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E	2018-4				
F	2019-3-1	1			
G	2020-4-1	10	! " # $ %ﾑ ' 中的 (Note: The BRCL4054ME does not include this trickle charge feature).		
H	2021-12-23				

BRCL4054BME / SOT
BRCL4054BME BRCL4054BME USB
PMOSFET

4.2V
1/10 BRCL4054BME BRCL4054BME

The BRCL4054BME is a complete constant-current/constant voltage linear charger for single cell lithium-ion batteries. Its Thin SOT package and low external component count make the BRCL4054BME ideally suited for portable applications. Furthermore, the BRCL4054BME 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 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 BRCL4054BME automatically terminates the charge cycle when the charge current drops to 1/10th the programmed value after the final float voltage is reached.Other features include charge current monitor, under voltage lockout, automatic recharge and a status pin to indicate charge termination and the presence of an input voltage.

- 800mA / Programmable charge current up to 800mA
- MOSFET / No MOSFET, sense resistor or blocking diode required
- SOT23-5

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See Marking Instructions

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Parameter	Rating	Unit
Input Supply Voltage (V_{CC})	-0.3 to 10	V
PROG	-0.3 to V_{CC} + 0.3	V
BAT	-0.3 to 7	V
$\overline{CHRG}$	-0.3 to 10	V
BAT Pin Current	800	mA
Operating Ambient Temperature Range	-40~85	℃
Storage Temperature Range	-65~150	℃
Lead Temperature (Soldering,10sec)	300	℃

