

## High Input Voltage Linear Charger

### GENERAL DESCRIPTION

The BC4056B40 is a complete constant-current/constant-voltage linear charger for single cell lithium battery. There's a temperature loop in the chip. When the chip is overheated, the temperature loop automatically reduces the charging current, ensure safe charging, avoid overheating and obtain maximum charging speed. The charging current can be regulated by external resistance. The Max charging current is 1A. No enable function, No NTC function.

### FEATURE

- Input voltage range 4.5V~6.5V, Maximum Voltage for the Power Input 30V
- Charging battery voltage 4.1V
- Accuracy of charging voltage  $\pm 1\%$
- Trickle/constant current/constant voltage charging
- Maximum constant current charging current 1A;  
External resistance adjustable
- Constant current charging accuracy  $\pm 10\%$

- VIN OVP 6.5V (VIN OVP can be customized to 21V)
- When the chip is overheated, the temperature loop automatically reduces the charging current
- Battery anti-irrigation protection: Static power consumption 30 nA
- Support single color light/dual color light display mode
- Package: SOT23-6, SOT23-5, DFN2\*2
- ESD 2KV

### APPLICATION

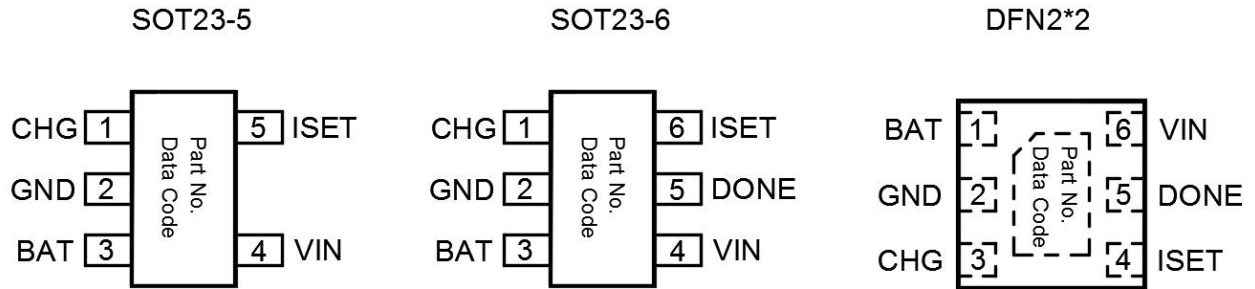
- TWS
- IOT Gadgets
- Wearable Devices
- Credential Keys
- Wireless Remote
- Electric toothbrush
- Electric shaver
- Electronic cigarette
- Other applications

### ORDING INFORMATION

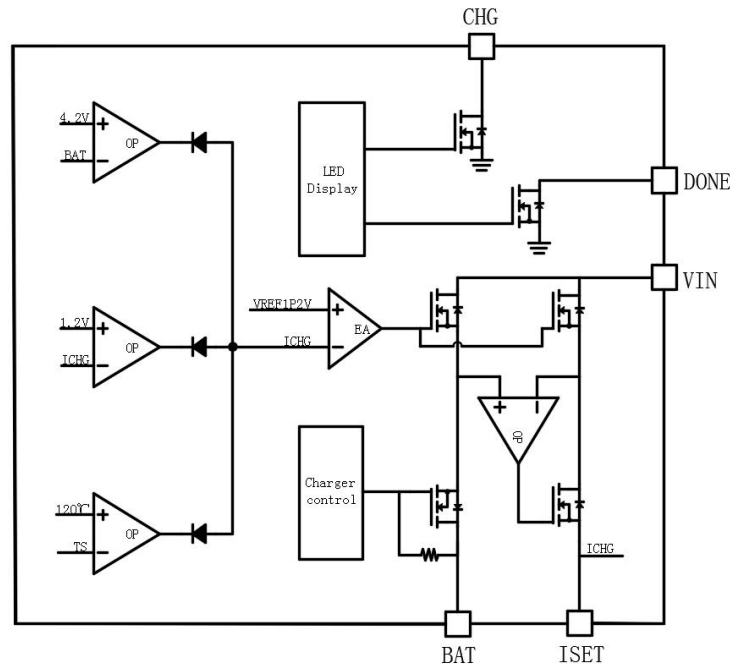
Part Number	Package Type	Package Quality	Op Temp(°C)
BC4056B40	SOT23-5	3000	-40~85
	SOT23-6	3000	-40~85
	DFN2*2	3000	-40~85

