

16V Standoff, 3A Charger with 3.1A OTG for Power Bank All-in-One Solution

DESCRIPTION

ETA6983 is a switching Li-lon battery charger capable of delivering up to 3A of charging current to the battery and also capable of delivering up to 3.1A in boost OTG operation. It includes an externally programmable fuel gauge system for power indication. For charging, it uses a proprietary control scheme that eliminates the current sense resistor for constant current control, thereby improving efficiency and reducing costs. It can also output a 5V voltage in the reversed direction by boosting from the battery. Therefore, it only needs a single inductor to provide power bi-directionally. Together with the build-in Microcontroller functions, such as push-button, auto load detection, and fuel gauging features, ETA6983 is truly an ideal all-in-one solution for battery charging and discharge applications, such as power banks, smart phones, and tablets with only one USB port that can be used for both charging battery and USB OTG function.

ETA6983 is in QFNFC 3x3-20 package.

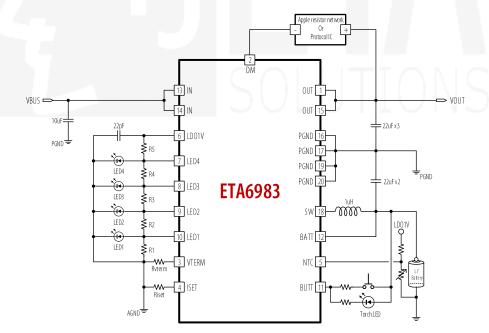
FEATURES

- Bi-Directional Power conversion with Single Inductor
- Switching Charger
- 5V Synchronous Boost
- Up to 97% Efficiency
- Up to 3A Max charging current and 3.1A discharging
- Automatic plug-in detection
- NTC thermistor input
- Tiny QFN3x3 package

APPLICATIONS

- Power Bank
- Smart Phone/ Tablet, MID

TYPICAL APPLICATION



ORDERING INFORMATION

PART No. ETA6983F3W

PACKAGE FCQFN3x3-20

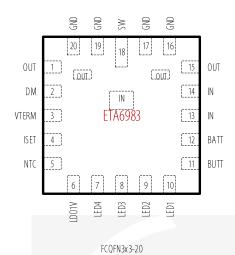
TOP MARK ETA6983

Pcs/Reel 5000

<u>YWW</u>2<u>L</u>



PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

IN Voltage		0.3V to 16V
OUT Voltage		0.3V to 6V
All Other Pin Voltage	• • • • • • • • • • • • • • • • • • • •	V_{0UT} -0.3V to V_{0UT} +0.3V
SW, IN, OUT to ground current		Internally limited
Operating Temperature Range		40°C to 85°C
Storage Temperature Range		55°C to 150°C
Thermal Resistance	Θ_{JA}	
FCQFN3X3-20	30	°C/W
Lead Temperature (Soldering, 10ssec)		260°C
ESD HBM (Human Body Mode)		2KV
ESD MM (Machine Mode)		200V

ELECTRICAL CHACRACTERISTICS

 $(V_{IN} = 5V$, unless otherwise specified. Typical values are at TA = 25oC.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
BUCK MODE					
IN Standoff Voltage			16		V
IN Range		4.5		6	V
IN UVLO Voltage	Rising, Hys=500mV	4.5			V
IN to OUT RDSON			60		mΩ
IN to OUT Input current limit					
IN to OUT Hiccup thresholdVoltage	Falling. Vin-Vout>500mV Rising, Hys=100mV	500			mV
Hiccup on time			mS		
Hiccup off time		200			mS
IN OVP Voltage	Hys=500mV		V		
IN Operating Current as DUCV	Switcher Enable, Switching	5			mA
IN Operating Current as BUCK	Switcher Enable, No Switching	500			μΑ
BATTERY CHARGER					
Pattory (VV) latage	R _{VTERM} =0, I _{BAT} =0mA, default	4.16	4.2	4.24	V
Battery CV Voltage	R _{VTERM} =60K, I _{BAT} =0mA, default	4.3	4.35	4.4	V
Charger Restart Threshold			-170		m۷
Battery Pre-Condition Voltage	V _{BAT} Rising Hys=200mV		3		V
Pre-Condition Charge Current			200		mA
	R _{ISET} =60KΩ	2.7	3	3.3	
Fast Charge Current	R _{ISET} =90KΩ	1.7 2 2.3			A
	R _{ISET} =180ΚΩ	0.8	1	1.2	



PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Charge Termination Current			250		mA
Charge Termination Blanking time			12		S
Pre-Condition Timer			1		hour
Fast-Charge Timer			24		hour
BOOST MODE	1				
BATT OK Threshold	Rising, HYS=0.4V		3.2		V
Output Voltage Range		5.1	5.15	5.22	V
Quiescent Current At BATT	Boost On		250		μA
Shutdown Supply Current At BATT	Idle Mode		65		μA
Switching Frequency	VBATT<4.4V		1.2		MHz
lout Current Limit	VBATT=3.8V	3.1	3.5	4	А
Maximum Duty Cycle			95		%
Highside Pmos Rdson	I _{sw} =500mA		20		mΩ
Lowside Nmos Rdson	I _{sw} =500mA		18		mΩ
Short Circuit Hiccup Current			3		А
Chaut Cinavit III and Time and	On Time		20		
Short Circuit Hiccup Timer	OffTime		700		- ms
Load current threshold into sleep mode		70		mA	
LEDS					
LED Flash Frequency			1		Hz
ISET,Vhold, VTERM					
Vhold	Vout start to reduce charging current		4.6	N I O	V
ISET Voltage			0.8		V
VTERM Voltage	R _{VTERM} =60K		0.6		V
LD01V					
LDO1V Voltage		0.99	1	1.01	V
LOGIC INPUT: BUTT					
Logic Input High		V _{BAT} -0.3			V
Logic Input Low				V _{BAT} -1.2 or Floating	V
NTC THERMISTOR MONITOR					
NTC Threshold, Cold	Charger Suspended		52		%Vldo1V
NTC Threshold, Hot	Charger Suspended	13			%Vldo1V
NTCThreshold Hysteresis		2		%Vldo1V	
NTC Disable Threshold	Tie to VLDO1V or set to 1V	1		V	
NTC Input Leakage		0 5		μΑ	
THERMAL PROTECTION					1
Charging Thermal Regulation threshold			110		٥(
Thermal Shutdown	Rising, Hys=30°C		160		٥(



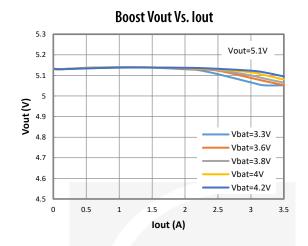
PIN DESCRIPTION

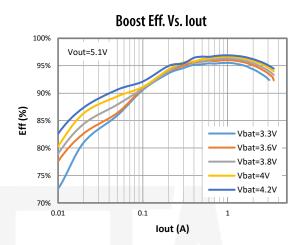
PIN#	NAME	DESCRIPTION
1, 15	OUT	USB 5.15V output during boost and charging input pin during charging. This is a power pin, bypass with 3x22uF MLCC caps to the pin and PGND as close as possible.
2	DM	The pin to switch off resistor divider or USB charge port controller IC (such as TPS2514) at USB port when starts to detect the load plug-in and when boost is being started, this DM pin turned on resistor divider or controller IC again. Connect this pin to the negative terminal of resistor divider strings or the GND pin of the controller IC.
3	VTERM	Battery termination voltage setting pin. Connect a resistor between this pin and analog ground to set battery termination voltage following the equation: Vbat=4.2V+10uA*R _{VTERM} /4. Vbat will be 4.2V when this pin is floating.
4	ISET	Buck Charging current setting pin. Connect a resistor between this pin and analog ground to set the current level.
5	NTC	Battery Temperature Monitoring input pin. It sets the valid temperature operating range for both battery charging and discharging.
6	LD01V	Fuel Gauge 1V LDO output pin. Bypass with a 22pF capacitor to Analog ground. Resistor chain from LDO1V, thru LED1–4 to AGND, will set the battery fuel gauge level.
7	LED4	Fuel gauge LED4 connection pin
8	LED3	Fuel gauge LED3 connection pin
9	LED2	Fuel gauge LED2 connection pin
10	LED1	Fuel gauge LED1 connection pin
11	BUTT	Push Button pin. When the push button is pushed, and input is not present, boost operation is activated. Depending on the loading at OUT, the boost may continue to supply an output voltage or go into sleep mode. When push this button sustain 0.8S, it will turn on or turn off the flashlight alternatively. Beside Push Button feature, this pin also works as Flashlight pin. An internal open drain will turn on Flashlight when this feature is ON.
12	BATT	Battery Voltage sense pin. Connect to the battery positive terminal with a separate sensing wire to avoid voltage drop to achieve accurate battery CV charging
13, 14	IN	DC Input pins. Bypass with a 10uF capacitor from this pin to GND
16, 17, 19, 20	GND	Power Ground pin
18	SW	Switching Pin. Connect with an inductor between this pin and BATT.