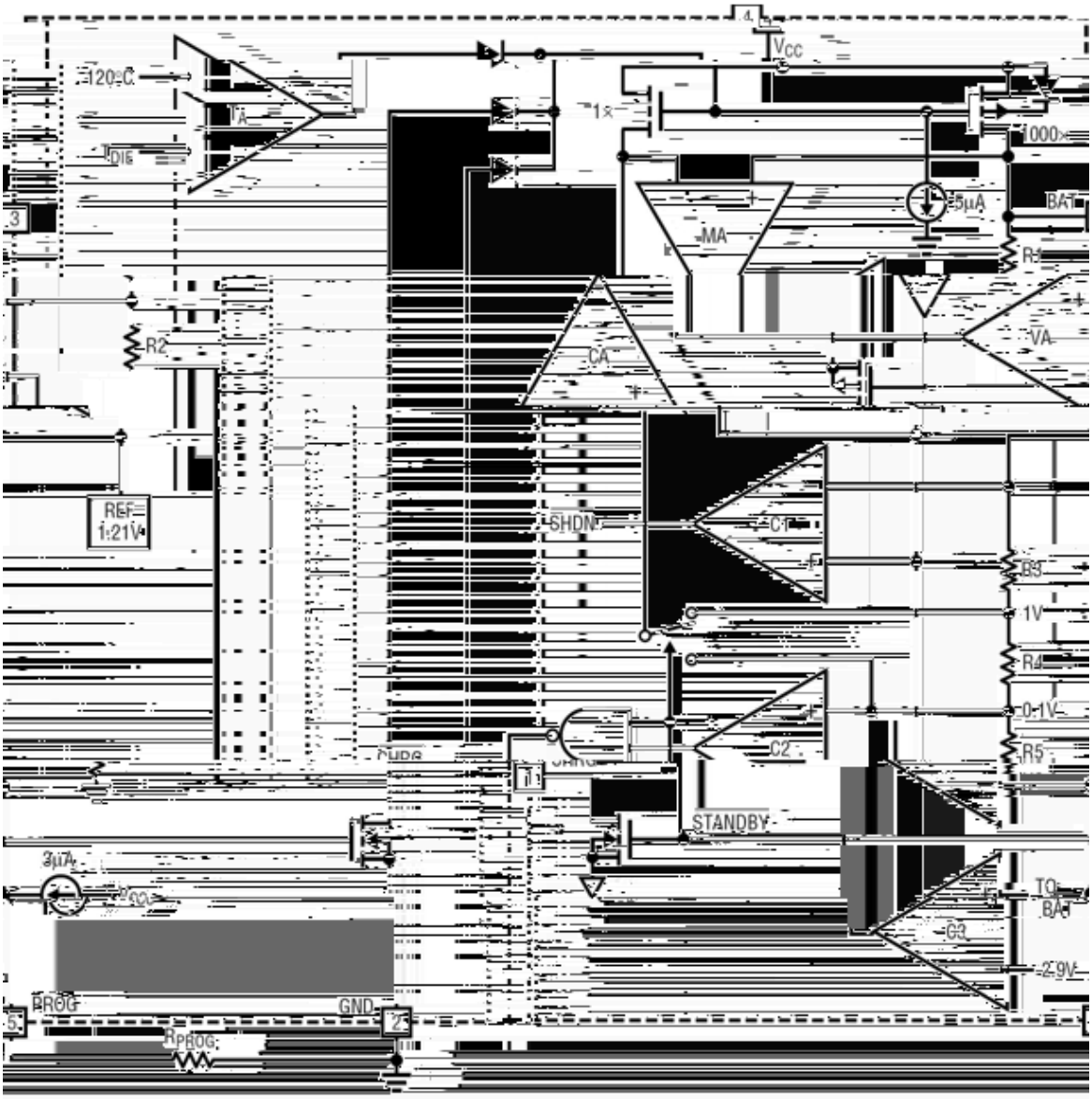
B C ? @ A

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Supply Voltage	V_{CC}		4.25		6.5	V
Input Supply Current	I_{CC}	Charge Mode , R_{PROG}=10k		300	2000	μA
		Standby Mode (Charge Terminated)		200	500	μA
		Shutdown Mode (R_{PROG} Not Connected V_{CC}<V_{BAT}, or V_{CC}<V_{UV})		25	50	μA
Regulated Output (Float) Voltage	V_{FLOAT}	0℃≤T_A≤85℃ I_{BAT} =40mA	4.158	4.20	4.242	V
BAT Pin Current	I_{BAT}	R_{PROG}=10k Current Mode	93	100	107	mA
		R_{PROG}=2k Current Mode	465	500	535	mA
		Standby Mode V_{BAT}=4.2V	0	-2.5	-6.0	μA
		Shutdown Mode (R_{PROG} Not Connected)		±1.0	±2.0	μA
		Sleep Mode V_{CC} = 0V		±1.0	±2.0	μA
Trickle Charge Current	I_{TRIKL}	V_{BAT} <V_{TRIKL} R_{PROG}=2k	20	45	70	mA
Trickle Charge Threshold Voltage	V_{TRIKL}	R_{PROG}=10k,V_{BAT} Rising	2.8	2.9	3.0	V
Trickle Charge Hysteresis Voltage	V_{TRHYS}	R_{PROG} = 10k	60	80	110	mV

 # B C ? @ A

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
V_{CC} Undervoltage Lockout Threshold	V_{UV}	From V_{CC} Low to High	3.7	3.8	3.92	V
