



**FM9833** (File No: S & CIC1296 )

**Mobile Power Management Private IC**

**Outline**

FM9833 A mobile power source is designed specifically for a single chip integrates all the charging, discharging, protection, led Automatic load identification in one of the portable power management IC . FM9833 With a chip, with no external MOSFET , DW01 , Schottky devices, etc., to solve the basic needs of mobile power. Due to saving and Schottky MOSFET Energy loss, the energy conversion efficiency of the system 92 %the above. And with minimal peripheral greatly reduce production costs and improve production efficiency.

FM9833 Integrated internal over-temperature protection, anti-intrusion protection when charging, short circuit protection, short circuit proof lock, soft start protection, lithium battery overcharge and over discharge almost all of the security features protection, undervoltage protection to ensure the security chip and lithium batteries.

**Feature**

- Ø Synchronous boost, no external MOSFET Schottky
- Ø 5V / 1A Synchronous boost the efficiency of 90%
- Ø Automatic recognition load, standby current 20UA the following
- Ø Load short prompts, automatic recovery after the short clearing
- Ø Integrated over-voltage protection, over temperature protection, short circuit protection, overload protection
- Ø maximum 600mA Linear charging current constant charging current value may be externally programmed
- Ø Having a charge, full discharge, low power LED indicates
- Ø Lithium battery overcharge, over discharge, and short circuit protection
- Ø Trickle / CC / CV charging three-
- Ø Charge cutoff voltage: 4.20V / 4.35V
- Ø Package: SOP-8

**application**

- Ø mobile power;
- Ø IPAD Standby power and other digital devices.

**Pin Diagrams and description**

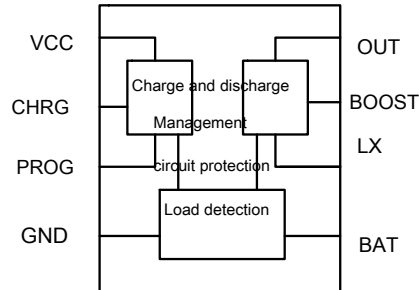
Pin Figure	Pin Symbol		Pin Description
<p>SOP-8</p>	1	VCC	Charging input voltage terminal
	2	BOOST	Indicates discharge end
	3	CHRG	Charge indicator pin
	4	PROG	Adjusting a charging current terminal
	5	BAT	Voltage output terminal
	6	SW	Switch terminal
	7	VOUT	Voltage output terminal
	8	GND	Chip ground



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Internal block diagram



Electrical performance parameters

Ø Recommended operating conditions

Input voltage ..... 4.5V ~ 5.5V

Ambient temperature ..... -20 °C ~ 85 °C

Ø Normal operating parameters (unless otherwise indicated, Vcc = 5V , VBAT = 3.8V , T = 25 °C)

symbol	parameter	Test Conditions	Min	Typ	Max	Units
<b>System parameters</b>						
VCC	Input supply voltage	--	4.5	5	5.5	V
VBAT	battery voltage	--	2.8	--	4.3	V
Istandby	Standby Current	No Vcc , No Load	--	20	25	uA
<b>Charging parameters</b>						
Vfload	Stable output (floating) voltage	25 °C ≤ Ta ≤ 85 °C	4.16	4.20	4.24	V
BAT Pin Current	BAT Current intrusion	Vcc = 3.5V , Vbat = 4.2V	--	± 0.5	± 5	uA
Vtrikl	Trickle charge current threshold	--	2.8	2.9	3.0	V
Vtrhys	Trickle charge voltage hysteresis	--	60	80	100	mV
Vuv	Vcc Undervoltage lockout threshold	Vcc Low to High	3.5	3.7	3.9	V
Vuvhys	Vcc Undervoltage lockout hysteresis	--	150	200	300	mV
Vasd	Vcc-VBAT Lockout threshold voltage	Vcc Low to High	60	100	140	mV
		Vcc High to Low	5	30	50	mV
Δ Vrechrg	Threshold voltage of the rechargeable battery	Vfload-Vrechrg	100	150	200	mV
Ron	Vcc versus BAT between	--	--	650	--	mΩ
<b>Discharge parameters</b>						
Vout	Boosted output voltage		5.00	5.05	5.20	V