**High Input Voltage Linear Charger**

**MARK INFORMATION**



**CONFIGURATION**



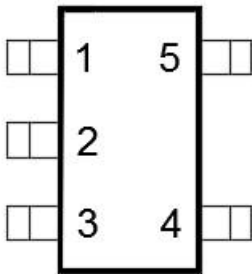
## High Input Voltage Linear Charger

### PIN FUNCTIONS

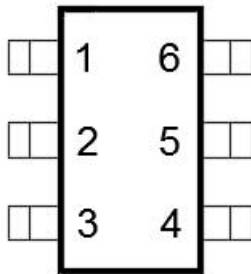
Pin Name	PIN Number			Description
	SOT23-6	SOT23-5	DFN2*2	
CHG	1	1	3	Open drain charge status output
GND	2	2	2	Ground
BAT	3	3	1	Charge current output.
V <sub>in</sub>	4	4	6	Power supply input, V <sub>in</sub> can range from 4.5V to 6.5V
DONE	5	NC	5	Open drain charge status output for full
ISET	6	5	4	Charge current program/monitor and shutdown pin I <sub>BAT</sub> =1V*0.88K/ISET

### PACKAGE

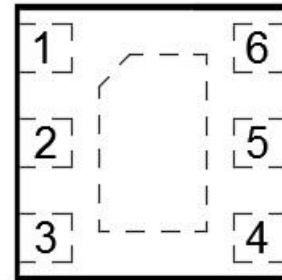
SOT23-5



SOT23-6



DFN2\*2



## High Input Voltage Linear Charger

### THERMAL CHARACTERISTICS

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

THERMAL METRIC			UNIT	
SOT23-6	$\theta_{JA}$	Package thermal impedance <sup>(1)</sup>	180	°C/W

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

### ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>

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

Parameter	Symbol	Min	Type	Max	Unit
Input voltage range	$V_{IN}$	-0.3		36	V
Battery voltage range	BAT	-0.3		11	V
Junction temperature range			125		°C
Storage temperature range		-40		150	°C
HBM(Human Body Model)	ESD		2K		V

### RECOMMENDED OPERATING CONDITIONS

parameter	Symbol	Min	Type	Max	Unit
Input voltage range	$V_{IN}$	4.5	5	21	V

\* Beyond these working conditions, the operating characteristics of the device can't be guaranteed.

## High Input Voltage Linear Charger

### ELECTRICAL CHARACTERISTICS

Chip working condition is 25°C except special specification

parameter	Symbol	Test conditions	Min	Type	Max	Unit
Input voltage range	$V_{IN}$		4.5	5	6.5	V
Input under voltage	$V_{IN\_UVLO}$			3.2		V
	slow-moving			0.32		V
Input overvoltage	$V_{IN\_OVP}$	$V_{IN\_OVP}=21.5V$ Customizable		6.5		V
	slow-moving			0.5		V
VIN-VBAT	VSD	VIN-VBAT up and charge	160	200	240	mV
		VIN-VBAT down, Turn off charge	60	90	120	mV
Input static current	$I_Q$	VIN=5V, VBAT=10uF		0.34		mA
Trickle charge current	$I_{trick}$			$0.1 \cdot ICC$		A
Trickle charging to constant current charging threshold				2.95		V
Constant current charging to trickle charging threshold				2.75		V
Constant current charging current	ICC	RISET=880		1		A
Accuracy of constant current charging current				±5		%
Full voltage	BAT			4.1		V
Accuracy of full voltage				±1		%
Battery overvoltage				$102\% \cdot V_{BAT}$		V
Charging cut-off current	$I_{term}$			$0.1 \cdot ICC$		A
Charging cut-off time	$T_{term}$			2		s
Recharge threshold	$V_{BAT\_rechg}$	Full voltage=4.0V		3.85		V
Temperature loop threshold				140		°C

