

## 1.2A Switching Charger and 1.2A Boost in One Sot23-5 with Single Inductor

### DESCRIPTION

HM5909 is a switching Li-Ion battery charger capable of delivering up to 1.2A of charging current to the battery and also capable of delivering up to 5V/1.2A in boost operation, with high efficiency in both charging mode and boost mode. For charging, it uses a proprietary control scheme that eliminates the current sense resistor for conventional constant current control, maximizing efficiency, reducing charging time and reducing costs. It can also output a 5V voltage in the reversed direction by boosting from the battery. It only needs a single inductor to provide power bi-directionally with a proprietary automatic mode detect and switch scheme. HM5909 is an ideal all-in-one solution for battery charging and discharge applications, such as power banks, smart phones, and tablets with only one USB port that can be used for charging battery function.

HM5909 is suitable for charging a 4.2V Li-ion battery. And HM5909 is in SOT23-5 package.

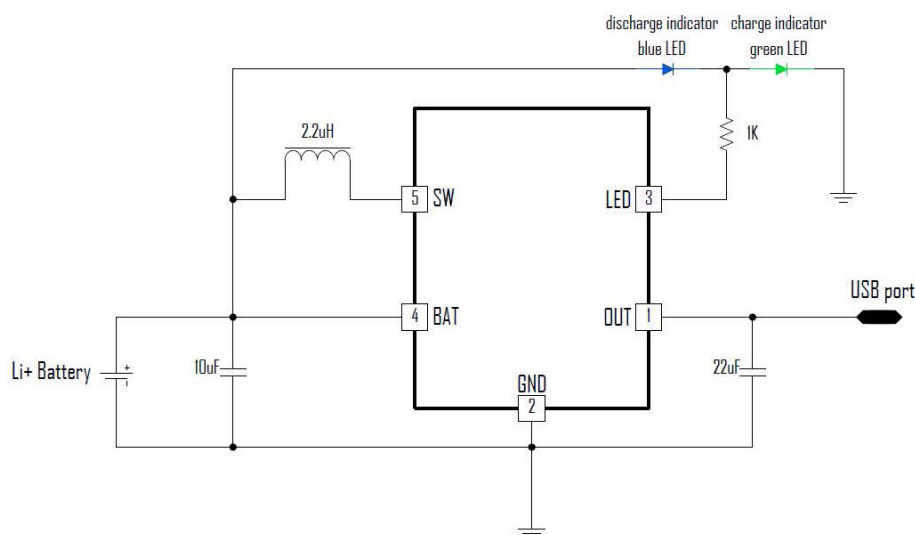
### FEATURES

- ◆ Bi-Directional Power conversion with Single Inductor
- ◆ Automatic Mode Switching
- ◆ Switching Charger
- ◆ 5V Synchronous Boost
- ◆ Up to 95% Efficiency
- ◆ Up to 1.2A Max charging current and 1.2A discharging
- ◆ No-Battery detection
- ◆ No External Sense resistor

### APPLICATIONS

- ◆ Tablet, MID
- ◆ Smart Phone
- ◆ Power Bank

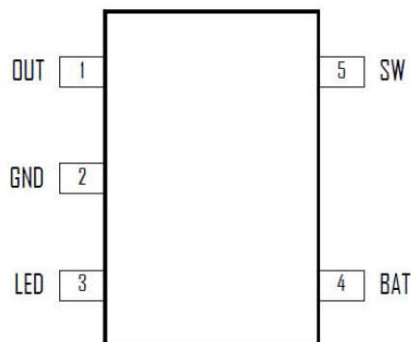
### TYPICAL APPLICATION



### ORDERING INFORMATION

PART No.	PACKAGE	TOP MARK	Pcs/Reel
HM5909	SOT23-5	JNYW	3000

## PIN CONFIGURATION



## ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

OUT, SW Voltage .....	-0.3V to 6V
All Other Pin Voltage .....	-0.3V to 6V
SW to ground current.....	Internally limited
Operating Temperature Range .....	-40°C to 85°C
Storage Temperature Range .....	-55°C to 150°C
Thermal Resistance	$\theta_{JA}$ $\theta_{JC}$
SOT23-5 .....	190.....110 ..... °C/W
Lead Temperature (Soldering, 10ssec) .....	260°C
ESD HBM (Human Body Mode) .....	2KV
ESD MM (Machine Mode) .....	200V