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Vuvlo	Undervoltage lockout	--	2.7	2.8	2.9 V	
Vuvlo_r	BAT Undervoltage lockout threshold	--	3.0	3.1	3.2 V	
Vuvlo_F	BAT Undervoltage release voltage	--	--	3.4	-- V	
Istandby	Standby Current	No Vcc , No Load	--20			uA
Tdelay	No-load standby time delay		--10		-- S	
FoscH	The oscillation frequency	--	-- 1		-- MHz	
Tov	Over-temperature protection	--	-- 160		--	°C
Tov_r	Over-temperature protection and restoration	--	-- 120		--	°C

**Application Note**

**Ø Inductor Selection**

At a given input voltage  $V_{in}$  And the output voltage  $V_{out}$  , At a clock frequency constant, current ripple with Decrease the inductance value increases, larger inductance value inductor ripple current can be reduced, for 1A Boost system recommended 3.3uH Inductance. Must be greater than the saturation current of the inductor 2.5A , Otherwise they will chip inductor saturation may lead to not work properly.

**Ø Automatic load detection**

FM9833 Insert automatic detection mode to support the load, when the load is connected, the charging to the load automatically wake up the chip. due to FM9833 is a way of detecting the load voltage, load device chip does not support overloaded insertion recognition, only support digital device, soft-start mode. Except when the load is spread through 10S-12S Delay circuit automatically enters a low current standby mode, the standby current 20uA the following. When entering the standby, the need to delay 3S When insert another party, or can not automatically restart.

**Ø PROG Pin resistor selection**

PROG Pin may be provided constant charging current and charging current is monitored. From PROG Pin is connected to the ground terminal of an external resistor can be programmed charging current. In the precharge phase, the voltage at this pin is modulated 0.1V ; Constant-current charging phase, the voltage at this pin is fixed 0.9V . All modes of the state of charge, PRDG The minimum resistance 2K , The charging current 600mA . PROG Not less than a set value 2K Otherwise chip easily lead to over-temperature protection.

**Ø Low Battery Protection**

During discharge, when BAT Voltage is less than 3.1V When the discharge lamp into a long bright flashes to alert low battery. Battery voltage is below 2.8V , The output of the discharge closed. The device enters the standby mode when the battery voltage is restored to 3.4V Or higher, the charging device to automatically start the chip.

**Ø Discharge indication**

Discharge, LED1 Long light, battery voltage is below 3.1V Time, LED1 With 1HZ Flash prompting the user. Charging, LED2 With 1HZ Blinking frequency, after charging LED2 Long bright.



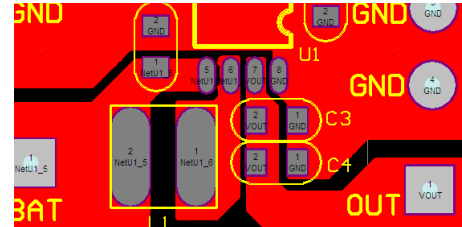
**PCB Traces description**

1 , The output capacitor C3 , C4 It must be close to the chip Pin 7 , Pin8 Pin, one end of the capacitor and Pin7 Connected to the other end of the capacitor and Pin8 Connected. capacitance We must face in the same chip.

2 , Export 5V After the output capacitor must be, not IC Direct output pin.

3 , capacitance C2 To be close to the chip BAT end, BAT Need to go through C2 Then chip

4 , Chip inductor as close as possible Pin6 5 , GND ( Pin8) Foot to BAT- Rough as possible, short to reduce parasitic resistance grounding.

