

#### 5V Input Support 3.6A Double-cell Series Lithium Battery Boost Charging Chip

### FEATURES

- The input operating voltage range is 4.6V~6V and the VIN withstand voltage is 20V.
- Boost Charge Efficiency: 95%.
- The maximum support 20W power charging.
- Rechargeable battery voltage: 2 strings 8.4V.
- Charge Voltage Accuracy  $\pm 1\%$ .
- Trickle/constant current/constant voltage charging.
- Constant current charge current, external resistance adjustable.
- Constant current charging accuracy  $\pm 10\%$ .
- Input adaptive charging 4.6V, automatic adjustment of input current, adaptive adapter load.
- Support charging NTC temperature protection
- Battery backfill protection, quiescent power consumption 0uA.
- 750KHz switching frequency.
- LED charging display.
- ESD 4KV.
- Package: ESOP8, DFN3\*3, DFN2\*3, QNF4\*4.
- Compatible with IP2325 (ESOP8), IP2326 (QFN4\*4 simplified application) two-cell lithium battery applications.

## PACKAGE AND APPLICATION

#### APPLICATIONS

Dual-cell Li-Battery/Li-ion battery charging

### DESCRIPTION

The BC915 is a boost charge management IC that supports dual-cell series Li-ion/Li-ion batteries .

The BC915 integrated power MOS, using a synchronous switching architecture, integrates the power MOS, so that it requires only a few peripheral components for the application, and effectively reduces the size of the overall solution and reduces the BOM cost.

BC915's step-up switching charging converter works at 750KHz; 5V input, 8V/2A output conversion efficiency 95%.

The BC915 has an input voltage limiting function, which can intelligently adjust the charging current and adapt to the load capacity of the adapter.

BC915 supports external resistors to adjust the charging current; The BC915 has integrated NTC protection with NTC resistors.



ESOP8 PACKAGE



## **ORDING INFORMATION**

Orderable Part Number	Package Type	Package Qty	Op Temp(°C)
BC915	ESOP8	3000	-40~85
BC915	DFN3*3_10/DFN2*3_8	3000	-40~85
BC915	QFN4*4	3000	-40~85

### **MARK INFORMATION**



### **ABSOLUTE MAXIMUM RATINGS (1)**

Over recommended operating free-air temperature range (unless otherwise noted)

Parameter	value	symbol	unit
Input voltage range	$V_{\rm IN}$	-0.3~18	V
Battery voltage range	VBAT	-0.3~8.4	V
Junction temperature range	$T_J$	-40 ~ 150	°C
Storage temperature range	T <sub>stg</sub>	-60 ~ 150	°C
Human Body Model (HBM)	ESD	4K	V

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.



### THERMAL CHARACTERISTICS

over operating free-air temperature range (unless otherwise noted)

	THERMAL METRIC					
Thermal resistance (ESOP8)	$\theta_{JA}$	45	°C/W			
Thermal resistance (DFN3*3)	$\theta_{JA}$	65	°C/W			
Thermal resistance (QFN4*4)	$ heta_{JA}$	55	°C/W			

(1) The package thermal impedance is calculated in accordance with JESD 51-7.

### **RECOMMENDED OPERATING CONDITIONS**

Parameter	Symbol	MIN	Typical	MAX	UNIT
Input voltage	V <sub>IN</sub>	4.5	5	6	V

\*Beyond these operating conditions, the operating characteristics of the device cannot be guaranteed.

