EV3655A_S0_R1

20V, 3A 4-Switch Buck-Boost Charging Converter

Parameters Subject to Change Without Notice

FEATURES

- Wide input voltage: 4.2V to 20V.
- Adaptive Input current limit.
- Selectable charge cut-off voltage for 1-3 cell(s).
- High efficiency buck-boost transition.
- 450kHz switching frequency
- Programmable charge current (up to 3A).
- Quiescent current: <60μA.
- Integrate thermal protection.
- QFN3*4 package.

APPLICATIONS

- power bank systems
- Battery and Super Capacitor Charging
- USB Power Delivery

DESCRIPTION

The JW®3655A is a buck boost converter targets HVDC fast charging system.

The JW3655A implements the Buck Boost converter with an H-bridge. Support 1 to 3 cells Li-ion battery. The full charge voltage and charge current can be programmable through external resistor.

Constant current control is utilized to protect the device from overshooting in unwanted conditions. Built-in loop compensation simplifies the circuit and design. PFM is engaged to maintain high efficiency at light load current.

JW3655A guarantees robustness with thermal protection and battery under voltage lockout.

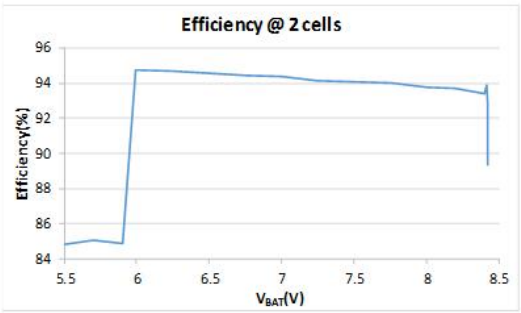
ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Unit
V_{IN} Voltage	V_{IN}	5.0	V
Charge Current	I_{IN}	2.0	A
Battery Voltage	V_{BAT}	6.0-8.4	V

