Sola IC

SLM4055-4.2

Anti-independent linear reverse battery Battery Charger

RoHS Certification, green lead-free package

Package Type: **SOT-23-5L**

RoHS

product description

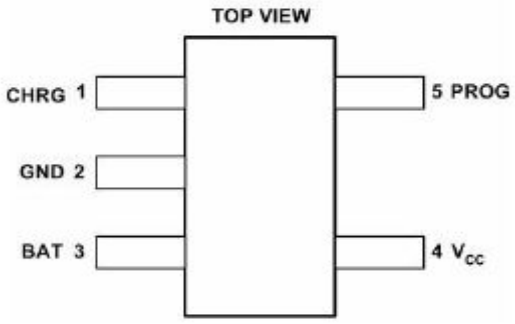
SLM4055 Is a complete single lithium battery constant current linear charge IC , Up to the maximum charging current 800mA . It uses very small SOT-23-5L Package, only the outer few external components, so that it can fully applicable to portable applications. SLM4055 Designed for USB Power supply design characteristics, while SLM4055 It may be used as independent linear lithium battery charger.

Features

- **Maximum charge current to programmable 800mA**
- **No external MOSFET , And the diode sensing resistor**
- Overtemperature protection constant current constant voltage charging
- It includes a battery anti-reverse function
- **From USB Port directly to a single lithium battery**
- **Preset 4.2V Charging voltage accuracy ± 1%**
- **Trickle Charge value 2.9V**
- It can be preset without trickle charge mode
- Soft start to limit inrush current effective
- **RoHS SOT-23-5L Package**

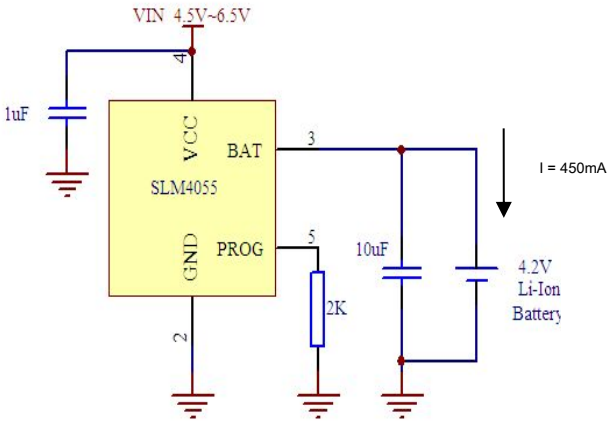
Applications

- **Hand-held phone, PDA , MP4 / MP3 player**
- Bluetooth devices
- charger



Map 1. Package

typical application



Pin Description

Pin Number	Pin name	Features
1	CHRG	Charging status indicator
2	GND	Ground
3	BAT	Then the battery
4	VCC	power input
5	PROG	A charge current program pin

CHRG (1) : Open-drain output pin of the state of charge. When charging the battery, the internal NMOS This tube pin low state of charge indication led Bright; when the charging is completed, the internal NMOS Tube high impedance state, led Off.

GND (2) : **Power Ground** .

BAT (3) : **Charging current output pin. Supplying a charging current to the battery while controlling the charge completion voltage 4.2V . Accurate internal resistor divider** Lead foot from the modified pressure control the output voltage. Shutdown mode, this change is disconnected from resistor divider foot.

VCC (4) : Positive power input. Power supply to the charger, the voltage range 4.5V to 6.5V . Meet 1μF Capacitance to ground to reduce ripple.

PROG (5) : Charge current programming pin, and the charging switch the charge current monitoring. By foot between this and the links 1% Resistor provided Constant charging current. When the chip is in the constant current charging state, this level is defined as the feet 1V . Under all operating conditions, the magnitude of the charging current can be calculated as follows:

$$I_{BAT} = 900V_{PROG} / R_{PROG}$$

This pin can also be used as the charging switch pin, and this pin disconnected, the charger enters shutdown mode, charging is stopped, the input current is reduced to chip 25μA the following.

