

5V/1.5A Backup Battery Pack Manager

FEATURES

- Dedicated Single Chip Solution for Mobile Power With Minimal Component Count
- 5V/1.5A Constant Output Current in Boost Mode
- 1.5A Switching Charger
- Programmable 4.1V to 4.35V Battery Voltage
- 95% Boost Efficiency ($V_{bat}=4.1V$)
- Adaptive to 10mA-2400mA Input Sources
- Battery Disconnection at Output Short
- $<10\mu A$ Low Battery Leakage Current at HZ Mode During Storage
- Boost Auto Turn-off at No Load and Push Button Turn-on
- Battery Over Current, Over Voltage, Over Temperature and Short Circuit Protections
- Boost Auto Startup with Load Detection
- Up to 2.0A Input Current Limit with Prioritized Power Path to Output
- 5V \pm 100mV Output Voltage in Boost Mode
- 1.1MHz/0.55MHz Boost Switching Frequencies
- 2.2uH SMD Inductor and Low Profile Ceramic Capacitors
- 4 LEDs Battery Level and Status Indication
- Battery Impedance Compensation
- Full Cycle of Battery Charge Management Preconditioning, Fast Charge, Top Off and End of Charge
- Charge Current Foldback at 110°C Die Temperature
- IC Over Temperature Protection at 160°C
- QFN4x4-24 Package

APPLICATIONS

- Backup Battery Pack
- Power Bank
- Mobile Power
- Standalone Battery Charger with USB Output

GENERAL DESCRIPTION

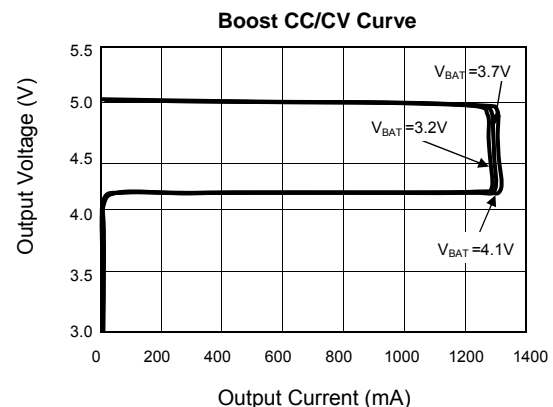
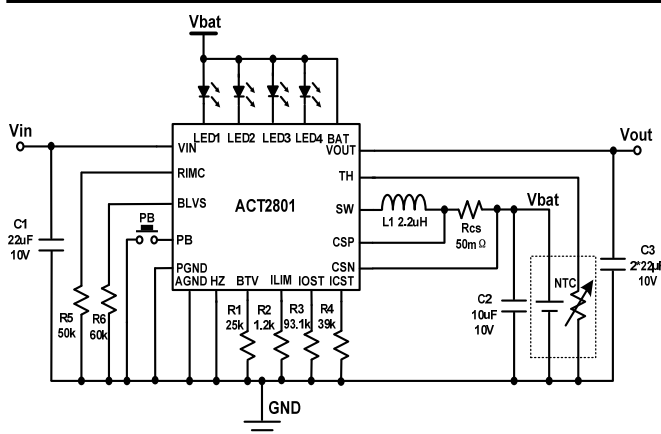
ACT2801 is a space-saving and high-performance low-profile single-chip solution for backup battery pack and standalone battery charger. ACT2801 integrates all the functions that a backup battery pack needs, including switching charger, boost converter and LED indication.

ACT2801 operates at 2.2MHz/1.1MHz for switching charger and 1.1MHz/0.55MHz for boost converter allowing tiny external inductor and capacitors. ACT2801 provides a direct power path from input to output with programmable current limit while providing power to switching charger. Output has higher priority than battery charger if the programmed input current limit is reached.

ACT2801 charges battery with full cycle of preconditioning, fast charge with constant current and constant voltage until end of charge. The battery charger is thermally regulated at 110°C with charge current foldback.

ACT2801 boost converter steps battery voltage up to 5V. Boost converter features high efficiency, constant current regulation, short circuit protection and over voltage protection.

