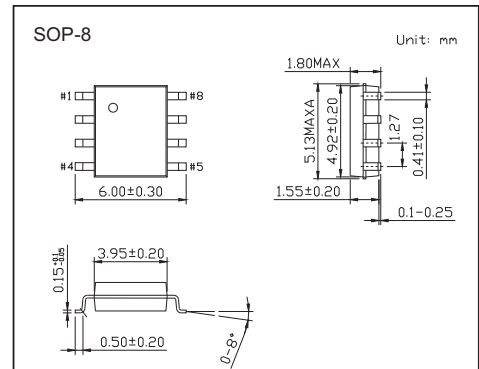


3A, 23V, 340KHz Synchronous Rectified Step-Down Converter

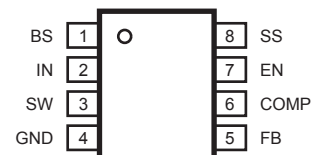
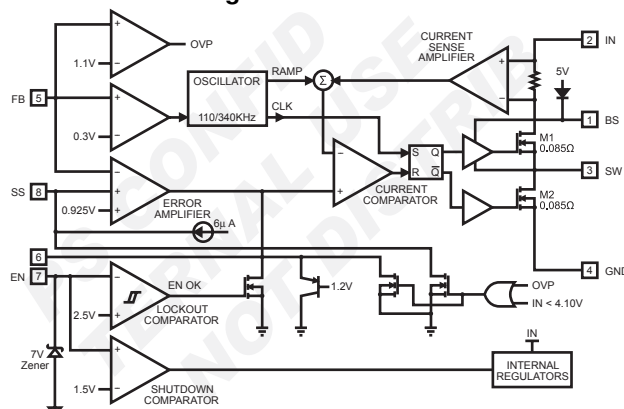
MP1484

■ Features

- 3A Continuous Output Current
- Wide 4.75V to 23V Operating Input Range
- Integrated 85mΩ 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 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 24	V
Switch Voltage	V_{sw}	-1 to $V_{in} + 0.3$	V
Boot Strap Voltage	V_{bs}	$V_{sw} - 0.3\text{V}$ to $V_{sw} + 6$	V
All Other Pins		-0.3 to 6V	V
Power Dissipation	P_D	2.5	mW
Thermal Resistance	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
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 23	V
Output Voltage	V_{out}	0.925 to 20	V
Operating Temperature	T_A	-20 to 85	$^\circ\text{C}$

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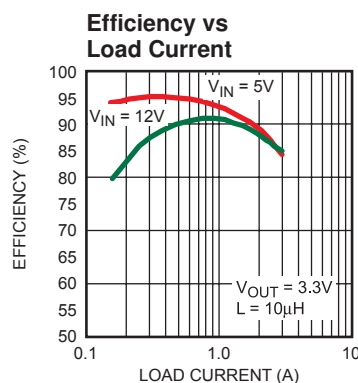
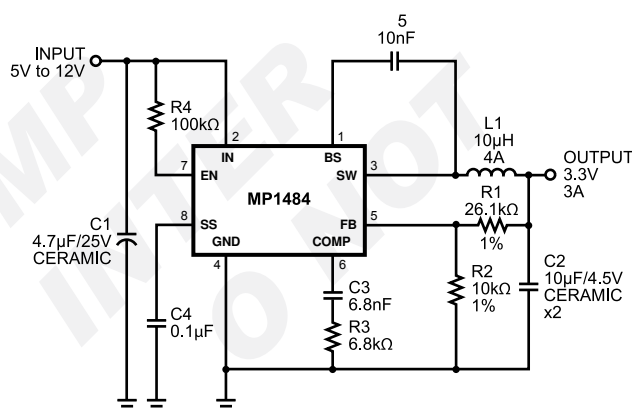
■ Electrical Characteristics ($T_a = 25^\circ\text{C}$, $V_{IN}=12\text{V}$, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Units
Shutdown Supply Current		$V_{EN} = 0\text{V}$		0.3	3.0	μA
Supply Current		$V_{EN} = 2.0\text{V}$, $V_{FB} = 1.0\text{V}$		1.3	1.5	mA
Feedback Voltage	V_{FB}	$4.75\text{V} \leq V_{IN} \leq 23\text{V}$	0.900	0.925	0.950	V
Feedback Overvoltage Threshold				1.1		V
Error Amplifier Voltage Gain ⁽⁴⁾	A_{EA}			400		V/V
Error Amplifier Transconductance	G_{EA}	$\Delta I_C = \pm 10\mu\text{A}$		820		$\mu\text{A/V}$
High-Side/Low-Side Switch On-Resistance ⁽⁴⁾				85		$\text{m}\Omega$
High-Side Switch Leakage Current		$V_{EN} = 0\text{V}$, $V_{SW} = 0\text{V}$		0	10	μA
Upper Switch Current Limit		Minimum Duty Cycle	3.8	5.3		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}		300	340	380	KHz
Short Circuit Oscillation Frequency	F_{osc2}	$V_{FB} = 0\text{V}$		110		KHz
Maximum Duty Cycle	D_{MAX}	$V_{FB} = 1.0\text{V}$		90		$\%$
Minimum On Time ⁽⁴⁾	T_{ON}			220		ns
EN Shutdown Threshold Voltage		V_{EN} Rising	1.1	1.5	2.0	V
EN Shutdown Threshold Voltage Hysteresis				220		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	4.05	4.40	V
Input Under Voltage Lockout Threshold Hysteresis				210		mV
Soft-Start Current		$V_{SS} = 0\text{V}$		6		μA
Soft-Start Period		$C_{SS} = 0.1\mu\text{F}$		15		ms
Thermal Shutdown ⁽¹⁾				160		$^\circ\text{C}$

Note:

1) Guaranteed by design, not tested.

