

POWER MANAGEMENT

PRELIMINARY

Description

The SC1418 is a fixed off time, current mode, step up DC/DC converter aimed primarily at single cell applications. By using synchronous rectification conversion efficiencies of greater than 90% are achievable. The fixed off time is varied with input to output ratio to achieve constant frequency operation for a range of input voltages.

The chip is initially powered from the input voltage. Once the output is established, the chip is powered from the output.

Start up is guaranteed from a 0.9V input supply with loads less than 5mA.

The low battery monitor, including 200mV reference circuit, remains active when the part is shut down.

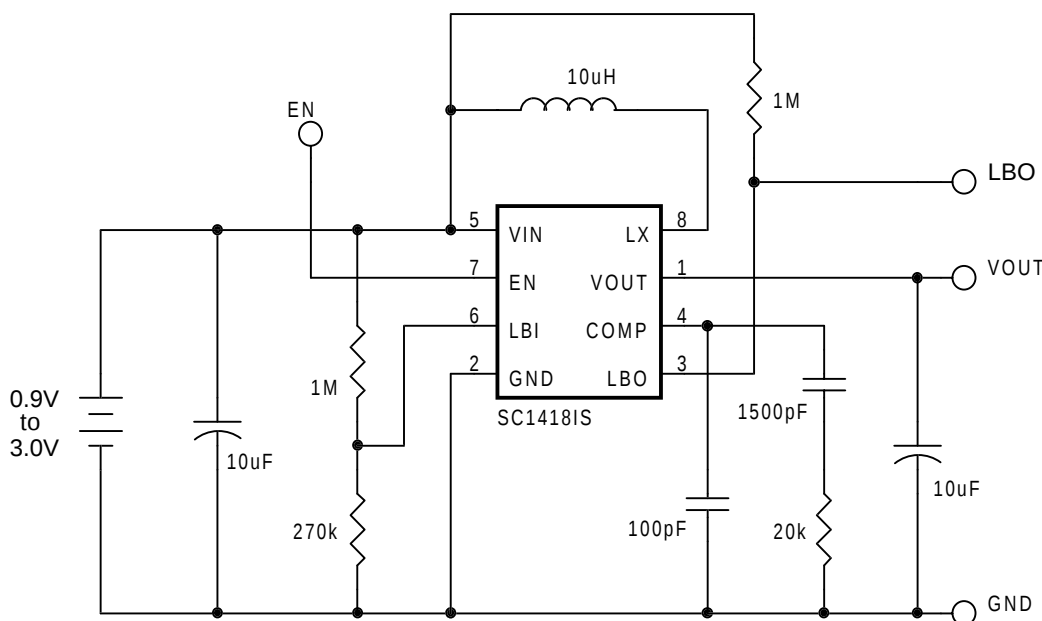
Features

- ◆ Pseudo fixed OFF time, current mode control
- ◆ Bootstrapped supply voltage
- ◆ Constant frequency over wide load range
- ◆ Fixed 3.3V output
- ◆ 180mA output load at $V_{IN} = 1.2V$
- ◆ Synchronous rectification, 550mΩ on chip PMOS
- ◆ 350mΩ on-chip power NMOS
- ◆ Up to 92% efficient at 100mA load
- ◆ Guaranteed startup at 0.9V
- ◆ Low battery monitor function
- ◆ MSOP-8 package

Applications

- ◆ PDA, MP3, Pager
- ◆ Cordless Telephone
- ◆ Hand held GPS

Typical Application Circuit



POWER MANAGEMENT**PRELIMINARY****Absolute Maximum Ratings**

Parameter	Symbol	Maximum	Units
Input Supply Voltage	V_{IN}	7	V
Output Voltage	V_{OUT}	7	V
LX Input	V_{LX}	7	V
LBI Input	V_{LBI}	-0.3 to 2	V
EN Input	V_{EN}	-0.3 to 7	V
LBO Output	V_{LBO}	-0.3 to 7	V
COMP Output	V_{COMP}	-0.3 to 2	V
Operating Ambient Temperature Range	T_A	-40 to 85	°C
Operating Junction Temperature	T_J	125	°C
Storage Temperature	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering) 10s	T_{LEAD}	300	°C
Thermal Resistance Junction to Ambient ⁽¹⁾	θ_{JA}	95	°C/W
Thermal Resistance Junction to Case	θ_{JC}	39	°C/W

Note:

(1) 1 square inch of FR4, double sided, 1oz. minimum copper weight.