V_{CC} Undervoltage Lockout Hysteresis	V_{UVHYS}		150	200	300	mV
Manual Shutdown Threshold Voltage	V_{MSD}	PROG Pin Rising	1.15	1.21	1.30	V
		PROG Pin Falling	0.9	1.0	1.1	V
V_{CC} – V_{BAT} Lockout Threshold Voltage	V_{ASD}	V_{CC} from Low to High	70	100	140	mV
		V_{CC} from High to Low	5.0	30	50	mV
C/10 Termination Current Threshold	I_{TERM}	R_{PROG}=10k	0.085	0.10	0.115	mA/mA
		R_{PROG}=2k	0.085	0.10	0.115	mA/mA
PROG Pin Voltage	V_{PROG}	R_{PROG}=10k Current Mode	0.93	1.0	1.07	V
$\overline{CHRG}$ Pin Weak Pull-Down Current	I_{CHRG}	V_{CHRG}=5V	8.0	20	35	μA
$\overline{CHRG}$ Pin Output Low Voltage	V_{CHRG}	I_{CHRG}= 5mA		0.35	0.60	V
Recharge Battery Threshold Voltage	V_{RECHRG}	V_{FLOAT}-V_{RECHRG}	100	150	200	mV
Junction Temperature in Constant Temperature Mode	T_{LIM}			120		℃
Soft-Start Time	t_{SS}	I_{BAT}=0 to I_{BAT}=1000V/R_{PROG}		100		μs
Recharge Comparator Filter Time	$t_{RECHARGE}$	V_{BAT} High to Low	0.75	2.0	4.5	ms
Termination Comparator Filter Time	t_{TERM}	I_{BAT} Falling Below I_{CHG}/10	400	1000	2500	μs
PROG Pin Pull-Up Current	I_{PROG}			3.0		μA

