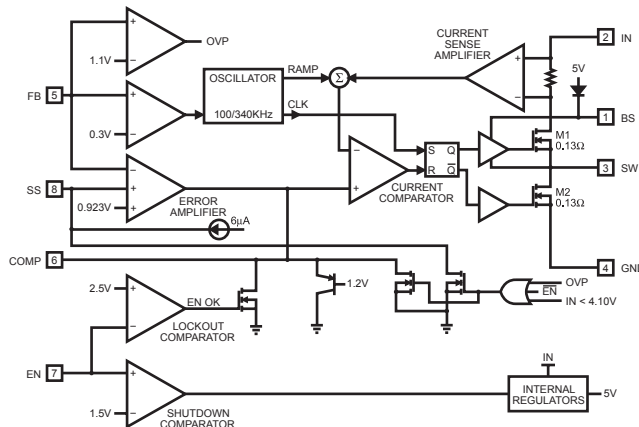
MP1482

■ Features

- 2A Output Current
- Wide 4.75V to 18V Operating Input Range
- Integrated 130mΩ Power MOSFET Switches
- Output Adjustable from 0.923V to 15V
- Up to 93% Efficiency
- Programmable Soft-Start
- Stable with Low ESR Ceramic Output Capacitors
- Fixed 340KHz Frequency
- Cycle-by-Cycle Over Current Protection
- Input Under Voltage Lockout



■ Functional Block Diagram



■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Input Voltage	V_{in}	-0.3 to 20	V
Switch Voltage	V_{sw}	21	V
Boot Strap Voltage	V_{bs}	$V_{sw}-0.3V$ to $V_{sw}+6$	V
All Other Pins		-0.3 to 6V	V
Power Dissipation	P_D	1300	mW
Thermal Resistance	$R_{\theta JA}$	90	$^\circ\text{C}/\text{W}$
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to 150	$^\circ\text{C}$
Lead Temperature	T_L	260	$^\circ\text{C}$

■ Recommended Operating Conditions

Input Voltage	V_{in}	4.75 to 18	V
Output Voltage	V_{out}	0.923 to 15	V
Operating Temperature	T_A	-40 to 85	$^\circ\text{C}$

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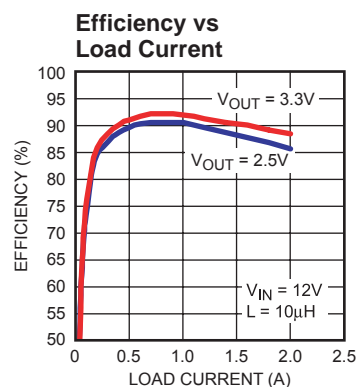
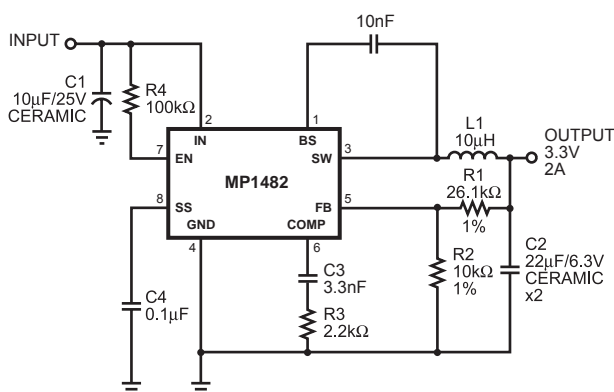
■ Electrical Characteristics (Ta = 25°C, VIN=12V, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Units
Shutdown Supply Current		$V_{EN} = 0V$		1	3.0	μA
Supply Current		$V_{EN} = 2.0V; V_{FB} = 1.0V$		1.3	1.5	mA
Feedback Voltage	V_{FB}	$4.75V \leq V_{IN} \leq 18V$	0.900	0.923	0.946	V
Feedback Overvoltage Threshold				1.1		V
Error Amplifier Voltage Gain ⁽⁴⁾	A_{EA}			400		V/V
Error Amplifier Transconductance	G_{EA}	$\Delta I_C = \pm 10\mu A$		800		$\mu A/V$
High-Side Switch On Resistance ⁽⁴⁾	$R_{DS(ON)1}$			130		m Ω
Low-Side Switch On Resistance ⁽⁴⁾	$R_{DS(ON)2}$			130		m Ω
High-Side Switch Leakage Current		$V_{EN} = 0V, V_{SW} = 0V$			10	μA
Upper Switch Current Limit		Minimum Duty Cycle	2.4	3.4		A
Lower Switch Current Limit		From Drain to Source		1.1		A
COMP to Current Sense Transconductance	G_{CS}			3.5		A/V
Oscillation Frequency	F_{osc1}			340		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 ⁽⁴⁾				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
Input Under Voltage Lockout Threshold		V_{IN} Rising	3.80	4.10	4.40	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 ⁽¹⁾				160		$^{\circ}C$

