BRCL4056BSE /
ESOP-8 BRCL4056BSE
BRCL4056BSE USB
PMOSFET

4.20V 4.20V
1/10 BRCL4056BSE
USB BRCL4056BSE
3uA BRCL4056BSE

BRCL4056BSE is a complete CC/CV linear charger for single cell lithium-ion batteries,It has the function of positive and negative electrode protection for battery.Its ESOP-8 package and low external component count make the BRCL4056BSE ideally suited for portable applications. Furthermore, the BRCL4056BSE is specifically designed to work within USB power specifications.

No external sense resistor is needed and no blocking diode is required due to the internal P-MOSFET architecture. Thermal feedback regulates the charge current to limit the die temperature during high power operation or high ambient temperature .The charge voltage is fixed at 4.2V,and the charge current can be programmed externally with a single resistor. The BRCL4056BSE automatically terminates the charge cycle when the charge current drops to 1/10th the programmed value after the final float voltage is reached.

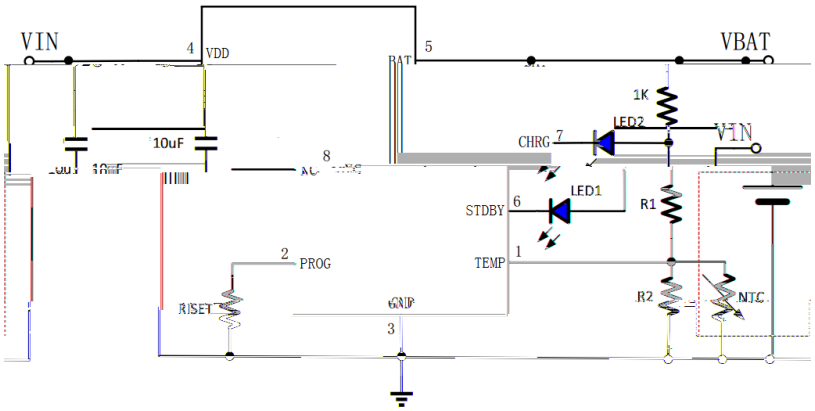
When the input supply (wall adapter or USB supply) is removed the BRCL4056BSE automatically enters a low current state dropping the battery drain current to less than 3μA. Other features include charge

current monitor, under-voltage lockout, automatic recharge and two status pins to indicate charge and charge termination.

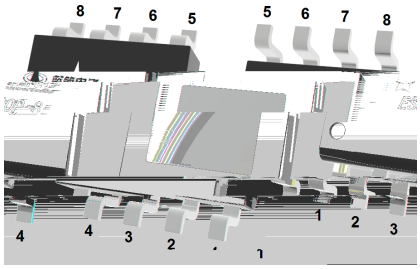
- 4.20V±1%
  Preset 4.20V charge voltage with ±1% accuracy
- 8V
  Maximum allowable input voltage is 8V
- BAT-VIN
  With BAT-VIN anti-backflow function
- 1A MOSFET / /
  Linear charge mode,built-in 1A MOSFET,Trickle /Constant current/Constant voltage three stage charging ,externally adjustable charging charging current
- 0V
  Supports 0V battery charing
-
  Short circuit protection,battery polarity reverse polarity protection
- USB
  Charges single cell Li-ion batteries Directly from USB port

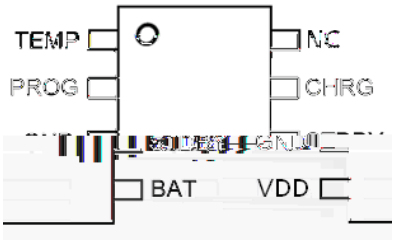
- 130 0
  Intelligent temperature control technology,charging current will decrease with increasing temperature,130 began to decline,the lowest can be reduced to 0
-
  Soft-Start limits inrush current
-
  Automatic recharge
- 4KV ESD HBM mode
-
  Halogen-free Product.

USB
Suitable for USB power and adapter power,Bluetooth applications and other portable devices.