D E F G


Vcc
120°C
DIE
1x
1000x
25µA
BAT
MA
R3
R2
CA
VA
REF
1.21V
SHDN
C1
R3
1V
R4
0-1V
C2
R5
STANDBY
3µA
TO
BAT
C3
2.9V
PROG
GND
RPROG

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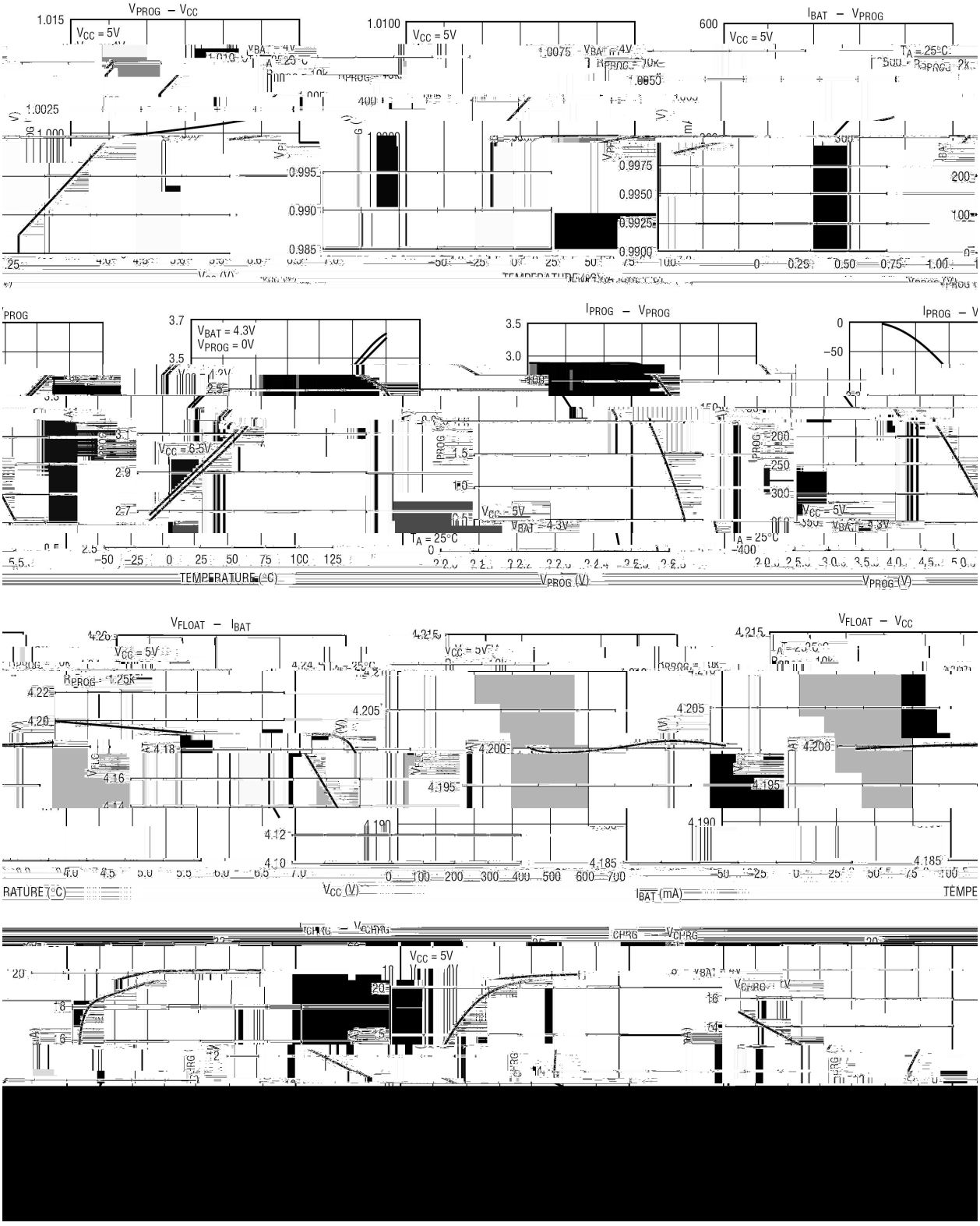
VPROG – VCC
VCC = 5V
IBAT – VPROG
VCC = 5V
TA = 25°C
VCC = 5V
VBAT = 4.3V
VPROG = 0V
IPROG – VPROG
VCC = 5V
VBAT = 4.3V
TA = 25°C
VFLOAT – IBAT
VCC = 5V
RPROG = 1.25k
VFLOAT – VCC
VCC = 5V
VCC = 5V
TEMPERATURE (°C)
VCC (V)
IBAT (mA)
VPROG (V)