## ELECTRICAL CHARACTERISTICS

( $V_{IN} = 5V$ , unless otherwise specified. Typical values are at  $T_A = 25^\circ C$ .)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>BUCK MODE</b>					
USB Range		4.5		5.5	V
USB UVLO Voltage	Rising, Hys=500mV		4.5		V
USB Operating Current as BUCK	Switcher Enable, Switching		5		mA
	Switcher Enable, No Switching		800		$\mu A$
<b>BATTERY CHARGER</b>					
Battery CV Voltage	$I_{BAT} = 0mA$ , default	4.17	4.21	4.25	V
Charger Restart Threshold	From DONE to Fast Charge		-160		mV
Battery Pre-Condition Voltage	$V_{BAT}$ Rising Hys=250mV		2.9		V
Pre-Condition Charge Current			200		mA
Fast Charge Current			1.2		A
Charge Termination Current			100		mA
Charge Termination Blanking time			16		S
<b>BOOST MODE</b>					
BATT Ok Threshold	Rising, HYS=0.6 V		3.1		V
Output Voltage Range	$I_{out} = 0$	5.05	5.1	5.15	V
Quiescent Current At BATT	$V_{bat} = 3.6V$		80		$\mu A$
Switching Frequency	$V_{IN} < 4.3V$	675	900	1125	KHz
Inductor Peak Current Limit			2.4		A
Maximum Duty Cycle			90		%
Highside Pmos Rdsn	$I_{SW} = 500mA$		120		$m\Omega$
Lowside Nmos Rdsn	$I_{SW} = 500mA$		100		$m\Omega$

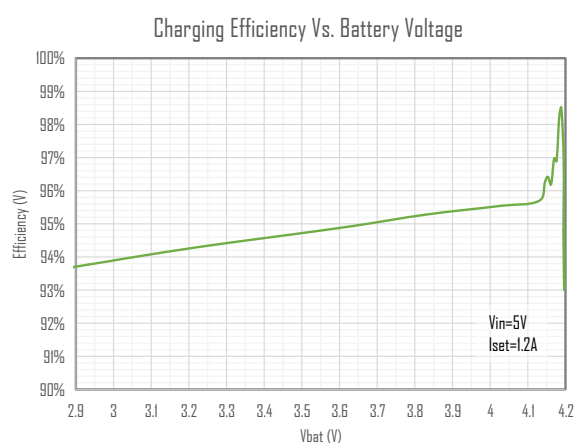
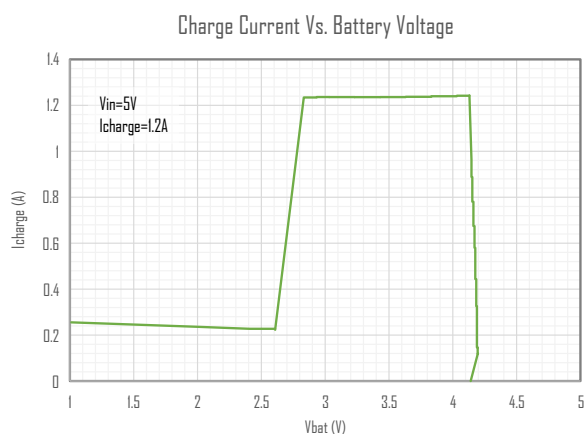
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Short Circuit Hiccup Current			1.8		A
Short Circuit Hiccup Timer	On Time		62.5		ms
	Off Time		2000		
Charging Thermal Regulation threshold			85		°C
Thermal Shutdown	Rising, Hys=20°C		150		°C

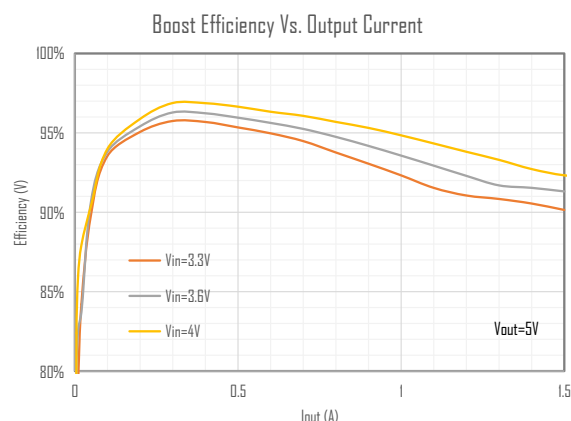
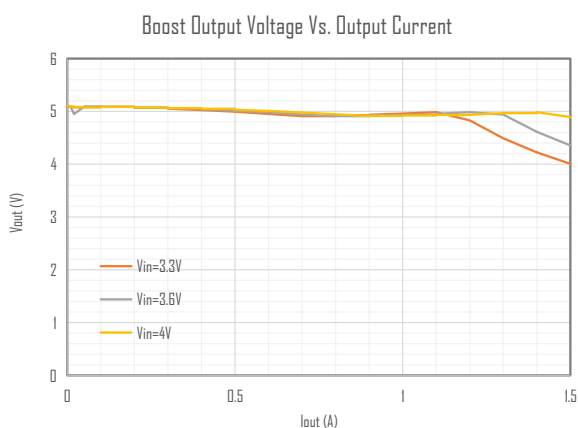
## PIN DESCRIPTION