ACT2801 provides 3.5mA constant currents to drive 4 LEDs to indicate battery level and charge status.

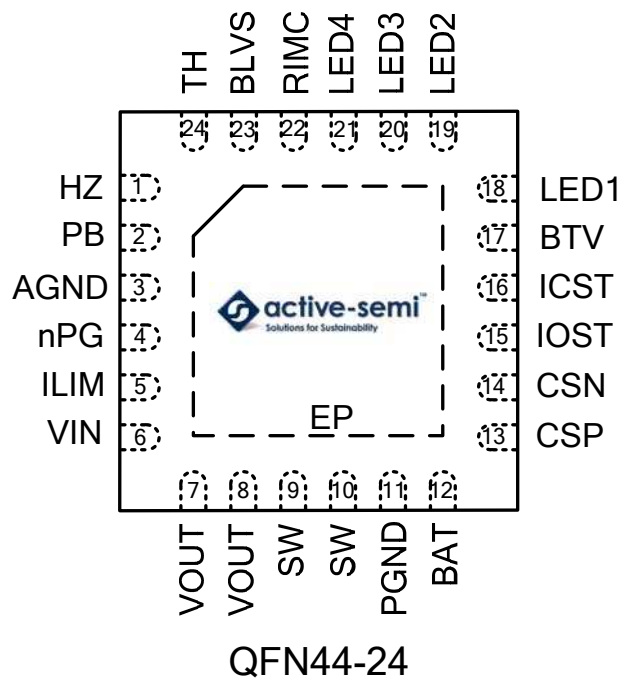


ORDERING INFORMATION

PART NUMBER	BOOST SWITCH FREQUENCY	OUTPUT	CHARGE CURRENT	PACKAGE	PACKING
ACT2801QL-T	1.1MHz	5V/1.5A	1.5A	QFN44-24	TAPE & REEL, 3KU/REEL
ACT2801QL-T0550	0.55MHz	5V/1.5A	1.5A	QFN44-24	TAPE & REEL, 3KU/REEL

PIN CONFIGURATION

TOP VIEW



PIN DESCRIPTIONS

PIN	NAME	DESCRIPTION
1	HZ	Boost high-Z mode enable pin, internally pulled up by a 3MΩ resistor to battery. When HZ pin is pulled ground, boost is enabled if VIN is not present.
2	PB	Push button input, connect a push button from this pin to AGND, internally pulled up by a 3MΩ resistor to battery. When this pin is pushed for 100ms, LED1-4 indicators are enable for 5 seconds. PB starts up boost converter if HZ pin is grounded and VIN is not present.
3	AGND	Logic ground.
4	nPG	Drive external P-FET to protect output short circuit and leakage during shutdown. nPG pin is pulled up to VOUT internally. nPG pin is pulled low if VOUT is in the range.
5	ILIM	Input current limit setting pin. Connect a resistor from this pin to AGND to set the input current limit. The current setting ranges from 0.5A-2.0A.
6	VIN	USB or AC adaptor input. When VIN is valid, charge and power path is enabled.
7, 8	VOUT	Output pin. Bypass to PGND with a high quality low ESR and ESL ceramic capacitor placed as close to the IC as possible.
9, 10	SW	Internal switch to output inductor terminal.
11	PGND	Power ground. PGND is connected to the source of low-side N-channel MOSFET and the MOSFET's gate driver.
12	BAT	Battery input. Connected to the battery pack positive terminal to provide power in High -Z mode. Bypass to PGND with a high quality ceramic capacitor placed as close to the IC as possible.
13	CSP	Positive terminal of charge current sense input. Kevin sense is required with 10nF ceramic capacitor right across CSP and CSN pins.
14	CSN	Negative terminal of charge current sense input.
15	IOST	Output current setting. Connect a resistor from this pin to AGND to set output constant current. The current setting ranges from 0.75A-1.5A.
16	ICST	Fast charge current setting pin. Connect a resistor from this pin to AGND to set the charge current. The current setting ranges from 0.75A-1.5A.
17	BTV	Battery termination voltage setting. Connect a resistor from this pin to AGND to program battery charge termination voltage.
18	LED1	Battery level indicator. An internal 3.5mA sink current limit is built in.
19	LED2	Battery level indicator. An internal 3.5mA sink current limit is built in.
20	LED3	Battery level indicator. An internal 3.5mA sink current limit is built in.
21	LED4	Battery level indicator. An internal 3.5mA sink current limit is built in.
22	RIMC	Battery impedance compensation input. Connect to a resistor from this pin to APNG to program the battery impedance.
23	BLVS	Battery level voltage shift. Connect a resistor from this pin to AGND to shift the battery LED indication thresholds.
24	TH	Temperature sensing input. Connect to battery thermistor terminal. If no use, put 10K pulled down resistor.
25	EP	Exposed pad. Must be soldered to ground on the PCB.