	L1 CHRG	L2 STDBY
/Charging	/Light	/Lights off
/Battery full	/ Lights off	/ Light
TEMP Undervoltage,battery temperature is too high,too low or other fault conditions,or no battery access(use TEMP)	/ Lights off	/ Lights off
BAT 10μF TEMP=GND BAT terminated with 10uF capacitor,no battery	/Flashing light T=1-4s	/ Light





1	TEMP	/External temperature sensing pin
2	PROG	/Charge current regulator
3	GND	/Chip ground
4	VDD	5V/External input DC 5V
5	BAT	/Battery input
6	STDBY	/Battery charge completion indicator
7	CHRG	/Charging indicator
8	NC	/Vacant

See Marking Instructions.

Parameter	Symbol	Rating	Unit
VDD to GND	V_{DD}	-0.3~8	V
BAT to GND	V_{BAT}	-0.3~7	V
CHRG/STDBY to GND	V_{chrg}/V_{stdby}	-0.3~8	V
PROG to GND	V_{prog}	-0.3~8	V
TEMP to GND	V_{temp}	-0.3~8	V
Storage Temperature	T_{STG}	-50~+125	℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
	V_{DD}		4	5	6	V
V_{DD}	V_{DD}	V_{DD}>BAT		100		mV
V_{DD}		V_{DD}>BAT		30		mV
	V_{BAT}	V_{DD}=5V	4.158	4.20	4.242	V
BAT	I_{BAT}	Vcc=3.5V Vbat=4.2V		±0.5	±5	μA
	V_{TRKL}	V_{BAT}		2.8		V
	V_{TRHYS}			100		mV
V_{DD}	V_{UV}	V_{DD}		3.7		V
V_{DD}	V_{UVHYS}			200		mV
	V_{msd}			1.2		V
	V_{msdHYS}			50		mV
PROG	V_{prog1}			0.1		V
PROG	V_{prog2}			1.0		V
	OTR	V_{DD}=5V		130		

BRCL4056BSE

1A

BRCL4056BSE

CHRG STDBY

130

BRCL4056BSE

BRCL4056BSE CHRG

2.8V 2.8V

PROG GND RPROG

4.2V BRCL4056BSE

CHRG STDBY

10%

1%

3uA

The BRCL4056BSE is a complete CC/CV linear charger for single cell lithium-ion batteries. CC/CV to charger batter by internal MOSFET. It can deliver up to 1A of charge current .No blocking diode or external current sense resistors required. BRCL4056BSE include two Open-Drain charge status Pins: Charge status indicator CHRG and battery charge completion status output STDBY.

The internal thermal regulation circuit reduces the programmed charge current if the die temperature attempts to rise above a preset value of approximately 130 .This feature protects the BRCL4056BSE from excessive temperature, and allows the user to push the limits of the power handling capability of a given circuit the external components. Another benefit of adopting thermal regulation is that charge current can be set according to typical, not worst-case, ambient temperatures for a given application with the assurance that the charger will automatically reduce the current in worst-case conditions.

