

## SS8392 High Efficiency DC-DC Boost Regulator

#### **Features**

- Min1.6V Startup @1mA Load
- 600mV Feedback Voltage
- 550KHz Internal Oscillator
- Soft Startup: 10mS Typical
- Peak Current Programmable by Bottom Sensing Resistor
- 300μA Typical Iq

- Internal PWM/PFM Auto Mode Switching
- Up to 90% Efficiency
- External Enable
- Power OFF Current<1µA</li>
- Over Voltage Protection
- 140°C Thermal Shut Down, 20°C Hysteresis

#### **Applications**

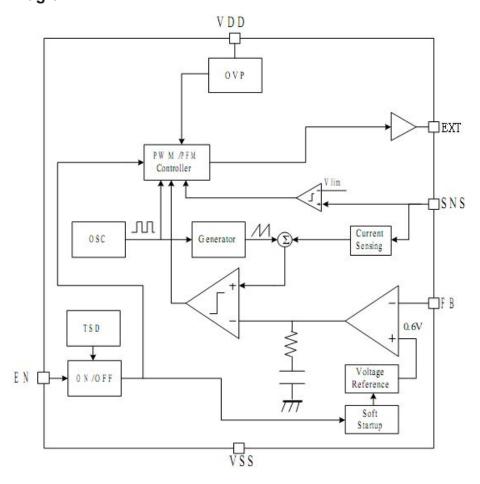
USB Charger

#### **General Description**

The SS8392 using the external NMOSFET. It is a high efficiency boost converter with 600mV feedback voltage. A switching frequency of 550KHz minimizes solution footprint by allowing the use of tiny low profile inductors and ceramic capacitors. The

current mode PWM/PFM design is internally compensated, and the device has a 1.6V startup voltage with 1mA load. It needs few external components, only inductance, resistance and capacitance can meet the driving capacity.

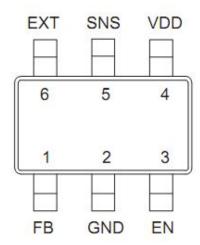
#### **Block Diagram**



Ver1.2 Feb 22,2013

#### **Pin Assignment**

PIN NUMBER	PIN NAME	FUNCTION	
I III NOMBER	I IIV IVINIE	TONOTION	
1	FB	Feedback Input	
2	GND	Power Ground	
3	EN	Enable. High Active	
4	VDD	Power Supply	
5	SNS	Switching Node	
6	EXT	Power MOSFET Gate Driver	



#### **Absolute Maximum Ratings**

Power Supply Voltage	2.8V to 7.5V	Quiescent	Current 450uA
Feedback Voltage	600mV		

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

#### **Thermal Information**

Implementation of integrated circuits in low-profile and fine-pitch surface-mount packages typically requires special attention to power dissipation. Many system-dependent issue such as thermal coupling, airflow, added heat sinks and convection surfaces, and the presence of other heat-generating components affect the power-dissipation limits of a given component.

Three basic approaches for enhancing thermal performance follow.

- Improving the power dissipation capability of the PCB design
- Improving the thermal coupling of the component to the PCB
- Introducing airflow in the system

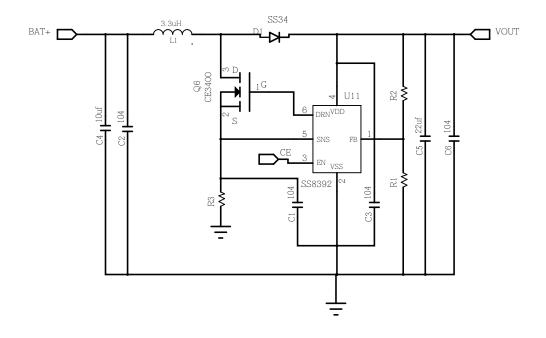
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#### **Electrical Characteristics**

(VDD = 5 V, Ta = 25℃, Unless otherwise specified)

