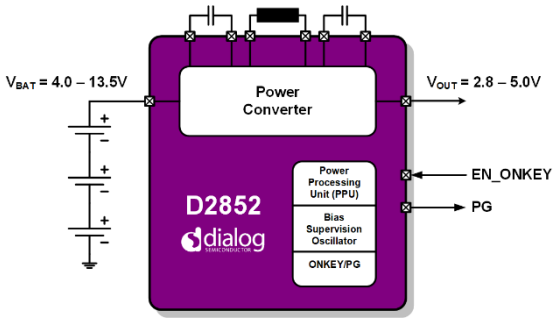
Augustiner Test-Chip

High Efficiency Regulated Switched Capacitor Converter

D2852

High Efficiency Bus Converter



The D2852 is a high efficiency DC-DC step-down converter with a maximum output current of 8 A (10A peak), suitable for applications supplied by a dual (2S), triple (3S) Li-Ion or Li-Polymer stacked cell battery pack or any input voltage between 4 V and 13.5 V. It generates a varying (input voltage dependent) output voltage in the range of 2.8 V and 5 V, dynamically optimized for highest converter efficiency (conversion ratios are OTP programmable).

The hybrid power converter achieves typical conversion efficiency of 98 %.

Low profile external components and a minimum PCB footprint allow small circuit implementation in compact applications. As the pass devices are fully integrated, no external power switches are needed.

The D2852 implements input voltage detection with autonomous wake-up and programmable soft-start to limit inrush current. It also implements integrated input voltage supervision and over-temperature protection for increased system reliability without the need for external sensing components.

Enable / ON-key supervision and power good signals are available, supporting application shelf-mode and different power-up or power cycle scenarios.

Highlights

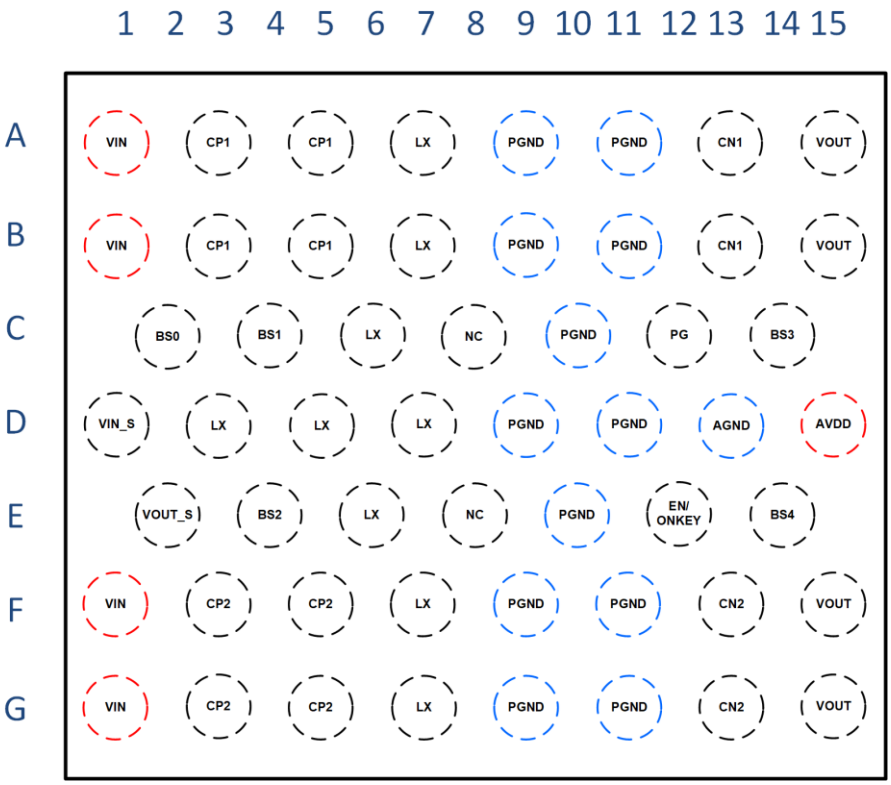
Features	Benefits
Input Voltage 4 V to 13.5 V	• One Device for 2S & 3S, but also 12V Systems
Output Voltage 2.8 to 5V (varying)	• Limits the maximum Bus Voltage below System required Rating (5V) • Prevents Brown-out by discharging Batteries to lower Voltages • Automatically selects Conversion Ratio with best Efficiency
8 A Output Current (10 A peak)	• Wide range of supported Applications
Integrated Power Switches	• No need for external Power FETs • Minimum Solution Size
Autonomous Soft Start (Configurable)	• Virtual 1S Battery Pack (without need for Controls)
Application Shelf-mode	• Stop Battery Drain during Storage and Delivery

dialog SEMICONDUCTOR

Applications

- Ultrabooks™
- Notebook computers
- Tablet PCs
- Smartphones
- Infotainment
- DSLR and mirrorless Cameras
- Power Banks
- Game Consoles
- Drones
- Other 2S or 3S battery powered applications
- Industrial
- Server

Pinout



DA2852 (Top View)