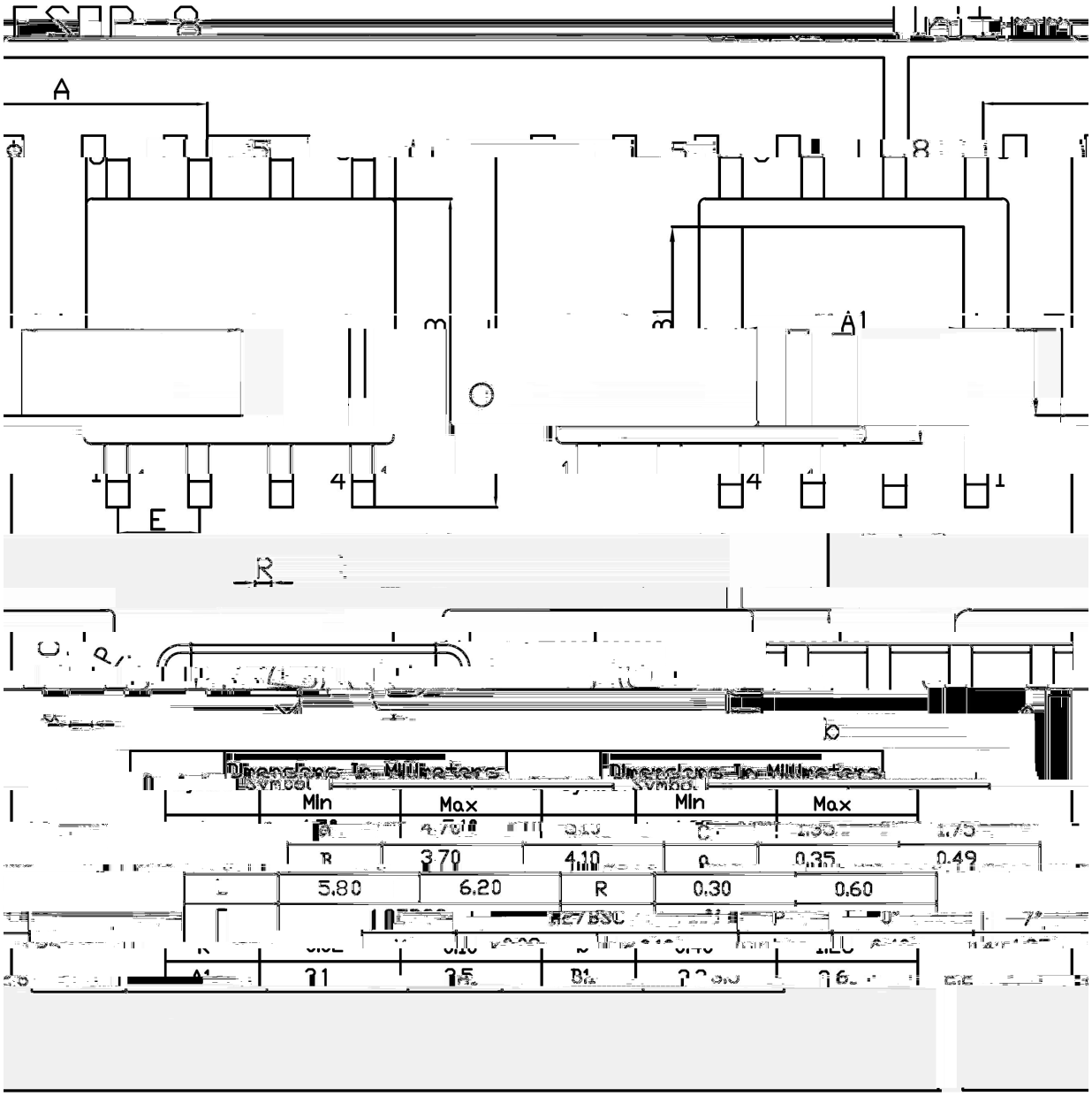
The charge cycle begins when the voltage at the VCC pin rises above the UVLO level, a current set resistor is connected from the PROG pin to ground. The CHRG pin outputs a logic low to indicate that the charge cycle is on going. At the beginning of the charge cycle, if the battery voltage is below 2.8V, the charge is in pre charge mode to bring the cell voltage up to a safe level for charging. The charger goes into the fast charge CC mode once the voltage on the BAT pin rises above 2.8V. In CC mode, the charge current is set by RPROG. When the battery approaches the regulation voltage 4.2V, the charge current begins to decreases the BRCL4056BSE enters the CV mode. When the current drops to charge termination threshold, the charge cycle is terminated, and CHRG pin assumes a high impedance state to indicate that the charge cycle is terminated and STDBY pin is pulled low. The charge termination threshold is 10% of the current in CC mode.