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V_{cc} UVLO PROG 1%

BAT 2.9V

BRCL4054BME 1/10

A charge cycle begins when the voltage at the V_{CC} pin rises above the UVLO threshold level and a 1% program resistor is connected from the PROG pin to ground or when a battery is connected to the charger output. If the BAT pin is less than 2.9V, the charger enters trickle charge mode. In this mode, the BRCL4054BME supplies approximately 1/10 the programmed charge current to bring the battery voltage up to a safe level for full current charging.

BAT 2.9V BAT

4.2V BRCL4054BME

1/10

When the BAT pin voltage rises above 2.9V, the charger enters constant-current mode, where the programmed charge current is supplied to the battery. When the BAT pin approaches the final float voltage (4.2V), the BRCL4054BME enters constant-voltage mode and the charge current begins to decrease. When the charge current drops to 1/10 of the programmed value, the charge cycle ends.

BRCL4054BME BAT 4.05V

(V_{RECHRG})

PROG

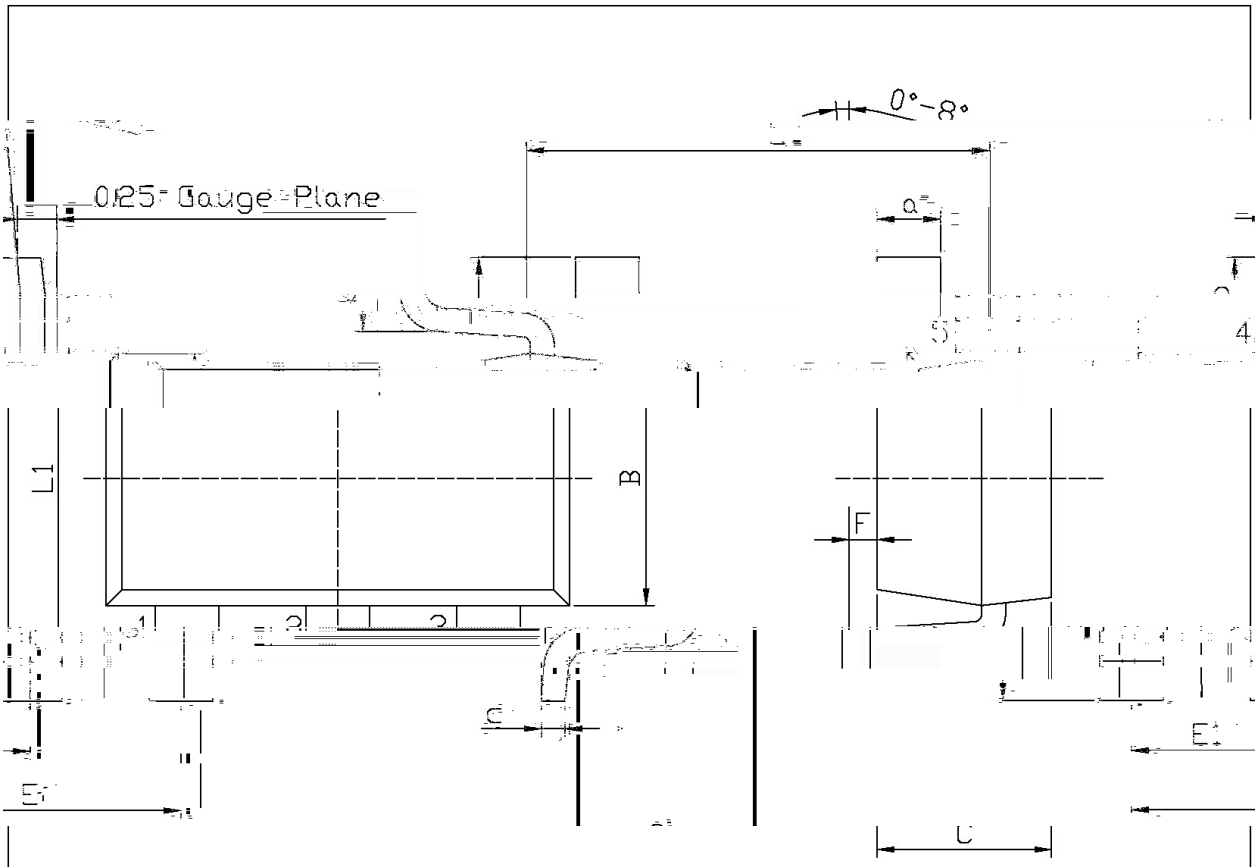
The BRCL4054BME constantly monitors the BAT pin voltage in standby mode. If this voltage drops below the 4.05V recharge threshold (V_{RECHRG}), another charge cycle begins and current is once again supplied to the battery. To manually restart a charge cycle when in standby mode, the input voltage must be removed and reapplied, or the charger must be shut down and restarted using the PROG pin.

PROG PROG

1000

The charging current is set by a resistor connected between prog pin and ground. The charging current is 1000 times the output current of prog pin. The setting resistor and charging current are calculated using the following formula

K L M N G



Unit: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	0.90	1.30	c	0.13	0.25
L1	2.60	3.00	b	0.35	0.55
E	1.80	2.00	F	0	0.15

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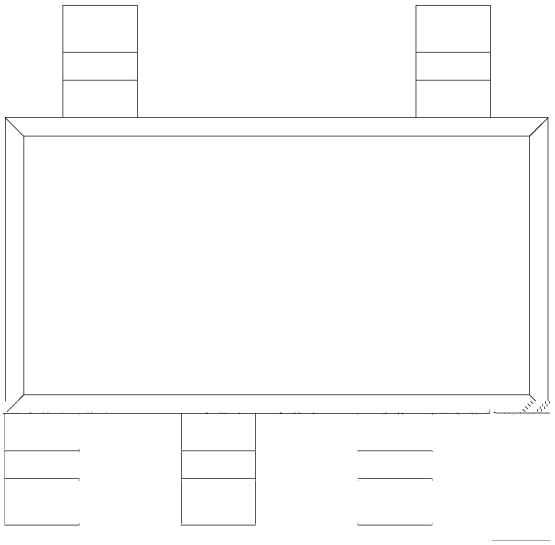

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Q R S T U H I G V W

Note:

1 150 180 60 90sec;

2 245±5 5±0.5sec;

3 2 10℃/sec.

1.Preheating:150~180℃, Time:60~90sec.

2.Peak Temp.:245±5℃, Duration:5±0.5sec.

3. Cooling Speed: 2~10℃/sec.

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

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/ REEL

Package Type	Units	Dimension (unit mm^3)