

## DESCRIPTION

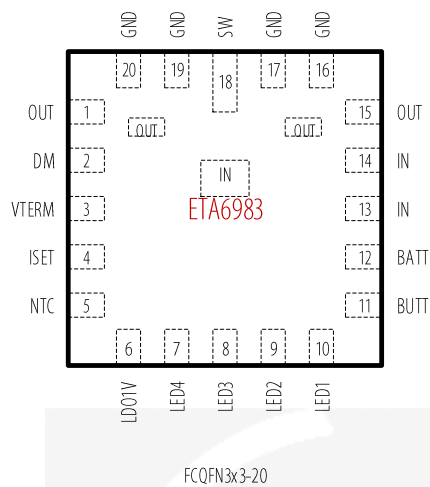
ETA6983 is in QFNFC 3x3-20 package.

- ◆ 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

- ◆ Power Bank
- ◆ Smart Phone/ Tablet, MID

**Pcs/Reel**  
5000

## 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.....	$V_{OUT} - 0.3V$ to $V_{OUT} + 0.3V$
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 $\theta_{JA}$	
FCQFN3X3-20.....	30.....°C/W
Lead Temperature (Soldering, 10ssec) .....	260°C
ESD HBM (Human Body Mode) .....	2KV
ESD MM (Machine Mode) .....	200V

## ELECTRICAL CHARACTERISTICS

( $V_{IN} = 5V$ , unless otherwise specified. Typical values are at  $T_A = 25^\circ C$ .)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
<b>BUCK MODE</b>					
IN Standoff Voltage			16		V
IN Range		4.5		6	V
IN UVLO Voltage	Rising, Hys=500mV		4.5		V
IN to OUT RDS(on)			60		mΩ
IN to OUT Input current limit			5		A
IN to OUT Hiccup threshold Voltage	Falling, $V_{in} - V_{out} > 500mV$ Rising, Hys=100mV		500		mV
Hiccup on time			7		mS
Hiccup off time			200		mS
IN OVP Voltage	Hys=500mV		6.1		V
IN Operating Current as BUCK	Switcher Enable, Switching		5		mA
	Switcher Enable, No Switching		500		μA
<b>BATTERY CHARGER</b>					
Battery CV Voltage	$R_{VTERM}=0, I_{BAT}=0mA$ , default	4.16	4.2	4.24	V
	$R_{VTERM}=60K, I_{BAT}=0mA$ , default	4.3	4.35	4.4	V
Charger Restart Threshold			-170		mV
Battery Pre-Condition Voltage	$V_{BAT}$ Rising Hys=200mV		3		V
Pre-Condition Charge Current			200		mA
Fast Charge Current	$R_{ISET}=60K\Omega$	2.7	3	3.3	A
	$R_{ISET}=90K\Omega$	1.7	2	2.3	
	$R_{ISET}=180K\Omega$	0.8	1	1.2	