PARAMETER SYMB OL NO TYP MAX UNITS CONDITION  Power Supply Voltage for normal operation  Min Input Startup Voltage WST1				( ( )	- 0 V \	1a - 25 C	, Offices officiwise specified)
Power Supply Voltage for normal operation	PARAMETER		MIN	TYP	MAX	UNITS	CONDITION
normal operation         Min Input Startup Voltage         VST1         1.6         V         1mA load, VDD tied to VOUT           Input Startup Voltage with Heavy Load         VST2         2.6         V         VDD tied to VOUT           Heavy Load         William Voltage         VFB         600         mV         VDD tied to VOUT           Feedback Voltage         VFB         600         mV         Feedback Voltage         VFBTC         130         ppm/'C           Feedback Voltage         VFBTC         130         ppm/'C         Close Loop. Varying VDD by adjusting Resistor Divider Ratio           Feedback Voltage Supply         Vreg         0.2         %/A         Close Loop. Varying VDD by adjusting Resistor Divider Ratio           Load Regulation         I reg         0.3         %/A         No Switching           OFF current         I off         1         uA         No Switching           OFF current         I off         1         uA         No Switching           Obustoor Frequency         fosc         550         KHz           Max Duty         Dmax         90         %           Duty boundary for PWM/PFM         Dmin         15         %           Current Limit Set Voltage         Vim         250 <td< td=""><td>Power Supply Voltage for</td><td></td><td>2.8</td><td></td><td>7</td><td>V</td><td>For normal operation after start-up</td></td<>	Power Supply Voltage for		2.8		7	V	For normal operation after start-up
Min Input Startup Voltage         VST1         1.6         V         1mA load, VDD tied to VOUT           Input Startup Voltage with Heavy Load         VST2         2.6         V         VDD tied to VOUT           Heavy Load         Min Input Hold Voltage         VHLD         0.9         V         VDD tied to VOUT           Feedback Voltage         VFB         600         mV           Feedback Voltage         VFBTC         130         ppm/°C           Temperature Coefficient         Feedback Voltage Supply         Vreg         0.2         %/V         Close Loop. Varying VDD by adjusting Resistor Divider Ratio           Load Regulation         Ireg         0.3         %/A         No Switching           Quiescent Current         Iq         350         uA         No Switching           OFF current         Ioff         1         uA         No Switching           OFF current         Ioff         1         uA         No Switching           OFF current         Ioff         1         uA         No Switching           Obustour Specification         Dmax         90         %         What Intervel Int		,,,,	2.0		,		To normal operation also start up
Heavy Load   Min Input Hold Voltage	· .	VST1		1.6		V	1mA load, VDD tied to VOUT
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Feedback Voltage VFB 600 mV  Feedback Voltage VFBTC 130 ppm/°C  Temperature Coefficient  Feedback Voltage Supply Vreg 0.2 %/V Close Loop. Varying VDD by adjusting Resistor Divider Ratio  Load Regulation Ireg 0.3 %/A  Quiescent Current Iq 350 uA No Switching  OFF current Ioff 1 uA  Oscillator Frequency fosc 550 KHz  Max Duty Dmax 90 %  Duty boundary for PWM/PFM Dmin 15 %  Current Limit Set Voltage Vlim 250 mV  DRV PMOS On Resistor Ronp 10 Ohm Min measured at 3V VDD  DRV NMOS On Resistor Ronn 7.5 Ohm Min measured at 3V VDD  DRV PMOS Max Output Imaxp 230 mA Min measured at 3V VDD  Current  DRV NMOS MAX Output Imaxn 190 mA Min measured at 3V VDD  Current FB OVP Threshold Vovp 720 mV Measured at FB  FB OVP Hysteresis Vophys 100 mV Measured at FB  TSD Threshold TSD 140 degc  TSD Hysteresis TSDhy 20 degc  EN High Level VL 0.3 V	Heavy Load						
Feedback Voltage Temperature Coefficient Feedback Voltage Supply Regulation Load Regulation Ireg O.3 W/A Quiescent Current Iq Oscillator Frequency Duty boundary for PWM/PFM DRV PMOS On Resistor DRV PMOS On Resistor DRV PMOS Max Output DRV PMOS Max Output DRV PMOS MAX Output Current DRV PMOS MAX Output DRX PB OVP Physteresis TSD Threshold TSD Hysteresis TSD Hysteresis TSD Hysteresis EN High Level VI TO A  O.2 W/V Close Loop. Varying VDD by adjusting Resistor Divider Ratio AD DR/V Close Loop. Varying VDD by adjusting Resistor Divider Ratio AD DRV Close Loop. Varying VDD by adjusting Resistor Divider Ratio AD DRV MO SWitching  DRA A No Switching  HA No Switching  WA No Switching  WH  WA No Switching  WA No Switching  WA No Switching  WH  WA No Switching  No Switching  WA No Switching  WA No Switching  No Switching  WA No Switching  WA No Switching  WA No Switching  No A No	Min Input Hold Voltage	VHLD	0.9			V	VDD tied to VOUT
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DRV PMOS Max Output Current  DRV NMOS MAX Output Imaxn Current  FB OVP Threshold  TSD Threshold  TSD Hysteresis  TSD Hysteresis  EN High Level  VL  TMA  Min measured at 3V VDD  MA  Min measured at 3V VDD  MA  Min measured at 3V VDD  MA  Min measured at 3V VDD  MV  Measured at FB  Measured at FB  Measured at FB  Measured at FB  Vophys  100  MV  Measured at FB  Measured at FB  Vophys  140  degc  S  EN High Level  VH  1  V  EN Low Level  VL  0.3  V	DRV PMOS On Resistor	Ronp		10		Ohm	Min measured at 3V VDD
Current         Imaxn         190         mA         Min measured at 3V VDD           Current         FB OVP Threshold         Vovp         720         mV         Measured at FB           FB OVP Hysteresis         Vophys         100         mV         Measured at FB           TSD Threshold         TSD         140         degc           TSD Hysteresis         TSDhy         20         degc           EN High Level         VH         1         V           EN Low Level         VL         0.3         V	DRV NMOS On Resistor	Ronn		7.5		Ohm	Min measured at 3V VDD
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s         V           EN High Level         VH         1         V           EN Low Level         VL         0.3         V	TSD Threshold	TSD		140		degc	
EN High Level         VH         1         V           EN Low Level         VL         0.3         V	TSD Hysteresis	TSDhy		20		degc	
EN Low Level VL 0.3 V		s					
	EN High Level	VH	1			V	
Soft Start Time Tss 10 mS VIN=1.5V,VOUT=5V, LOAD=1mA	EN Low Level	VL			0.3	V	
	Soft Start Time	Tss		10		mS	VIN=1.5V,VOUT=5V, LOAD=1mA