Maximum Ratings (1)

parameter	Ratings
Supply voltage (V_{CC})	**-0.3V To + 8V**
PROG Pin voltage (V_{PROG})	**VCC + 0.3V**
BAT Pin voltage (V_{BAT})	**+ 8V**
CHRG Pin voltage (V_{CHRG})	**+ 8V**
BAT Shorted time	**continued**
BAT Pin Current (I_{BAT})	**850mA**
The maximum junction temperature	+ 125 ° C
Storage temperature range	- 65 ° C To + 125 ° C
range of working temperature	- 40 ° C To + 85 ° C
Welding temperature (10 second)	+ 300 ° C

The scope of work(2)

parameter	symbol	Numerical	unit
Input voltage	V_{CC}	-0.3 +8	V
Junction Temperature	T_J	- 40 ~ +80	° C

DC school properties

(VCC = 5V, TJ = 25 ° C Except particularly marked)

parameter	Symbol	Conditions	The minimum	typical	maximum	single Place
Input voltage	V_{CC}		4.25		6.5 V	
Input current support	I_{CC}	Charging mode (3) , R_{PROG} = 10K		190		μA
		Standby mode		85		
		Shutdown Mode (R_{PROG} Do not take $V_{CC} < V_{BAT}$ or $V_{CC} < V_{UV}$)		45		
Rectified output voltage	V_{FLOAT}	0 ° C≤T_J ≤85 ° C , I_{BAT} = 40mA	4.158	4.2	4.242 V	
BAT Pin Current	I_{BAT}	Charging mode, R_{PROG} = 10K		90		mA
		Charging mode, R_{PROG} = 2K		450		mA
		Standby mode, V_{BAT} = 4.2V		2.5		μA
		Shutdown mode, R_{PROG} Do not take		± 0.1		μA
		Sleep mode, V_{CC} = 0V		± 0.1		μA
Trickle charge current	I_{TRIKL}	$V_{BAT} < V_{TRIKL}$, R_{PROG} = 10K		10		mA
Trickle voltage value compartment	V_{TRIKL}	R_{PROG} = 10K, V_{BAT} rise		2.9		V
Manual shutdown threshold voltage compartment	V_{MSD}	PROG Pin voltage rises			1.25 V	
		PROG When the pin voltage drops			1.2	
VCC-VBAT Separated off voltage value	V_{ASD}	From low to high when the power		100		mV
		When the power supply from high to low		30		
Trickle charge current value of the off interval	I_{TERM}	R_{PROG} = 10K (4)		10		mA
		R_{PROG} = 2K		45		

PROG Pin voltage	V_{PROG} R_{PROG} = 10K, Charging			1.03		V
CHRG Weak legs down current	I_{CHRG}	V_{CHRG} = 5V		0		uA
CHRG Pin output low voltage	V_{CHRG}	I_{CHRG} = 5mA		0.35		V
Secondary Charge Threshold voltage	ΔV_{RHRG} V_{FLOAT} - V_{RECHRG}			150		mV
The junction temperature at a constant temperature limit	T_{LIM}			120		℃
Soft start time	tss	I_{BAT} = 0 to 1000V / R_{PROG}		100		uS
Rechargeable comparator lag time filter	t_{RECHRG} V_{BAT} High to Low			2		mS
Comparator terminate charging time lag filter		I_{BAT} Drops I_{CHRG} / 10		1000		uS
PROG Foot pull-up current				1		uA

Note 1 : Exceeding the maximum ratings may cause depletion of the chip. Note 2 : This exceeds the scope of work does not guarantee the normal operation of the chip. Note 3 : Current support Includes PROG Current feet (about 100μA), But does not include by BAT Current to the battery feet (about 100mA). Note 4 : ITERM Yes PROG Setting foot part of the charging current resistance value.

Application Note

Anti-reverse function:

SLM4055 includes lithium anti-reverse function, when connected to the power supply Vcc, if the need to recharge the lithium erroneous polarity reversal, then automatically detects SLM4055 reverse battery state and enters shutdown mode, to avoid the lithium battery and the chip damage.

stability:

Constant current feedback control loop without the output capacitor for stabilizing the output voltage of the external battery to the charger output. If no external battery, the output should be connected to an output capacitor to minimize ripple.