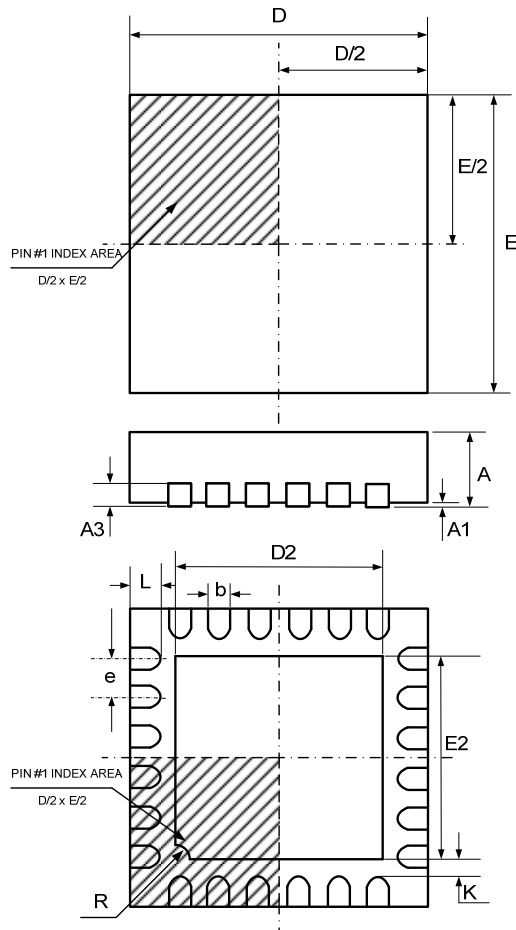
ABSOLUTE MAXIMUM RATINGS^①

PARAMETER	VALUE	UNIT
All the pin to PGND and AGND	-0.3 to 6.5	V
Junction to Ambient Thermal Resistance	40	°C/W
Maximum Power Dissipation	2.5	W
Operating Ambient Temperature Range	-40 to 85	°C
Operating Junction Temperature	-40 to 150	°C
Storage Junction Temperature	-40 to 150	°C
Lead Temperature (Soldering 10 sec.)	300	°C

①: Do not exceed these limits to prevent damage to the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.

PACKAGE OUTLINE


QFN44-24 PACKAGE OUTLINE AND DIMENSIONS



SYMBOL	DIMENSION IN MILLIMETERS		DIMENSION IN INCHES	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.200 REF		0.008 REF	
b	0.180	0.300	0.007	0.012
D	3.850	4.150	0.152	0.163
E	3.850	4.150	0.152	0.163
D2	2.500	2.800	0.098	0.110
E2	2.500	2.800	0.098	0.110
e	0.500 BSC		0.020 BSC	
L	0.350	0.450	0.014	0.018
R	0.200 TYP		0.008 TYP	
K	0.200	---	0.008	---

Active-Semi, Inc. reserves the right to modify the circuitry or specifications without notice. Users should evaluate each product to make sure that it is suitable for their applications. Active-Semi products are not intended or authorized for use as critical components in life-support devices or systems. Active-Semi, Inc. does not assume any liability arising out of the use of any product or circuit described in this datasheet, nor does it convey any patent license.

Active-Semi and its logo are trademarks of Active-Semi, Inc. For more information on this and other products, contact sales@active-semi.com or visit <http://www.active-semi.com>.

 is a registered trademark of Active-Semi.