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**LED DISPLAY MODE**

	Charge	Full voltage	VIN_OVP
Default	CHG, Lights on/DONE Lights out	CHG , Lights out/ DONE, Lights on	CHG, DONE, Lights out
Customizable	CHG 1HZ, twinkle	CHG, Lights on	CHG , Lights out

**CHARGER CURRENT SET**

Formula for setting charging current:  $I=880/RIS\text{ET}$

Such as:  $RIS\text{ET} = 1.76k$ ; Charging current  $I=880/1.76k=500\text{mA}$

**Charging curve**

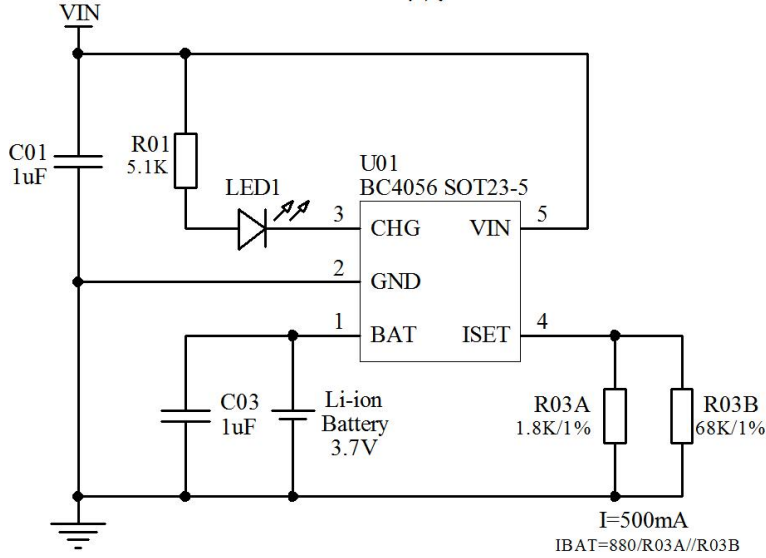


**High Input Voltage Linear Charger**

**SOT23—5 Typical Application Circuit**

SOT23-5 封装原理图