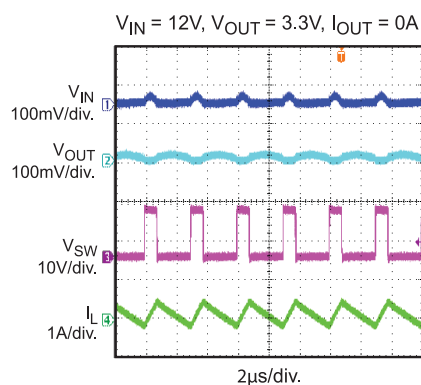
■ TypIacl Characteristics



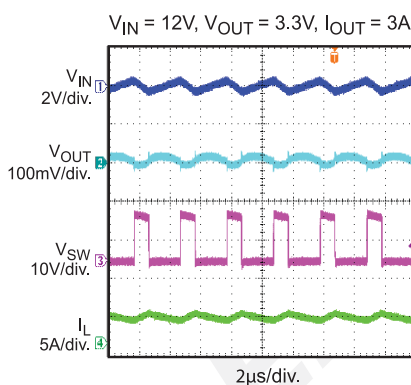
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■ Typical Characteristics

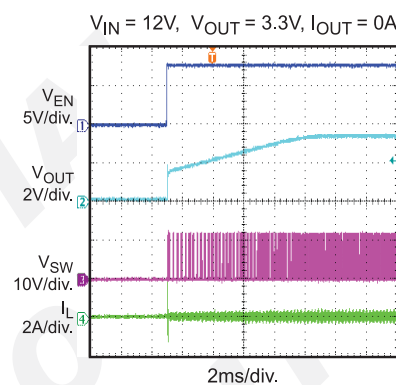
Steady State Test Waveforms



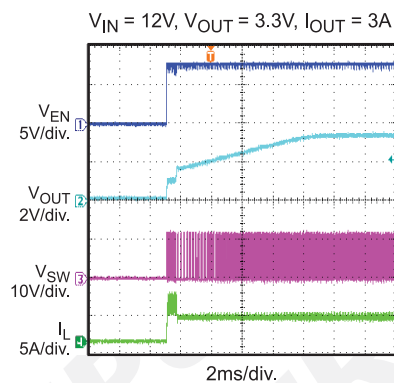
Steady State Test Waveforms



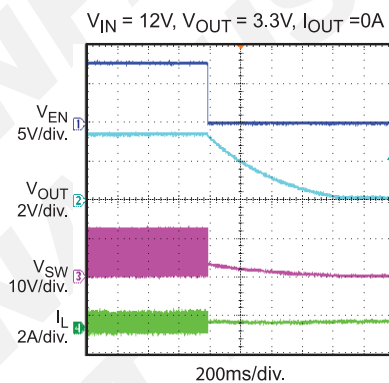
Startup through Enable Waveforms



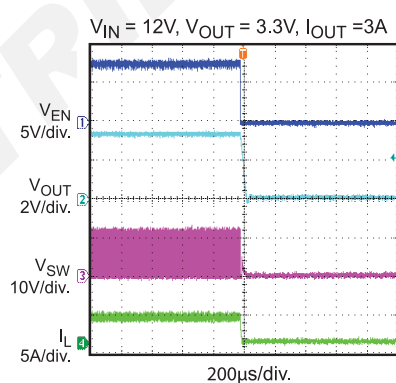
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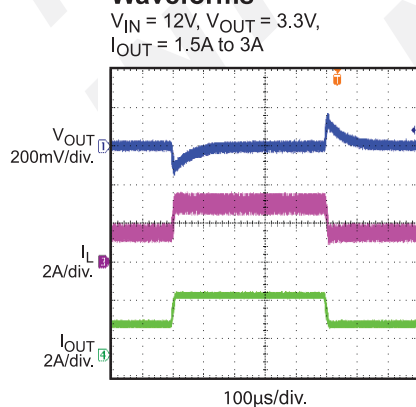
Shutdown Through Enable Waveforms



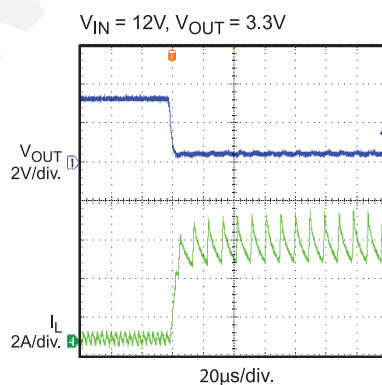
Shutdown Through Enable Waveforms



Load Transient Test Waveforms



Short Circuit Test Waveforms



Short Circuit Recovery Waveforms

