General Description

EXT9502 series is a double lithium battery charge management chip. The chip includes a charge state detection, the charging process, temperature detection and so on . The chip also integrates a high-precision reference voltage module in it. It uses the SOP-8 package. EXT9502 charge contains three modes: pre-charge, constant current charging, constant voltage charging. Constant current charging current is five times the pre-charge current; when the voltage is lower than 6.5V into the pre-charge mode; when the voltage is above 6.5V into the conatant current charge mode, the charging current is five times as the pre-charge, the charging current is dertermined by an external resistor.

Features

◆Double lithium battery charge management
◆Only need a few external compenents
◆Pre-charge, constant current charging, constant voltage charging mode
◆Temperature detection
◆Two charging status
◆SOP8 Package

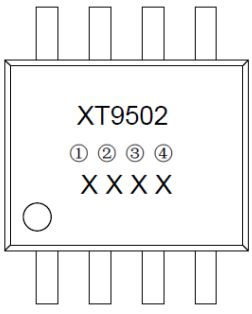
Applications

◆Digital camera
◆PDAS
◆The phone lithium battery

Ordering/Marking information

EXT9502 XX XX X R

- R → Tape & Reel
- X → Voltage Accuracy：
  - A：±1%
  - B：±2%
- XX (Voltage) →
  - 78=7.8V
  - 80=8.0V
  - 82=8.2V
  - 84=8.4V
  - 86=8.6V
  - 88=8.8V
- XX (Package) →
  - M1：SOP8

Part number	Package	Marking
EXT9502XXM1R	SOP8	

①②③ Represents the BATT central voltage value

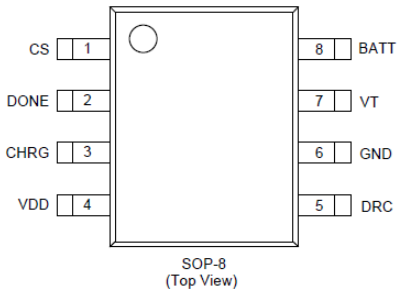
Symbol	Voltage	Product Name
780	7.80V	EXT950278M1XR
800	8.00V	EXT950280M1XR
820	8.20V	EXT950282M1XR
840	8.40V	EXT950284M1XR
860	8.60V	EXT950286M1XR
880	8.80V	EXT950288M1XR