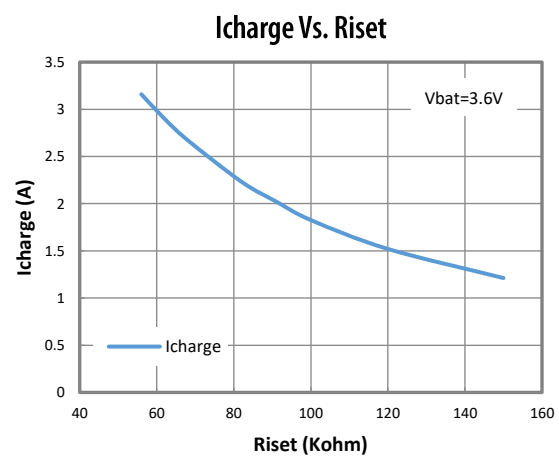
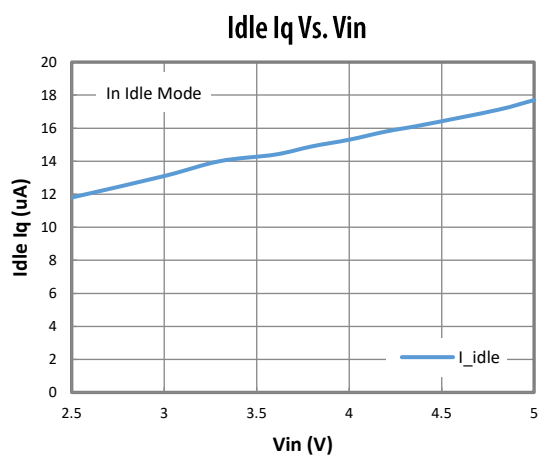
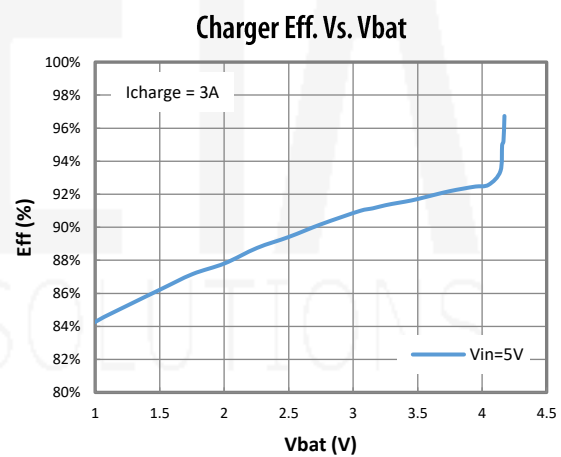
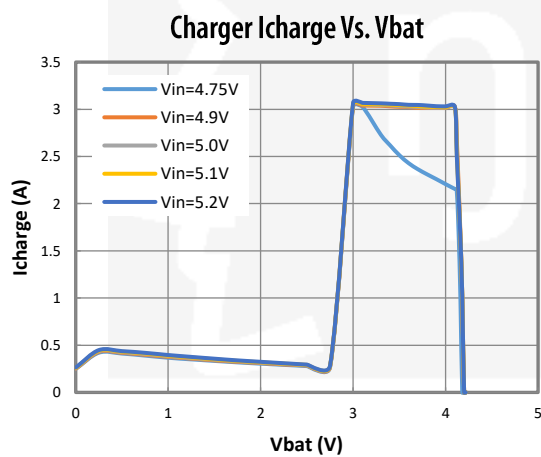
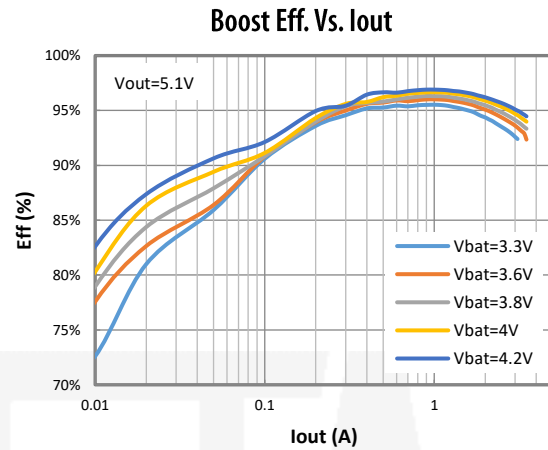
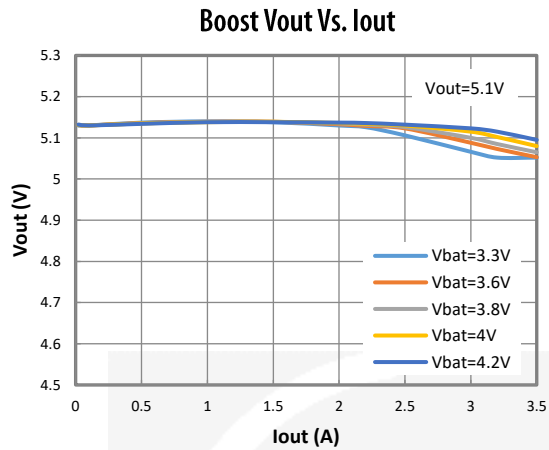
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Charge Termination Current			250		mA
Charge Termination Blanking time			12		S
Pre-Condition Timer			1		hour
Fast-Charge Timer			24		hour
BOOST MODE					
BATT OK Threshold	Rising, HYS=0.4V		3.2		V
Output Voltage Range		5.1	5.15	5.22	V
Quiescent Current At BATT	Boost On		250		μA
Shutdown Supply Current At BATT	Idle Mode		65		μA
Switching Frequency	VBATT<4.4V		1.2		MHz
Load Current Limit	VBATT=3.8V	3.1	3.5	4	A
Maximum Duty Cycle			95		%
Highside Pmos Rds(on)	ISW =500mA		20		mΩ
Lowside Nmos Rds(on)	ISW =500mA		18		mΩ
Short Circuit Hiccup Current			3		A
Short Circuit Hiccup Timer	On Time		20		ms
	Off Time		700		
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		V
ISET Voltage			0.8		V
VTERM Voltage	RVTERM=60K		0.6		V
LD01V					
LD01V Voltage		0.99	1	1.01	V
LOGIC INPUT: BUTT					
Logic Input High		VBAT -0.3			V
Logic Input Low		VBAT -1.2 or Floating			V
NTC THERMISTOR MONITOR					
NTC Threshold, Cold	Charger Suspended		52		%Vldo1V
NTC Threshold, Hot	Charger Suspended		13		%Vldo1V
NTC Threshold Hysteresis			2		%Vldo1V
NTC Disable Threshold	Tie to VLDO1V or set to 1V		1		V
NTC Input Leakage			0	5	μA
THERMAL PROTECTION					
Charging Thermal Regulation threshold			110		°C
Thermal Shutdown	Rising, Hys=30°C		160		°C