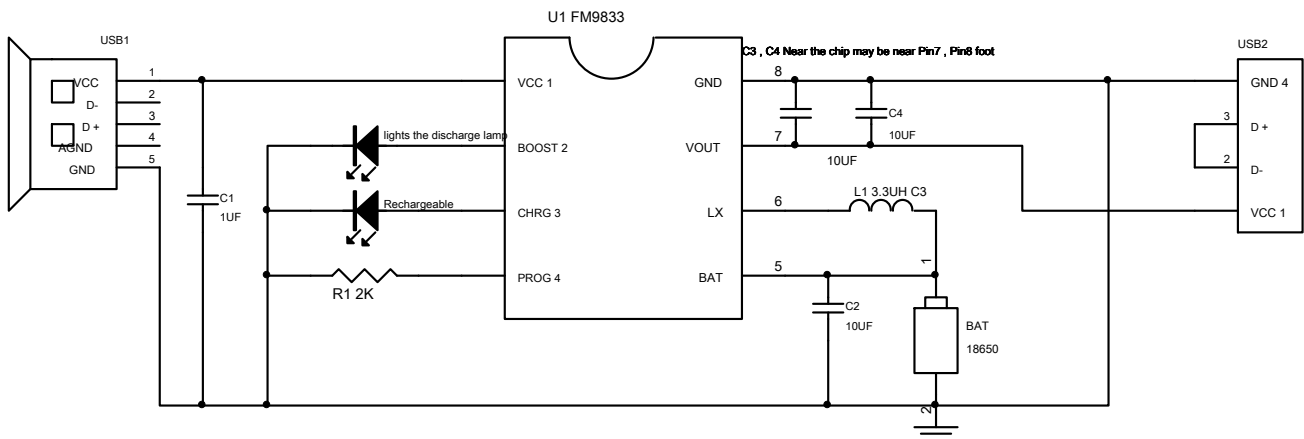


6 , Please bring gloves anti-static testing, in addition to prevent static electricity, but more important is to prevent the electrical test process, the staff directly touch PCB , Resulting in a Two nodes short circuit, causing the module caused by failure or abnormal leakage.

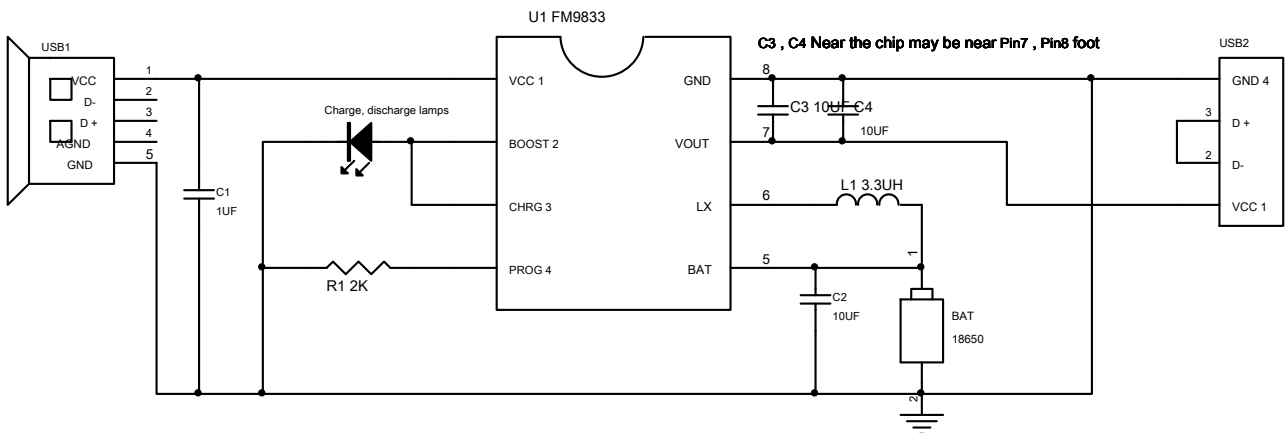
7 , The positive and negative poles of the battery can not be reversed, otherwise it will cause the module to fail. Please set the necessary measures in production processes to prevent this problem.