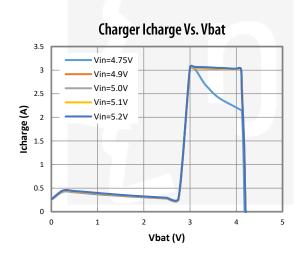


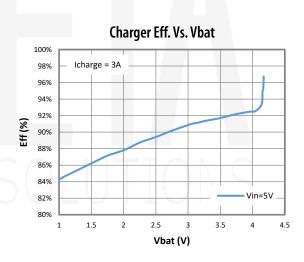
TYPICAL CHARACTERISTICS

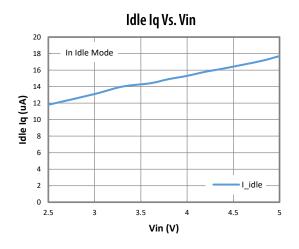
(Vin=5V, T_A=25°C, unless otherwise specified)

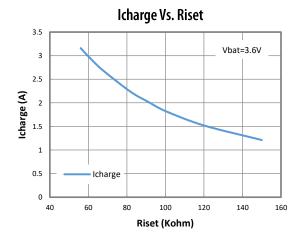










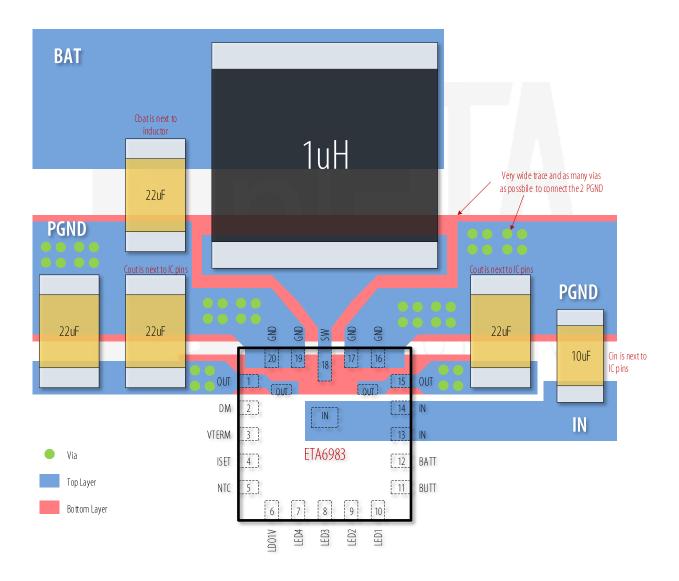




APPLICATION SUPPORT

Please contact local distributor or ETA solutions for detail engineering support.

PCB GUIDELINES

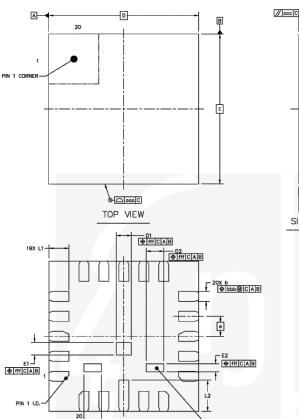


Please try to place the Cout, L, and Cin as suggested by the illustration above. The Cout has to be placed just next to the chip with shortest wire to the OUT and PGND pins. Inductor is moved a little far from the chip to get area for two PGNDs pin connected each other, but close to CBAT. The Cin placed aside, a very tight and small power loop is achieved to improve EMI characteristic. Besides, we also need to group the AGND of VTERM, ISET, NTC resistor and make star ground connection to PGND to minimize noise.



PACKAGE OUTLINE

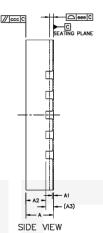
Package: QFN3x3-20



−D3 ⊕fffCAB

BOTTOM VIEW

EXPOSED DIE ATTACH PAD



		SYMBOL	MIN	NOM	MAX		
TOTAL THICKNESS		A	0.5 0.55		0.6		
STAND OFF		A1	0 0.02		0.05		
MOLD THICKNESS		A2	0.4				
L/F THICKNESS		A3	0.152 REF				
LEAD WIDTH		b	0.15 0.2 0.25				
BODY SIZE	×	D	3 BSC				
BOOT SIZE	Y	E	3 BSC				
LEAD PITCH		e	0.4 BSC				
	x	D1	0.2	0.3	0.4		
		D2	0.25	0.35	0.45		
EP SIZE		D3	0.25	0.35	0.45		
	Y	E1	0.15	0.25	0.35		
	7	E2	0.06	0.16	0.26		
LEAD LENGTH		L1	0.3	0.4	0.5		
		L2	0.525	0.625	0.725		
PACKAGE EDGE TOLERANCE 000		aca		0.1			
MOLD FLATNESS		ccc	0.1				
COPLANARITY		eee	0.08				
LEAD OFFSET		bbb	0.1				