## 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: $V_{bat} = 4.2V + 10\mu A * R_{VTERM} / 4$ . 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	LDO1V	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

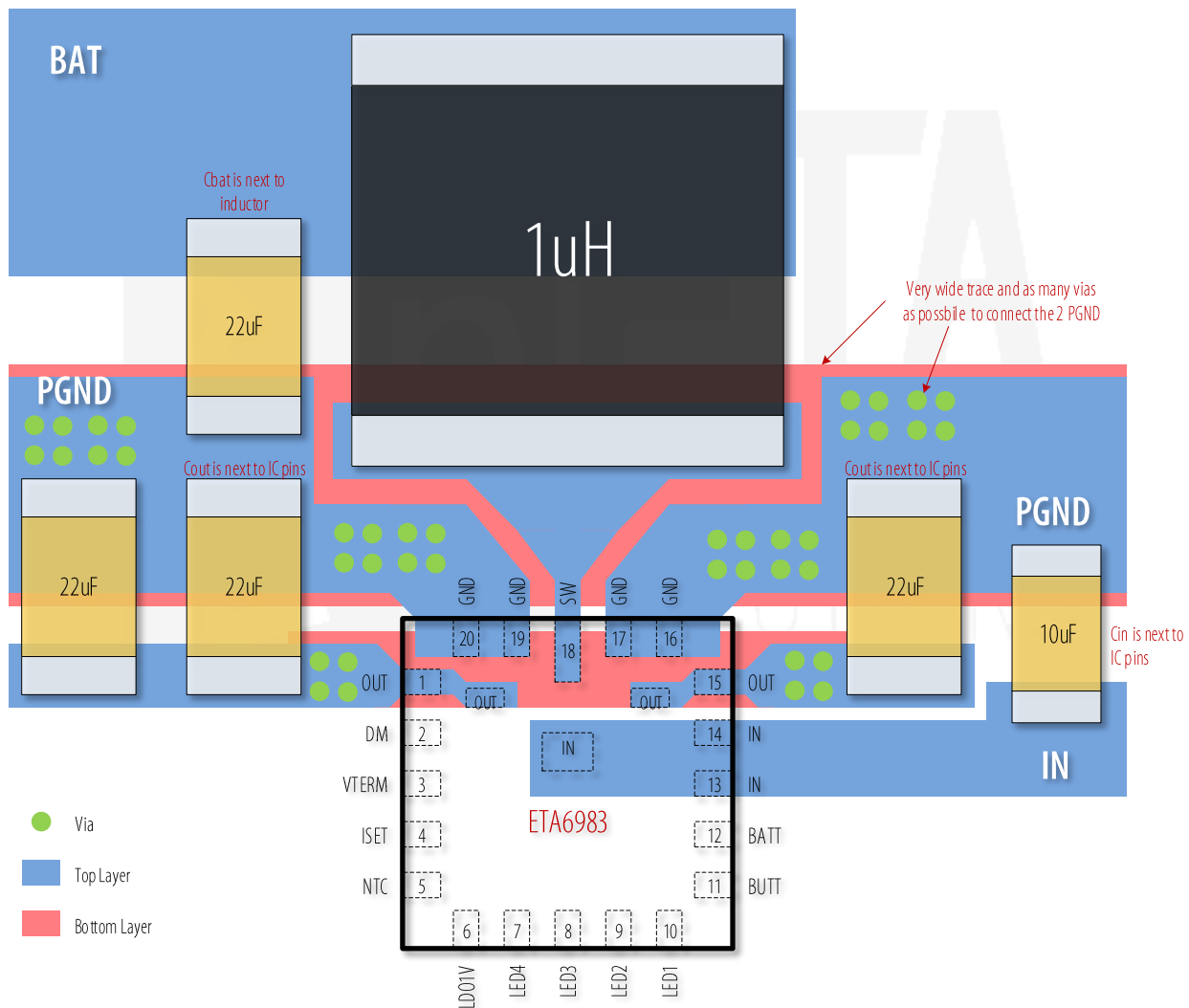
( $V_{in}=5V$ ,  $T_A=25^{\circ}C$ , unless otherwise specified)



## 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: QFN3x3-20