④ Represents the voltage accuracy

Symbol	Voltage Accuracy	Product Name
A	±1%	EXT9502XXM1AR
B	±2%	EXT9502XXM1BR

XXXX represents the production batch

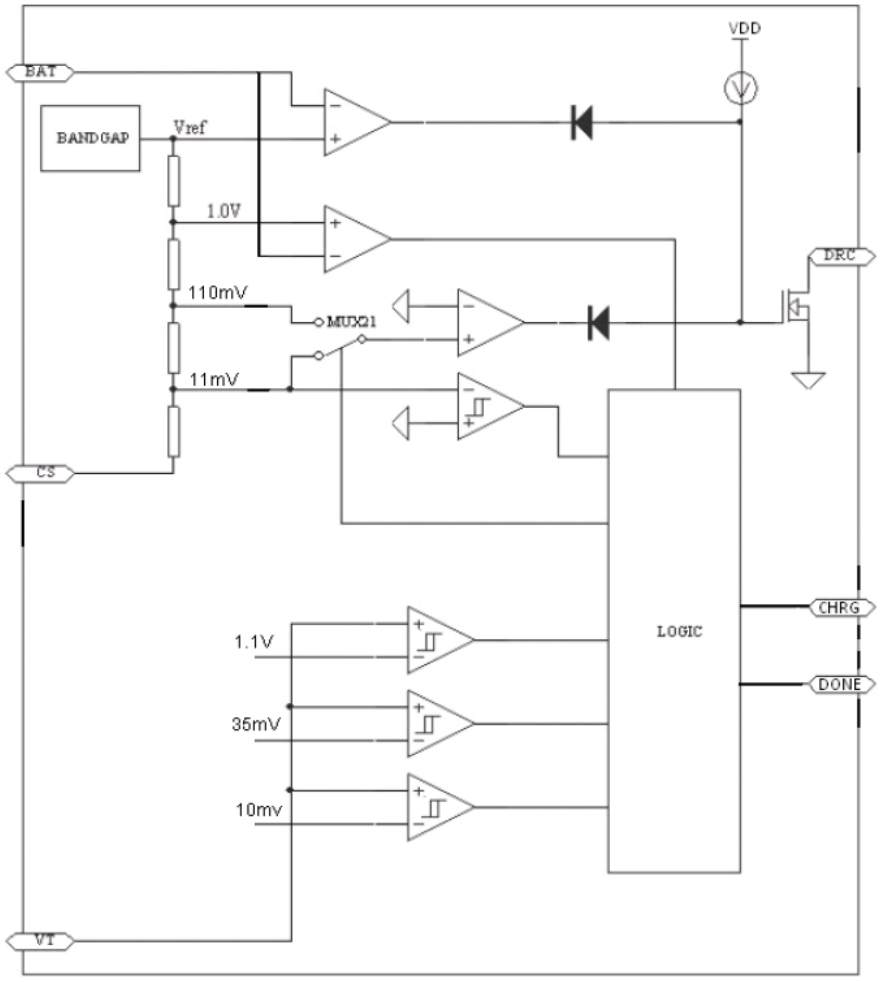
Pin Assignment



SOP-8
(Top View)

Pin Number	Pin Name	Function Description
1	CS	Overcharge detection pin
2	DONE	Charge status pin1
3	CHRG	Charge status pin2
4	VDD	Power input
5	DRC	External MOS or PNP control pin
6	GND	Ground
7	VT	Battery temperature detection pin
8	BATT	Battery voltage detection

Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating	Unit
Input Supply Voltage	VDD	VSS-0.3～VSS+18	V
DRC pin Voltage	Vdrc	VSS-0.3～Vcc+18	
BAT pin Voltage	Vbat	Vss-0.3～12	
CS pin Voltage	Vcs	Vss-0.3~6	
CHAG pin Voltage	Vchrg	VSS-0.3～18	
DONE pin Voltage	Vdone	Vss-0.3~18	
NTC pin Voltage	Vntc	Vss-0.3~6	
Operating Ambient Temperature	Topa	-40～+85	°C
Storage Temperature	Tstr	-65～+125	

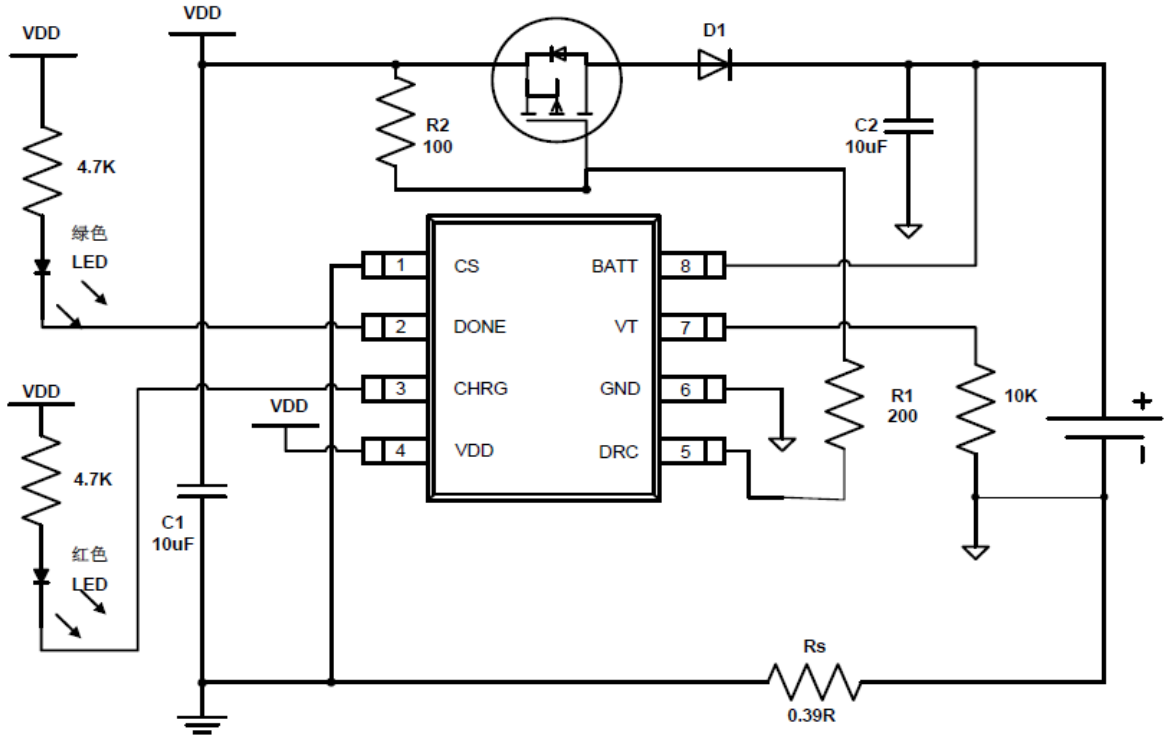
Caution:

The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Electrical Characteristics(Ta=25℃ unless specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating current 1	IDD（OPE）	9V<VDD<20V			350	μA
Input current 2	IDD（SLP）	VDD<7.5			20	μA
VBATT pin voltage	Vbatt		8.27	8.36	8.45	V
Constant current charging current	Iconst		90/Rs	100/Rs	110/Rs	mA
Trickle charge current	Ipre		18/Rs	20/Rs	22/Rs	mA
Precharge threshold voltage	VO(min)		6.2	6.5	6.8	V
Recharge threshold voltage	VO(RCH)			-400		mV
VT high temperature shutdown voltage	VT-hot		45	50	55	mV
VT low temperature shutdown voltage	VT-cold		1800	2000	2200	mV
Low power lockout threshold voltage	Vuvlo			7.5		V

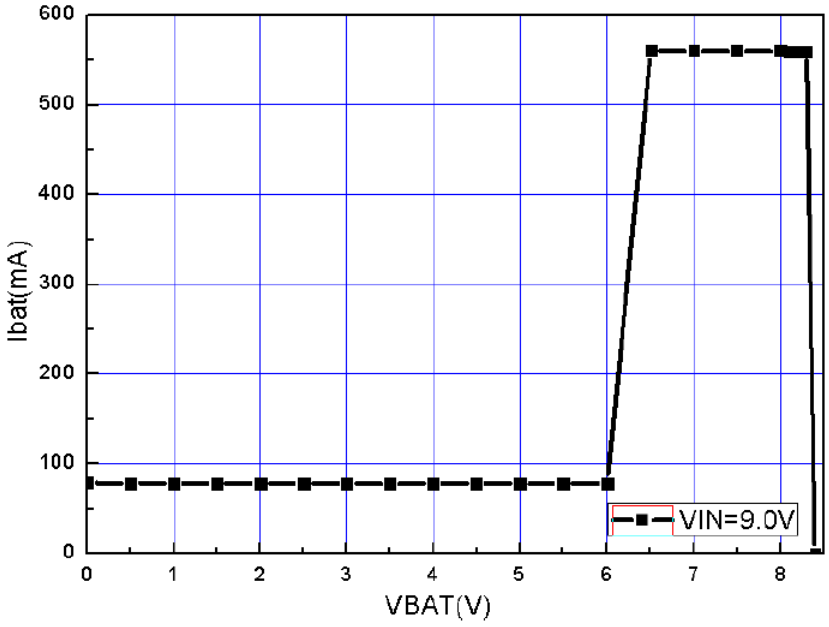
Typical Application Circuit



Note:

D1 is a Schottky; RS has been suggested that high-precision (1%) in order to ensure current accuracy, R1 and R2 is not required precision.