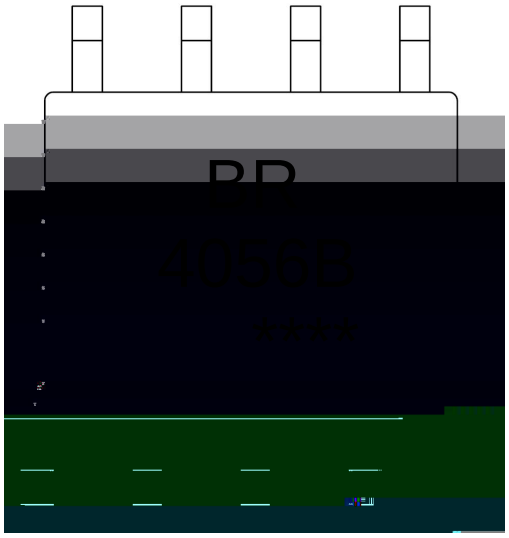
To restart the charge cycle, remove the input voltage and reapply it. The charge cycle can also be automatically restarted if the BAT pin voltage falls below the recharge threshold. The on-chip reference voltage, error amplifier and the resistor divider provide regulation voltage with 1% accuracy which can meet the requirement of lithium-ion and lithium polymer batteries. When the input voltage is not present, or input voltage is below VBAT, the charger goes into a sleep mode, dropping battery drain current to less than 3μA. This greatly reduces the current drain on the battery and increases the standby time.

PROG

The charge current is programmed using a single resistor from the PROG pin to ground. The program resistor and the charge current are calculated using the following equations.

$$R_{prog}(kohm) = \frac{1200}{I_{bat}(mA)} \text{（误差±10%）}$$


Dimensions In Millimeters
Symbol
Min
Max
Dimensions In Millimeters
Symbol
Min
Max
R
3.70
4.10
0.35
0.49
5.80
6.20
R
0.30
0.60



BR:

4056B

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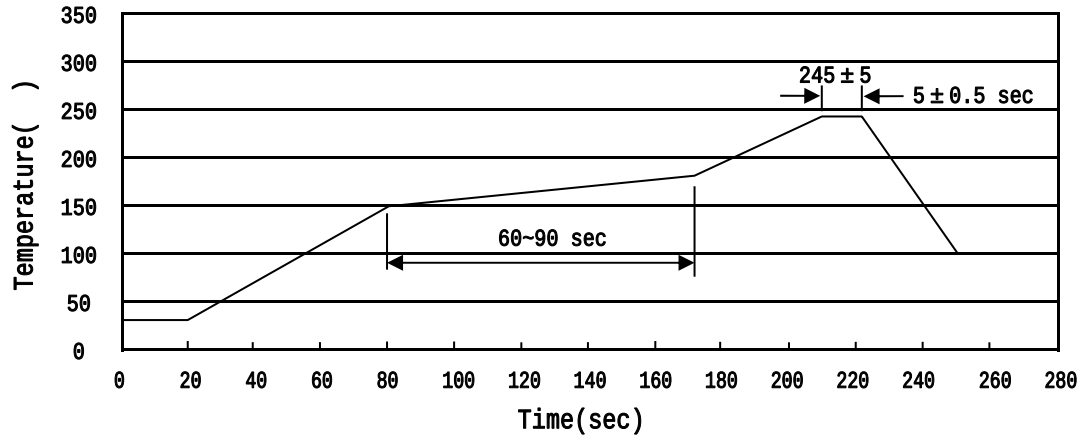
Note:

BR:	Company Code
4056B:	Product Type Code
****:	Lot No. Code, code change with Lot No

Temperature Profile for IR Reflow Soldering(Pb-Free)



				Note:	
1	150	180	60	90sec;	1.Preheating:150~180 , Time:60~90sec.
2	245±5			5±0.5sec;	2.Peak Temp.:245±5 , Duration:5±0.5sec.
3		2	10	/sec.	3. Cooling Speed: 2~10 /sec.

260±5	10±1 sec.	Temp.:260±5	Time:10±1 sec

/ REEL

Package Type	Units					Dimension		(unit mm³)
	Units/Reel /	Reels/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Reel	Inner Box	Outer Box
SOP/ESOP-8	4,000	2	8,000	6	48,000	13″ ×12	360×360×50	380×335×366