Electrical Characteristics

Unless specified, $V_{IN} = 1.2V$, $V_{OUT} = 3.3V$; $T_A = -40$ to $85^\circ C$.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}	Operational		0.8	$V_{OUT}-0.3V$	V
		Startup. $I_{OUT} < 5mA$; $T_J = 0$ to $100^\circ C$	0.9			
Output Voltage	V_{OUT}	$I_{OUT} = 100mA$	3.13	3.30	3.47	V
Maximum Output Current	I_{OUT}	$V_{OUT} = 3.3V$	$V_{IN} = 0.9V$	127		mA
			$V_{IN} = 1.2V$	182		
			$V_{IN} = 1.5V$	240		
Start-up Load Current	I_{START}	$V_{IN} = 1.2V$	50			mA
NMOS Power Switch On Resistance	$R_{DS(ON)}$			190	350	$m\Omega$
PMOS Power Switch On Resistance	$R_{DS(ON)}$			280	550	$m\Omega$
NMOS Power Switch Leakage		$LX-GND = 5.5V$; $V_{EN} = 0V$		0.1	15	μA
PMOS Power Switch Leakage		$V_{OUT} - LX = 5.5V$; $V_{EN} = 0V$		0.1	10	μA
Power Switch Current Limit	I_{LIMIT}		0.7	1	1.3	A
Error Amplifier Transconductance	gm	$dl_{COMP} = 2\mu A$	70	140	240	μS
Error Amplifier Gain	$A_{V(EA)}$	$T_J = 25^\circ C$		700		
Quiescent Supply Current	I_Q	Not Switching		115	140	μA
Switching Frequency	f_{OSC}	Continuous inductor current $1.2V \leq V_{IN} \leq 2.5V$	420	600	780	kHz
Shutdown Current	$I_{Q(SHDN)}$	$V_{EN} = 0V$		36	50	μA
Low Battery Monitor						
Low Battery Input Voltage Threshold	V_{LBI}	$T_J = 25^\circ C$	190	200	210	mV
LBI Input Current	I_{LBI}	$V_{LBI} = 200mV$		-25	-50	nA
Low Battery Output	$V_{LBO(L)}$	$I_{LBO} = 10\mu A$		150		mV
Low Battery Detector Gain	$A_{V(LB)}$	$1M\Omega$ load (V_{IN} to LBO); $T_J = 25^\circ C$		1000		
Logic Inputs						
Enable Input Voltage	$V_{EN(H)}$	$V_{IN} = 2.5V$	0.80			V
	$V_{EN(L)}$				0.20	V

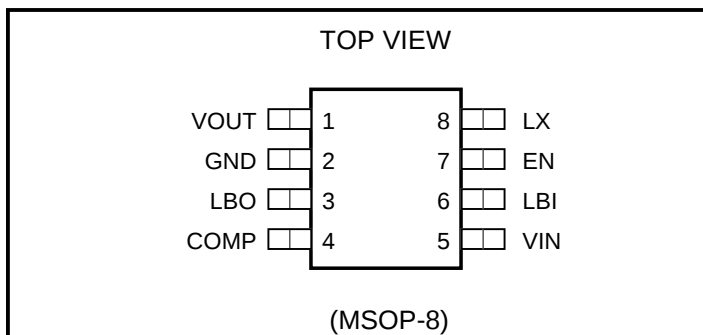
Note:

(1) This device is ESD sensitive. Use of standard ESD handling precautions is required.