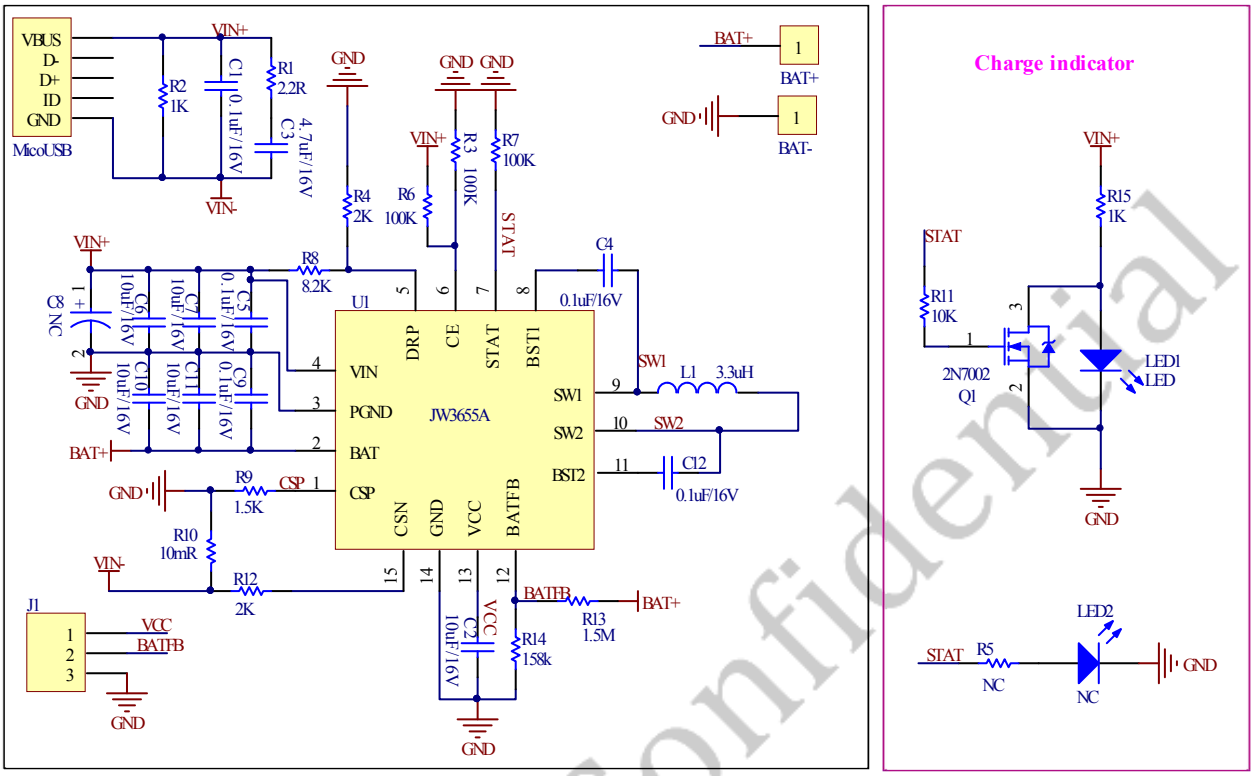
EVALUATION BOARD

EV3655A_S0_R1 60mm*50mm

Charge Efficiency @ 2 cells



SCHEMATIC



BILL OF MATERIALS

Qty.	Designator	Comment	Description	Footprint	Manufacturer	Manufacturer P/N
2	BAT+, BAT-	E4	Connector	SIP-1.2-2		
5	C1, C4, C5, C9, C12	0.1uF/16V	capacitor	0603C	SAMSUNG	CL10B104K08NNNC
5	C2, C6, C7, C10, C11	10uF/16V	capacitor	0805C	SAMSUNG	CL21A106KOQNNNE
1	C3	4.7uF/16V	capacitor	0603C	MURATA	GRM188R61C475KAAJ
1	C8	NC	Electrolytic capacitor	CAP-8*10		
1	J1	Header 3	Header, 3-Pin	SIP3-2.54		
1	L1	3.3uH		L-6*6SMT	WE	LQH43MN3R3M03
1	LED1	LED	Green	LED0603		

Qty.	Designator	Comment	Description	Footprint	Manufacturer	Manufacturer P/N
1	LED2	NC				
1	Q1	2N7002	NMOS	SOT23		
1	R1	2.2R	Resistor	0603R	uniohm	0603 F2.2RT5E
2	R2, R15	1K	Resistor	0603R	uniohm	0603J0102T5E
3	R3, R6, R7	100K	Resistor	0603R	uniohm	0603 J1003T5E
2	R4, R12	2K	Resistor	0603R	uniohm	0603 J2001T5E
1	R9	1.5K	Resistor	0603R	uniohm	0603 J1501T5E
1	R5	NC	Resistor	0603R		
1	R8	8.2K	Resistor	0603R	uniohm	0603F8201T5E
1	R10	10mR	Resistor	1206R		
1	R11	10K	Resistor	0603R	uniohm	0603J1002T5E
1	R13	1.5M %1	Resistor	0603R	uniohm	0603J1583T5E
1	R14	158K %1	Resistor	0603R	uniohm	0603J1504T5E
1	MicoUSB	USB	Header, 5-Pin	MICRO-10		
1	U1	JW3655A	IC	QFN3*4-15	JoulWatt	JW3655A