Typical Performance Characteristics



Charging process description

Function Description

When the input voltage VDD is below the UVLO level, the chip will enter into the SLEEP MODE, the chip power consumption will down to 20μA; When the VDD pin voltage rises above the UVLO voltage or more, the chip will into the CHRG the MODE, a charge cycle begins, early in the charge cycle, if the battery voltage is lower than the trickle charge threshold voltage (6.5V) the charger goes into trickle charge mode. The trickle charge current is internally set to 20% of the maximum charging current. When the battery voltage exceeds the trickle charge threshold, the charger enters constant current charging mode, the charging current from the internal 100mv baseline and the external sense resistor to a decision.

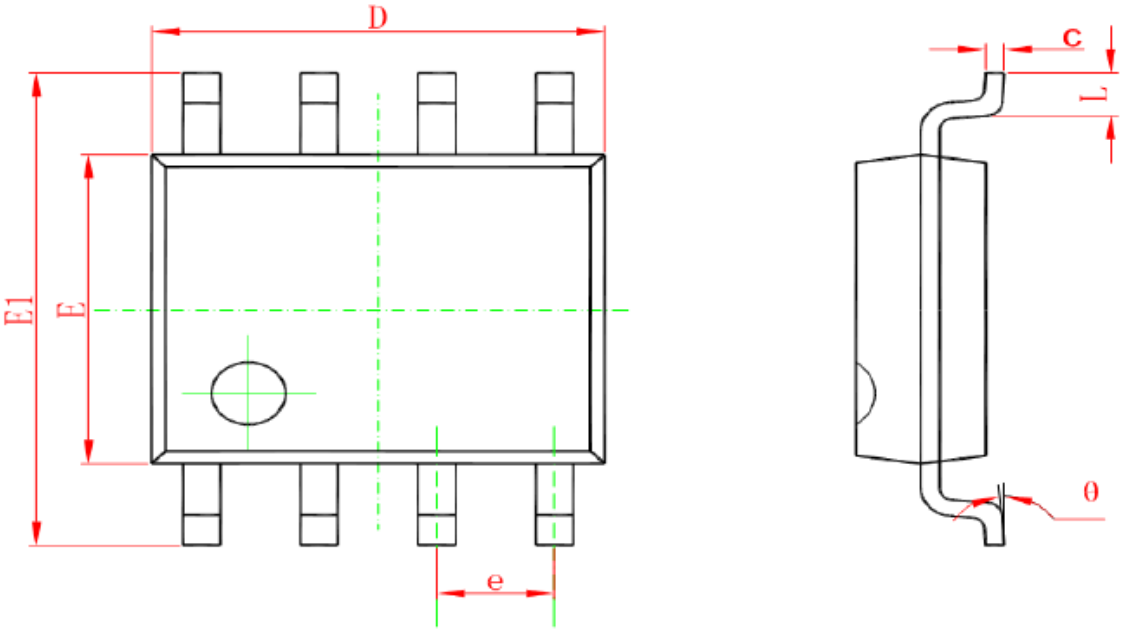
$$I_{BATT} = \frac{100mV}{R_S}$$

The chip also with battery temperature detection function, this function through the VT side, and in VT termination of a negative temperature coefficient 10KΩ thermistor (DALE NTHS1206N02), as the temperature rises to 80 degrees, the pin voltage is 50mV for low temperature to reach -30 degrees, the point voltage of 2V, only there voltage in the range of the two voltage values, the chip in order to work properly, otherwise the charge is stopped, the LED is not lit, this pin can be directly connected to shield of the temperature detection. Charging status display in the table below:

	No-load	Trickle charge	High current charging	Fully charged	NTC is not in the scope of state
Done（Green）	Flicker	Off	Off	On	Off
Charge（Red）	Off	On	On	Off	Off

Package Information

SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°