## PINOUT



Package		Nama	Function		
DFN10	ESOP8	QFN24	Iname	Function	
1	1	19, 20	VSYS	Output voltage terminal, external 22uF capacitor	
2	2	21, 22	VBAT	Battery end	
3	3	11	ISET	Charging current setting terminal, external resistor	
4	4	4	NTC	Battery temperature detection, pull up or down, terminate charging, can be reused as a balancing control terminal, once the external equalization chip detects that the battery voltage deviation is large, it can be terminated by NTC, or start charging.	
5	5	6	LED	LED display end	
6	6	13	VIN	Charging input	
7	7	14	BOOT	Bootstrap end, Bootstrap circuit pins	
8	8	15 , 16 , 17	SW	Switching end , DC/DC switch nodes, link inductors	



EPAD	EPAD	EPAD, 18	GND	systematically and powerfully
		1,2,3,5,7,8,9,10,12 23,24	NC	

(1) G = Ground, I = Input, O = Output, P = Power

## **ELECTRICAL CHARACTERISTICS**

Conditions are -40°C  $\leq$  (T<sub>J</sub>=T<sub>A</sub>)  $\leq$  125°C and 4.5 V  $\leq$  V<sub>IN</sub>  $\leq$  5.5 V unless otherwise noted. Typical value is at 25°C. All voltages are with respect to GND unless otherwise noted. Unless otherwise specified, TA=25°C, L=2.2uH, VIN=5V, VOUT=7.4V

Parameter	symbol	Test conditions	MIN	Typical	MAX	UNIT
Input voltage	VIN		4.5	5	6	V
Input undervoltage	V <sub>IN_UVLO</sub>			4.3		V
Input undervoltage	Hysteresis			20		mV
Input overvoltage	VIN_OVP			5.8		V
input over voltage	Hysteresis			0.2		V
Enter quiescent current	Iq	VIN=5V , VBAT=10uF	2	3	4	mA
Battery backflush current		VIN=0V , VBAT=8.4V		0		uA
Switching frequency				750		KHZ
Trickle charge current	Itrick	VBAT≤6V		100		mA
	Itrick	VBAT≤2V		70		mA
Trickle-current to	VTRKL	VBAT rising		6		V
threshold	VTRKL_HYS	VBAT falling		5.7		V
Short-circuit current				130		mA
Short-to-trickle threshold				2		v
Hysteresis				1.6		v
Constant current		IBAT(RISET=3K)		1		А
Constant current charging current accuracy				±10		%
Fill up the voltage	VBAT			8.4		V
Accuracy of full voltage				±1		%
Charge cut-off current	Iterm	IBAT(RISET=3K) CC 10%		100		mA
Charge cut-off detection time	Tterm			1		s
Recharge threshold	VBATrechg			8.05		v
Temperature loop threshold				120		°C
The chin is overheated		ОТР		150		°C
The emp is overheated		Hysteresis		20		°C



## FUNCTIONAL BLOCK DIAGRAM



## LED DISPLAY MODE

Mode 1: Monochrome light

	Charge	Fully charged	FAULT
LED1	Solid on	extinguish	flash1Hz

## **CHARGE CURRENT SETTING**

Charge current size setting : (I\_{BAT}\*R\_{ISET})/2K=1.5A



### CHARGE NTC

BC915 supports NTC protection function, which can be used with NTC resistance to detect battery temperature; The BC915 emits 20uA through the NTC pin, then detects the voltage generated by the current on the NTC resistor to determine the temperature, and turns off the charging when the detected temperature exceeds the set temperature. The BC915 detects that the NTC pin voltage is at 0.45V, indicating that the battery temperature is too high and the charging stops. The NTC pin voltage is detected to rise to greater than 1.84V, indicating that the battery temperature is too low and charging is stopped.

If the NTC function is not required, connect the NTC pin toa51K resistor to ground.