PRINTED CIRCUIT BOARD LAYEROUT

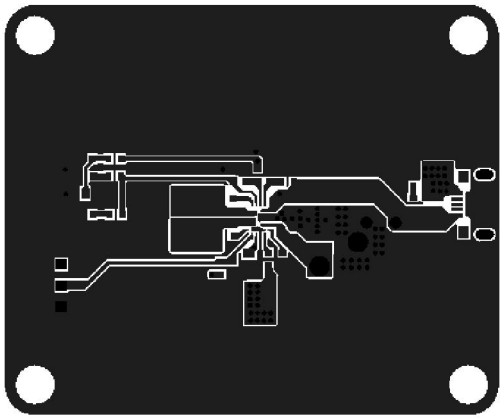


Figure1—Top Layer

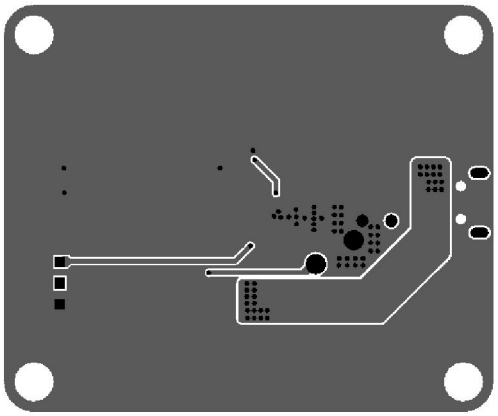


Figure2—Bottom Layer

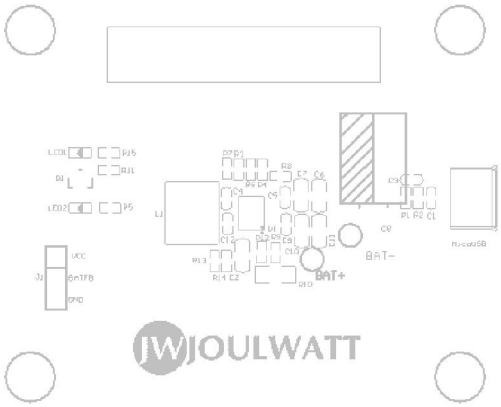


Figure3—Top Overlay

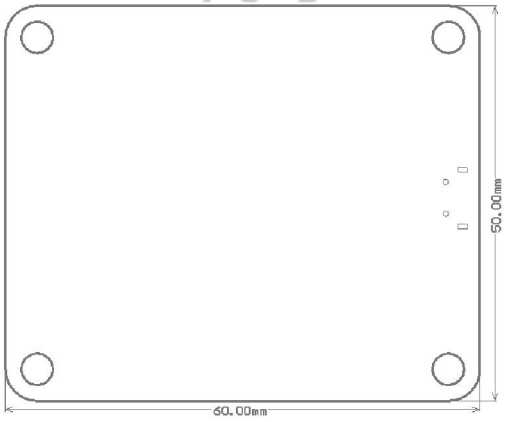


Figure4—Keep Out Layer

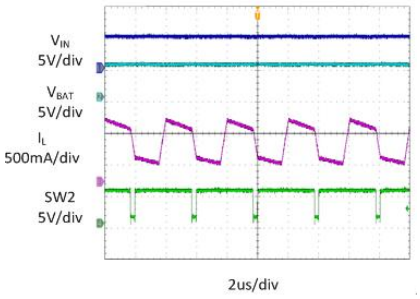
QUICK START GUIDE

1. **Connect a battery power supply between BAT+ and BAT-.**
2. **Connect a DC power supply through micro USB.**
3. **The charge current can be adjusted by varying the R10 and R12 on EVB.**
   I_{CC}(A)=R12(kΩ) /R10(mΩ)*10μA
4. **The number of the cells can be adjusted by J1 on EVB. Short pin2 (BATFB) to pin3 (GND) to charge 2 cells, leave pin2 (BATFB) float to charge 3 cells and configuration single cell charge need set R13=255k, R14=102k.**

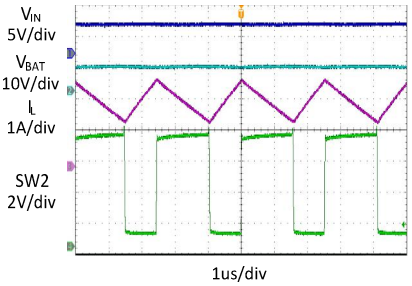
TYPICAL PERFORMANCE CHARACTERISTICS

V_{IN} = 5V, L = 3.3μH, C_{IN} = 20μF, C_{BAT}=20uF, 2 Cells, TA = +25°C, unless otherwise noted.

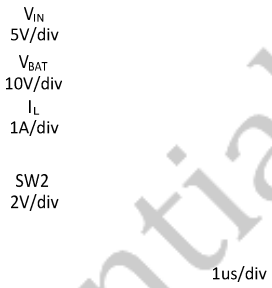
Trickle charge @ 2 cells



Constant current charge@ 2 cells

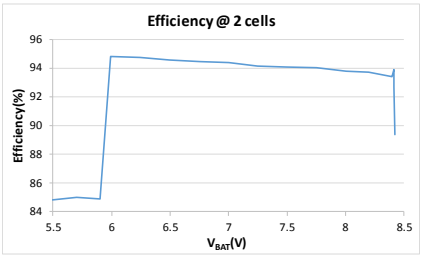


Constant voltage charge@ 2 cells



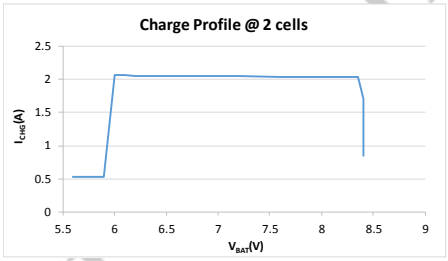
Charge efficiency @ 2 cells

V_{IN}=5V



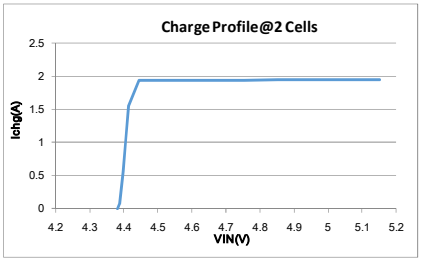
Charge current vs. V_{BAT} @ 2 cells

V_{IN}=5V



Charge current vs. V_{IN}

V_{BAT}=7.4V



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