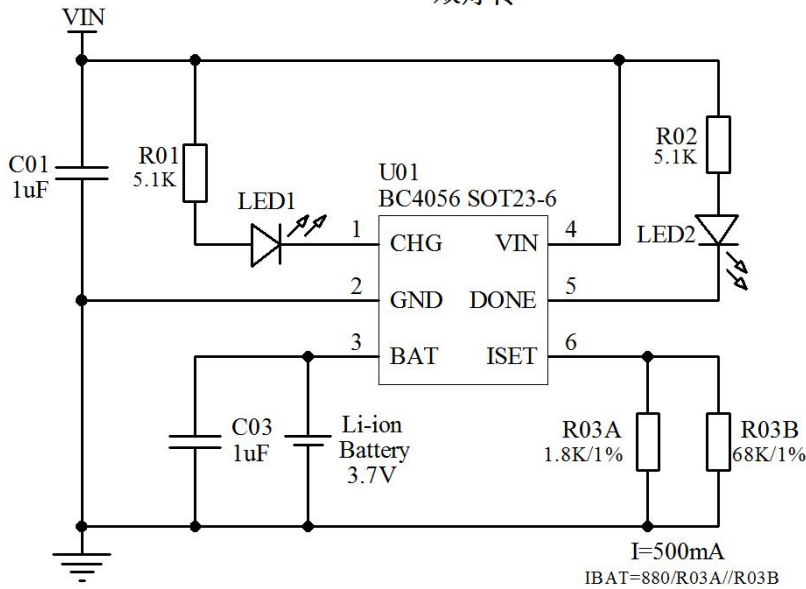
单灯



**SOT23-6 Typical Application Circuit**

SOT23-6 封装原理图

双灯转

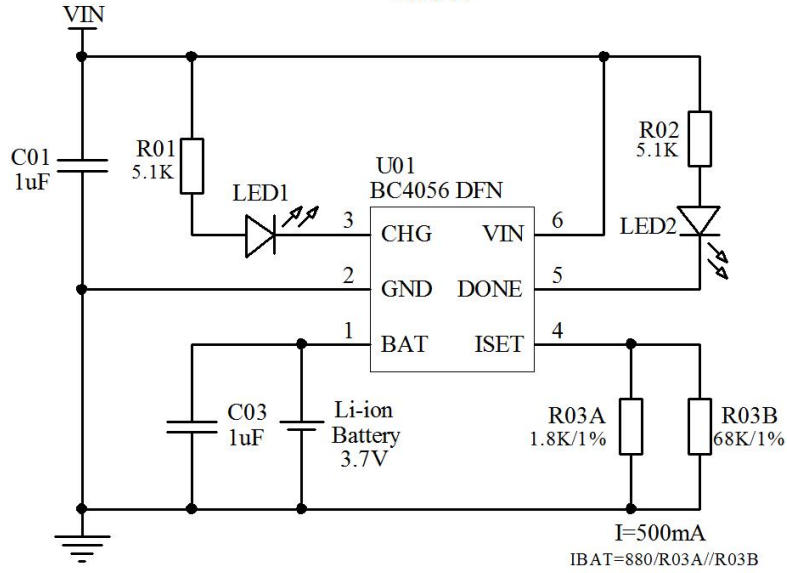


**High Input Voltage Linear Charger**

**DFN2\*2 Typical Application Circuit**

DFN2\*2 封装原理图

双灯转

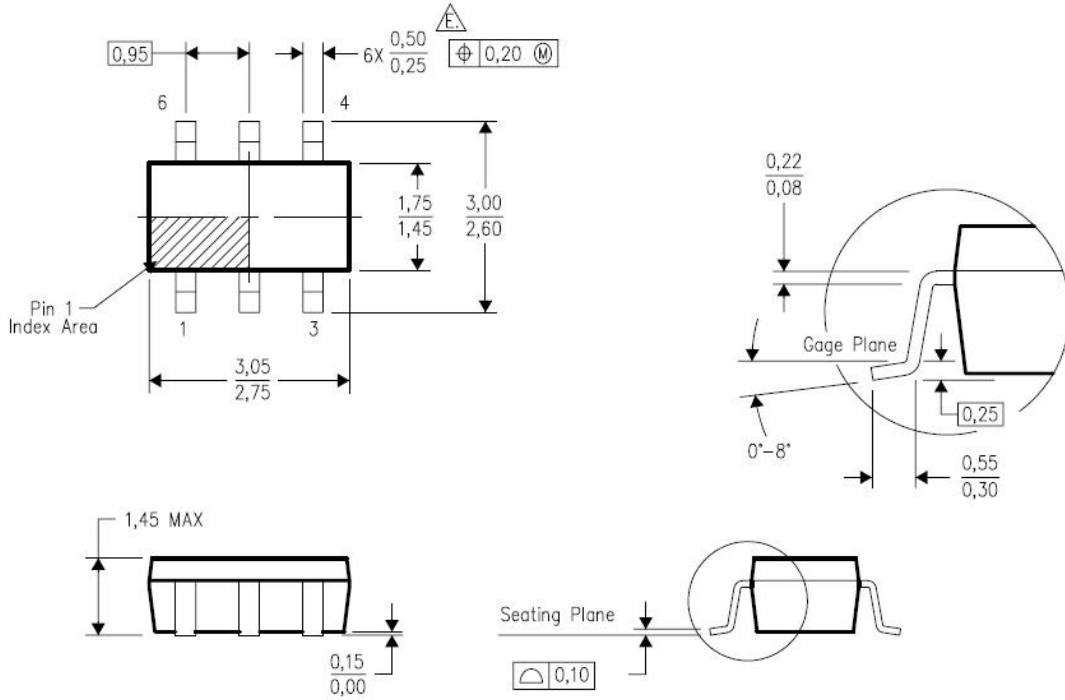




**High Input Voltage Linear Charger**

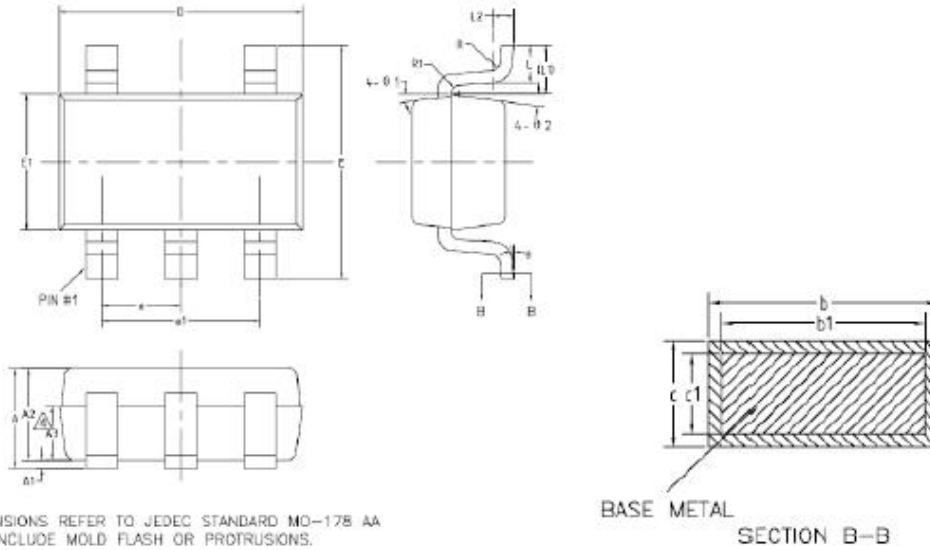
**Package information**

**SOT23-6**



**High Input Voltage Linear Charger**

**SOT23-5**



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	—	—	1.45
A1	0	—	0.15
A2	0.90	1.10	1.30
A3	0.60	0.65	0.70
b	0.39	—	0.49
b1	0.38	0.40	0.45
c	0.12	—	0.19
c1	0.11	0.13	0.15
D	2.82	2.92	3.02
E	2.70	2.90	3.10
E1	1.52	1.62	1.72
e	0.85	0.95	1.05
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	—	—
R1	0.10	—	0.25
θ	0°	—	8°
θ 1	7°	9°	11°
θ 2	8°	10°	12°

**High Input Voltage Linear Charger**

TDFN-2×2-6L

标注	尺寸	最小 (mm)	标准 (mm)	最大 (mm)	标注	尺寸	最小 (mm)	标准 (mm)	最大 (mm)
A		0.70	0.75	0.80	E2		0.75	0.80	0.85
A1		0.00	0.02	0.05	e		0.650BSC		
b		0.30	0.35	0.40	Nd		1.300BSC		
c		0.18	0.20	0.25	K		0.20	-	-
D		1.95	2.00	2.05	L		0.28	0.33	0.38
D2		1.25	1.30	1.35	h		0.15	0.20	0.25
E		1.95	2.00	2.05					