PIN #	NAME	DESCRIPTION
1	OUT	Output pin. Bypass with a 22uF or larger ceramic capacitor closely between this pin and GND
2	GND	Ground Pin
3	LED	LED indication pin
4	BAT	Battery pin. Connect a Battery to this pin, and with a bypass capacitor 10uF.
5	SW	Inductor Connection. Connect an inductor Between SW and the regulator output

## TYPICAL CHARACTERISTICS

(Vin=5V, TA=25°C, unless otherwise specified)

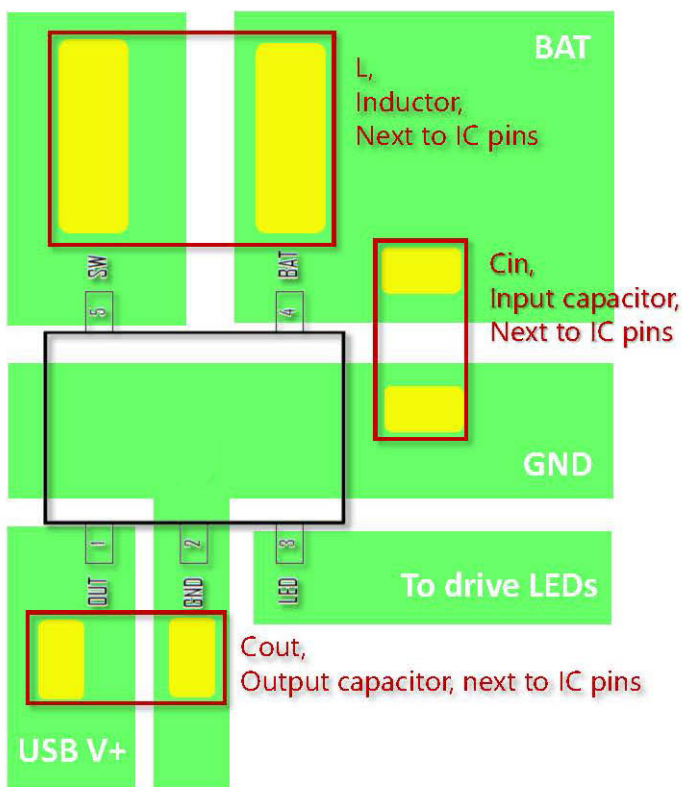




## APPLICATION SUPPORT

Please contact local distributor or H&M SEMI sales representatives for technical support.

## PCB GUIDELINES

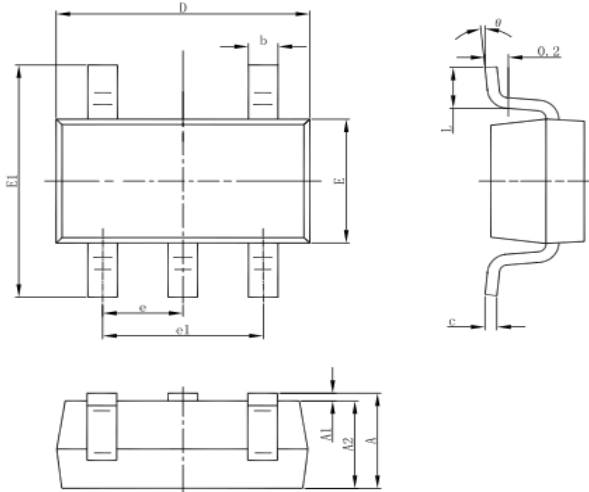


Please have the power devices placed just next to the IC pins so that the power traces are kept the shortest way to achieve a good performance of HM5909.

- PCB wire
- PCB Solder
- Device

PACKAGE OUTLINE

SOT23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	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
c	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
e	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°