**Typical application circuit**

Ø Two light applications



Ø Application of single-lamp

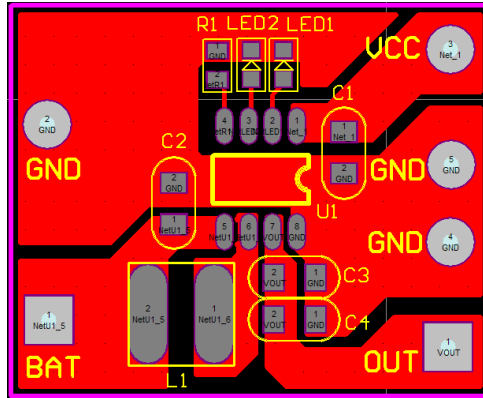




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**PCB And Figure BOM table**

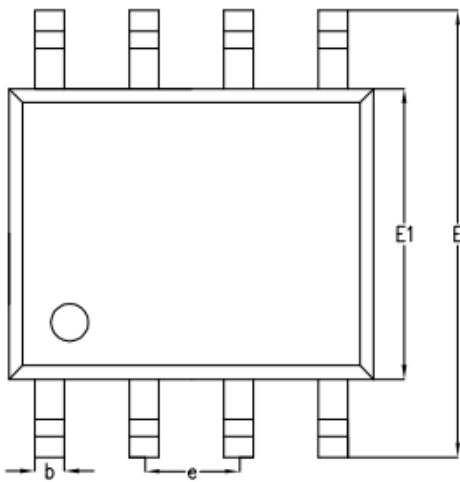
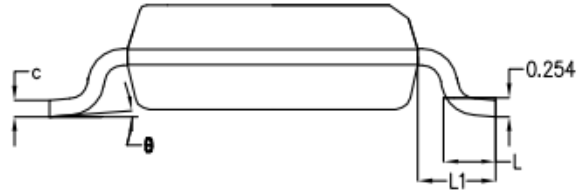
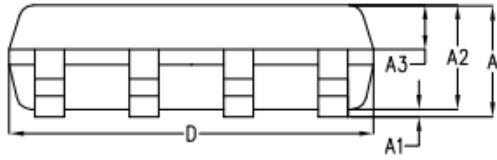


**Lipstick board BOM table**

No.	Component Name	Model & Specifications	The amount	of units	position
1	PCB	FM9833 1.0 Fiberglass panels	PCS	1	/
2	Chip Resistor	2K 5% 0603	PCS	1	R1
3	Chip capacitors	1UF 0603 10%	PCS	1	C1
4	Chip capacitors	10UF 0805 10%	PCS	1	C2
5	Chip capacitors	10UF 0805 10%	PCS	2	C3, C4
6	Patch IC	FM9833 SOP-8	PCS	1	U1
7	Chip inductors	3.3uH CD54	PCS	1	L1
8	SMD LEDs Hair blue	0603	PCS	1	LED1
9	SMD LEDs Red hair	0603	PCS	1	LED2
9	SMD female	Mike 5P, Pin to pin	PCS	1	USB1 MIC 5P
10	USB Female	Patch USB 14MM	PCS	1	USB2 USB



Package Information



symbol	Millimeter		
	Minimum	Typical values	Maximum
A	-	1.50	1.55
A1	-	0.10	0.15
A2	1.35	1.40	1.45
A3	0.55	0.60	0.65
b	0.35	0.40	0.45
c	0.17	0.22	0.25
D	4.85	4.90	4.95
E	5.90	6.00	6.10
E1	3.80	3.90	4.00
e	1.27BSC		
L	0.60	0.65	0.70
L1	1.05BSC		
theta	0°	4°	6°