Example : RNTC=100K Thermistor(B=4100) , R2=82K , Corresponding temperature and NTC pin voltage

Temperature(°C)	RNTC Resistance value	R2//RNTC Resistance	NTC Pin voltage
0	246.7K	66.3K	1.84V
45	41.2K	27.8K	0.56V
55	28.4K	21.1K	0.45V

### SCHEMATIC DIAGRAM OF A TYPICAL APPLICATION



ESOP8 Application diagram





QFN24 Apply a simplified diagram

serial number	The name of the component	Model & Specification	unit	Dosage	location	remark
1	IC	BC915	PCS	1	U1	
2	inductance	0630 One-piece molding	PCS	1	L1	Saturation Isat, temperature rise current Idc is greater than 5A, DCR is less than 20 mOhm, and inductance is 2.2uH @750KHz
3	SMD capacitors	0805 10uF 25V 10%	PCS	2	C1、C4	If the withstand voltage value is greater than 16V, a chip ceramic capacitor is required
4	SMD capacitors	0603 1nF 50V 10%	PCS	1	C2	EMC selection
5	SMD capacitors	0805 22uF 25V 10 %	PCS	1	C3	If the withstand voltage value is greater than 16V, a chip ceramic capacitor is required
6	SMD capacitors	0603 0.1uF 25V 10%	PCS	1	C5	
7	SMD resistors	0603 5.1K 5%	PCS	1	<b>R</b> 1	Used to adjust LED brightness
8	SMD resistors	0603 3K 1%	PCS	1	R2	Adjust the charging current
9	SMD resistors	0603 OR 5%	PCS	1	R3	Input RC filtering
10	SMD resistors	0603 120K 1%	PCS	1	R4	Adjust the temperature protection range
11	SMD resistors	0603 4.7R 5%	PCS	1	R5	EMC selection
12	SMD LEDs	0603	PCS	1	LED	LED indicator with a maximum drive capacity of 5mA
13	NTC resistor	NTC 电阻	PCS	1	NTC	Select according to the design temperature; When not in use, connect a 51K resistor to ground



# **PACKAGE INFORMATION**

#### DFN3\*3\_10

尺寸 标注	最小(mm)	标准(mm)	最大(mm)	尺寸	最小(mm)	标准(mm)	最大(mm)
A	0.70	0.75	0.80	E	2.90	3.00	3.10
A1	-	-	0.05	D2	1.60	1.70	1.80
A3		0.203 REF		E2	2.30	2.40	2.50
b	0.18	0.23	0.28	е		0.50 TYP	
D	2, 90	3,00	3, 10	L	0.35	0.40	0, 45





Side View



## ESOP8



DIMENSIONS IN MUILLIMETERS





BASE METAL SECTIONA-A 6:1

00/01/02/01	0.4151	ALC: N	1.0437	
STMBOL	MIN	NOW	MAX	
A	1,35	1.55	1.75	
A,	0.00		0,10	
Az	1,25	1,40	1.65	
As	0,50	0,60	0,70	
ь	0,39	—	0,49	
b,	0,28		0,48	
c	0,10		0,25	
0	0,10		0,23	
D	4.80	4.90	5.00	
E	5.80	6.00	6.20	
E	3.80	3.90	4.00	
6	1	27BSC		
L	0,45	—	1.00	
L		04REF		
La	0	).25BSC		
R	0,07	Ι	_	
Ri	0,07	Ι	_	
h	0,3	0,4	0,5	
	0°	Ι	8°	
B 1	11°	17*	19°	
0.5	11°	13°	15°	
0.5	15°	17*	19*	
- e .	11°	13*	15*	
EP1	2.40			
EP2	3,30			



# QFN4\*4





SYMBOL		MILLIMETE R		
	MIN	NOM	MAX	
А	0.70	0.75	0.80	
A1	-	0.02	0.05	
b	0.18	0.25	0.30	
с	0.18	0.20	0.25	
D	3.90	4.00	4.10	
D2	2.40	2.50	2.60	
e		0.50BSC		
Ne		2.50BSC		
Nd		2.50BSC		
Е	3.90	4.00	4.10	
E2	2.40	2.50	2.60	
L	0.35	0.40	0.45	
h	0.30	0.35	0.40	

SIDE VIEW



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## **Revision history**

#### **Document revision history**

Data	Version	Changes
26-May-2024	Ver0.1	First release
14- August-2024	Ver1.1	Version 1.1
12-May-25	Ver1.2	Update the input charger current