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Pin Configuration



Ordering Information

Part Numbers	Package
SC1418IMSTR ⁽¹⁾	MSOP-8

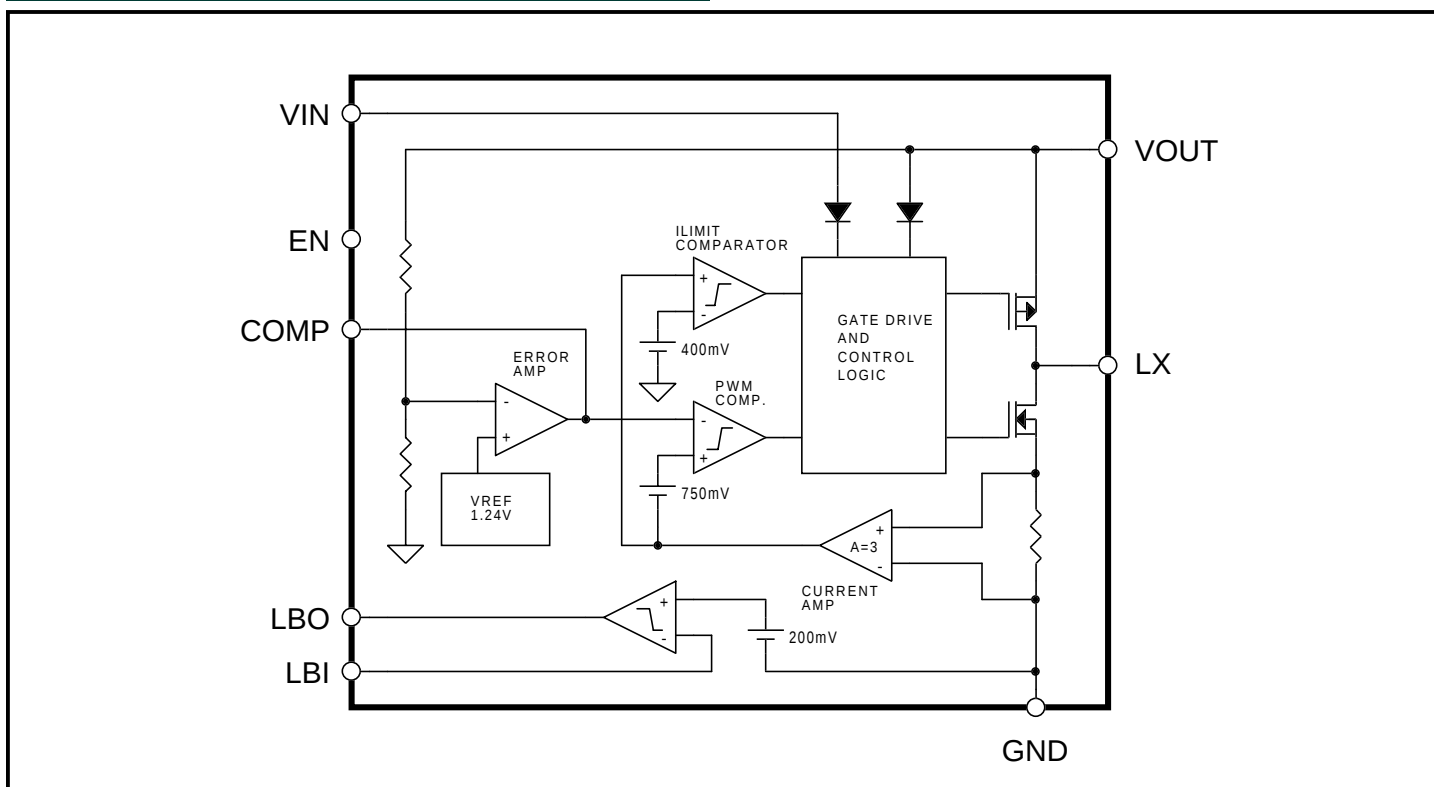
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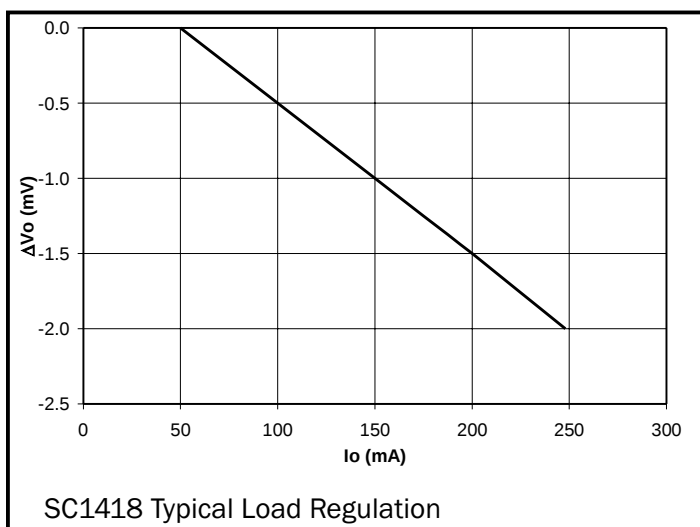
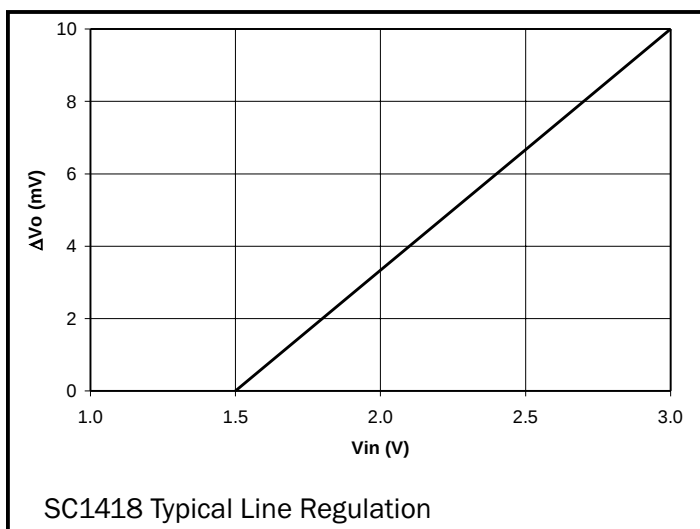
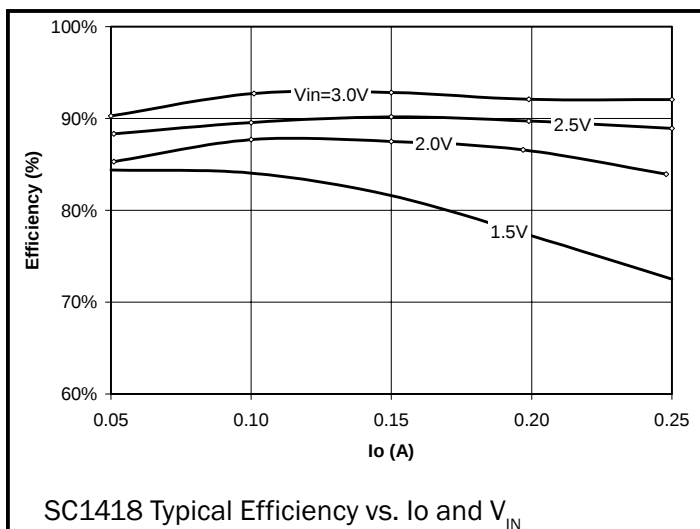
(1) Only available in tape and reel packaging. A reel contains 2500 devices.