Note:

1) Guaranteed by design, not tested.

■ Typical Characteristics

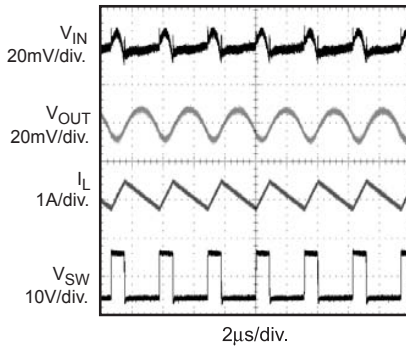


MP1482

Typical Characteristics

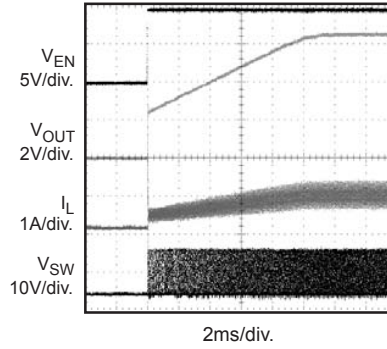
Steady State Test

$V_{IN} = 12V$, $V_{OUT} = 3.3V$
 $I_{OUT} = 0A$, $I_{IN} = 8.2mA$



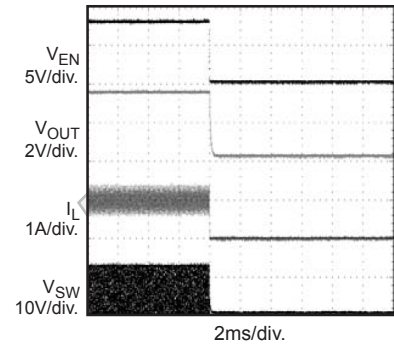
Startup through Enable

$V_{IN} = 12V$, $V_{OUT} = 3.3V$
 $I_{OUT} = 1A$ (Resistance Load)



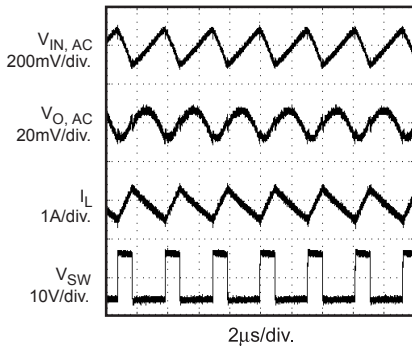
Shutdown through Enable

$V_{IN} = 12V$, $V_{OUT} = 3.3V$
 $I_{OUT} = 1A$ (Resistance Load)