The constant current mode, PROG Feet for the feedback loop. Stability constant current mode receiving PROG Affect the impedance of the foot. If no external capacito PROG Feet, when the high resistance to the programming 20KΩ , The charger remain stable; however, if additional capacitance, resistance will decrease the maximum allowed program.

VCC Bypass capacitor:

Although various types of capacitors can be used as a bypass capacitor, it is preferable to use a multilayer ceramic capacitor. Because in certain start conditions, subjected to high pressure transients capacitance of ceramic capacitors to generate vibration. For example, when a charger is connected **to the power fluctuations can occur above. Recommended at the time of application Vcc Input and GND In parallel with a capacitance value 0.1uF - 1uF Multilayer** ceramic capacitors.

Power dissipation:

Reducing the charging current by the thermal feedback condition can be approximated by the power dissipation of the chip. Almost all of the internal **power losses are MOSFET Generated, the following approximate formula:**

$$P_D = (V_{CC} - V_{BAT}) I_{BAT}$$

Thermal protection around the chip when the temperature is:

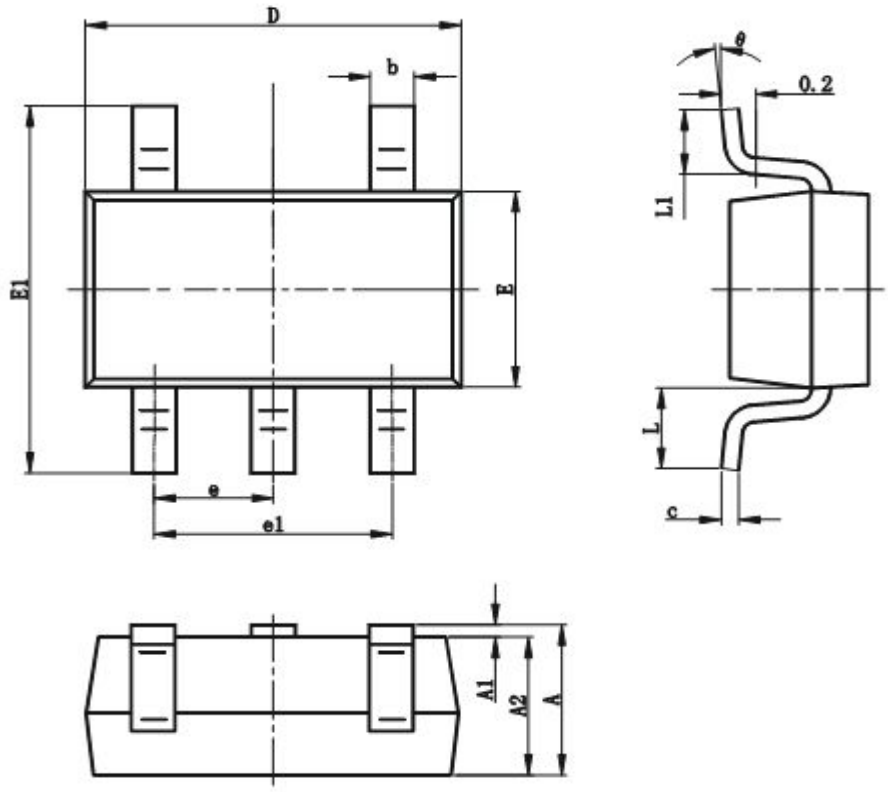
$$T_A = 120\ ℃ - P_D \theta_{JA} = 120\ ℃ - (V_{CC} - V_{BAT}) I_{BAT} \theta_{JA}$$

Thermal Considerations:

Because this is a small chip size SOT-23-5L Package, by PCB Layout maximizing the heat dissipation of the charge current is very important. A heat dissipation path to pin chip wafer, and then to the pad, and then to PCB Copper. PCB Plate as a heat sink on which the pad should be as wide, and accordingly increases conductor to dissipate heat to the air. get on PCB Layout design, PCB Other heating elements must also be taken into account, and try to avoid close charger, otherwise the overall rise in temperature will affect the charging current of the charger.

Package Information

SOT-23-5L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeter		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	0.400	0.012	0.016
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	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
?	0	8	0	8