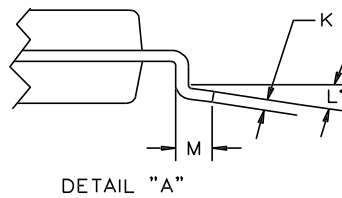
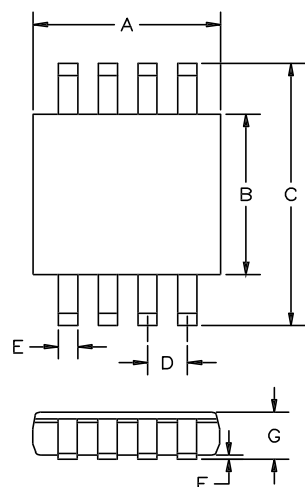
Pin Descriptions

Pin #	Pin Name	Pin Function
1	VOUT	Output Voltage.
2	GND	Ground
3	LBO	Low battery monitor output.
4	COMP	Compensation pin. Output of error amplifier.
5	VIN	Battery supply pin.
6	LBI	Low battery monitor input.
7	EN	Enable pin. Can be hard wired for start up on battery insertion. Pulling this pin low will shutdown the part.
8	LX	Phase Node, Input Inductor connects here.

Block Diagram



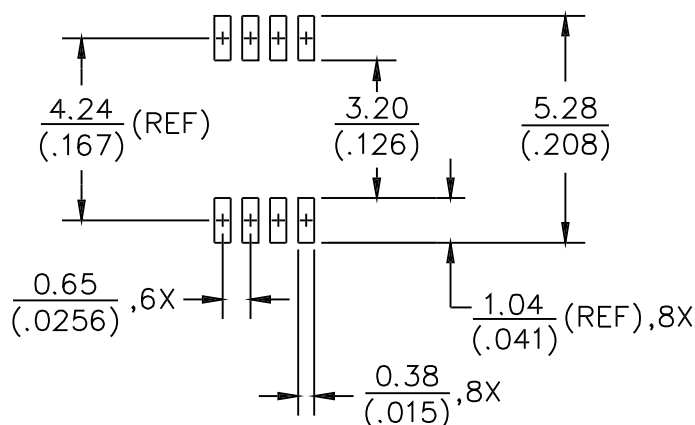
Typical Characteristics


Outline Drawing - MSOP-8


DIM ^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.114	.122	2.90	3.10	
B	.114	.122	2.90	3.10	
C	.187	.199	4.75	5.05	
D	.025	BSC	.65	BSC	
E	.010	.016	.25	.40	
F	.002	.006	.05	.15	
G	—	.043	—	1.10	
K	.005	.009	.13	.23	
L	0°	6°	0°	6°	
M	.016	.028	.40	.70	

SEE DETAIL "A"

- ② PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH AND METAL BURR.
 ① CONTROLLING DIMENSIONS: MILLIMETERS.

Land Pattern - MSOP-8


① DIMENSIONS ARE IN MILLIMETERS (INCHES).

Contact Information

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