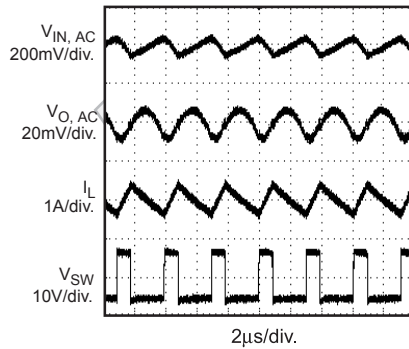
Heavy Load Operation

2A Load



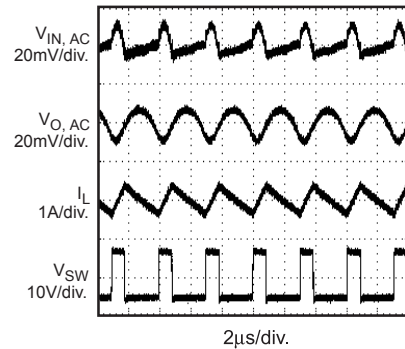
Medium Load Operation

1A Load

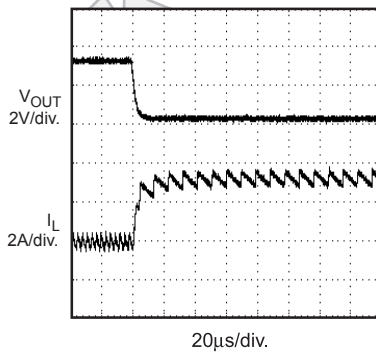


Light Load Operation

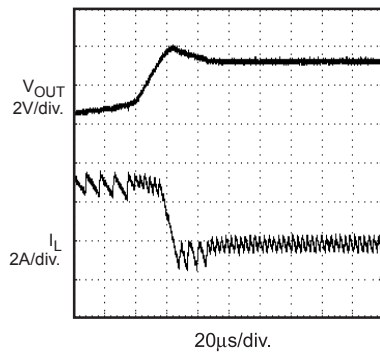
No Load



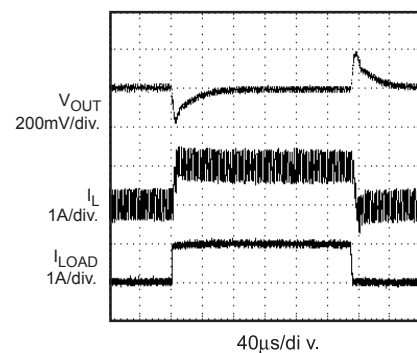
Short Circuit Protection



Short Circuit Recovery

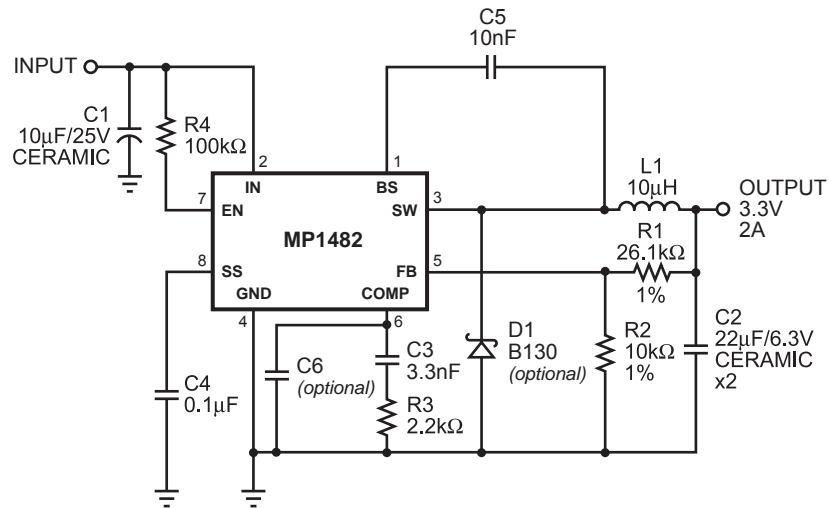


Load Transient



MP1482

■ TYPICAL APPLICATION CIRCUIT



MP1482 with 3.3V Output, 22μF/6.3V Ceramic Output Capacitor