### Application Circuits Power supply tied to VOUT



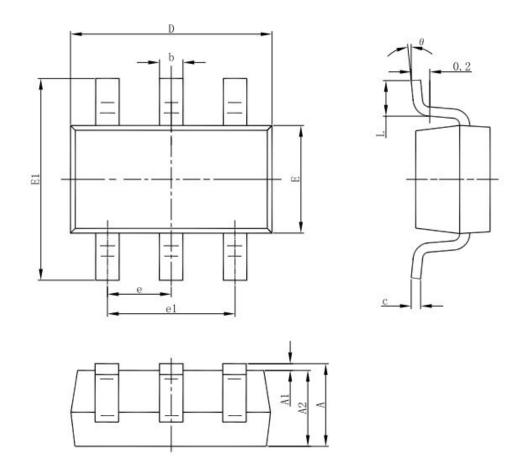
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#### 3) External Component Recommendation:

- 1) Rlim=50mOhm \*(2)
- 2) Cin=22uF
- 3) Cout=10uF \*(1)
- 4) L=3.3uH
- 5) C<sub>F</sub>=0.1uF
- \*(1) Cout needs to increase when reducing Rlim value. For example, Rlim=25mOh -> Cout=20uF
- \*(2) Selection table

Test Condition: Vin=3.3V, Vout=5V, L=3.3uH			
Rlim (mOhm)	Max load current (A)		
200	0.5		
100	1		
50	2		
25	3		

#### Package Information 6-pin SOT23-6 Outline Dimensions



O L I	Dimensions In Millimeters		Dimensions In Inches		
Symbol	Min	Max	Min	Max	
Α	1.050	1.250	0.041	0.049	
A1	0.000	0.100	0.000	0.004	
A2	1.050	1.150	0.041	0.045	
b	0.300	0.500	0.012	0.020	
С	0.100	0.200	0.004	0.008	
D	2.820	3.020	0.111	0.119	
E	1.500	1.700	0.059	0.067	
E1	2.650	2.950	0.104	0.116	
е	0.950(BSC)		0.037	(BSC)	
e1	1.800	2.000	0.071	0.079	
L	0.300	0.600	0.012	0.024	
θ	0°	8°	0°	8°	