Pin Description

Pin No.	Name	Type	Description
A1, B1, F1, G1	VIN	PWR	Power Supply
A3, A5, B3, B5	CP1	AIO	Flying Capacitance 1 positive Terminal
A7, B7, C6, D5, D7, E6, F7, G7	LX	AIO	Switched Node
A9, A11, B9, B11, C10, D9, D11, E10, F9, F11, G9, G11	PGND	GND	Power Ground
A13, B13	CN1	AIO	Flying Capacitance 1 negative Terminal
A15, B15, F15, G15	VOUT	AO	Output Voltage
C2	BS0	AIO	Boot-strap Capacitor 0 positive Terminal
C4	BS1	AIO	Boot-strap Capacitor 1 positive Terminal
C12	PG	DO	Power-Good Flag
C14	BS3	AIO	Boot-strap Capacitor 3 positive Terminal
D1	VIN_S	AI	Power Supply Voltage Sense
D13	AGND	GND	Analog quiet Ground
D15	AVDD	AIO	Power Supply for internal Logic and Control
E2	VOUT_S	AI	Output Voltage Sense
E4	BS2	AIO	Boot-strap Capacitor 2 positive Terminal
E12	EN/ONKEY	AIO	ON-key Signal or IC_EN
E14	BS4	AIO	Boot-strap Capacitor 4 positive Terminal
F3, F5, G3, G5	CP2	AIO	Flying Capacitance 2 positive Terminal
F13, G13	CN2	AIO	Flying Capacitance 2 negative Terminal
C8, E8		NC	

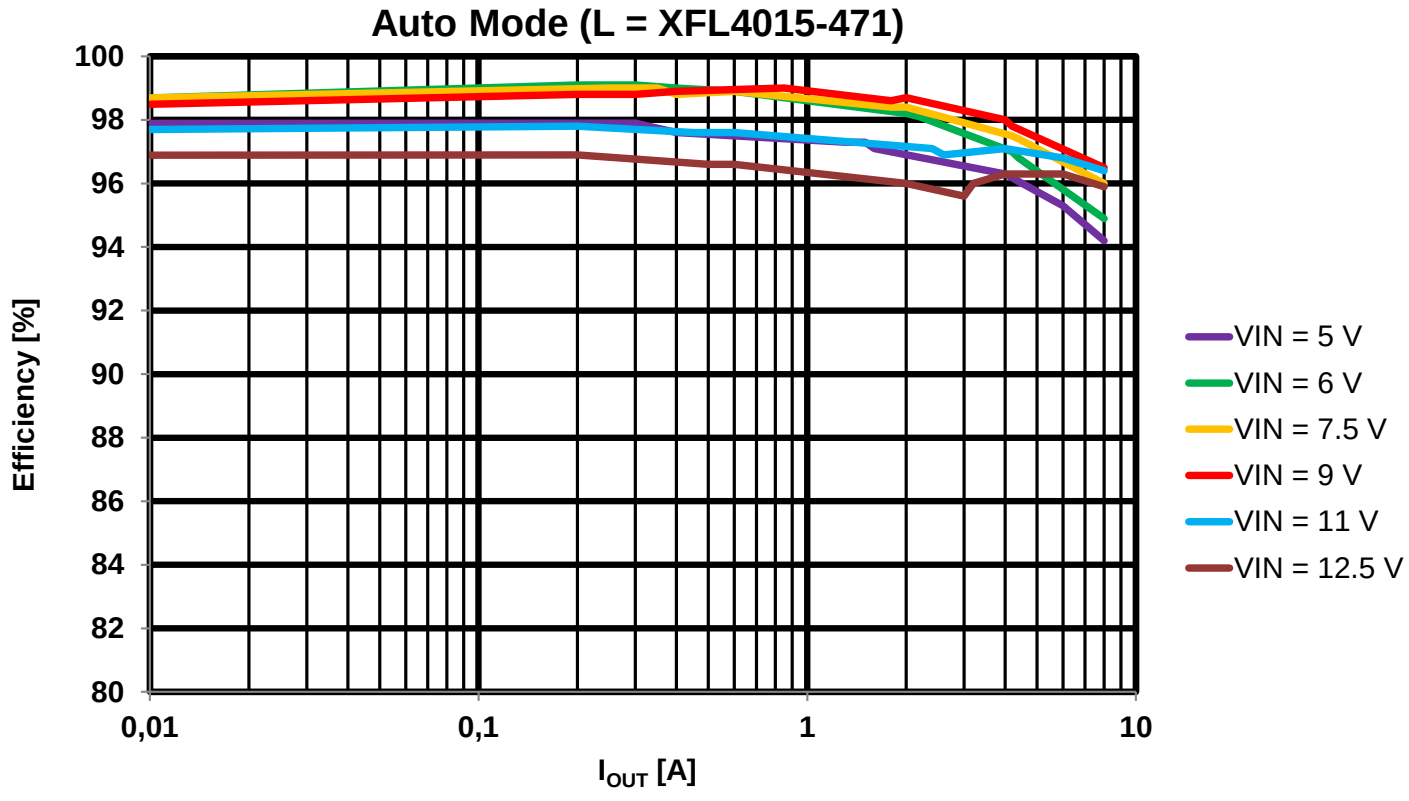
Pin Type Definition

Pin Type	Description	Pin Type	Description
DI	Digital input	AI	Analog input
DO	Digital output	AO	Analog output
DIO	Digital input/output	AIO	Analog input/output
DIOD	Digital input/output open drain	GND	Ground
PWR	Power	NC	Not connected

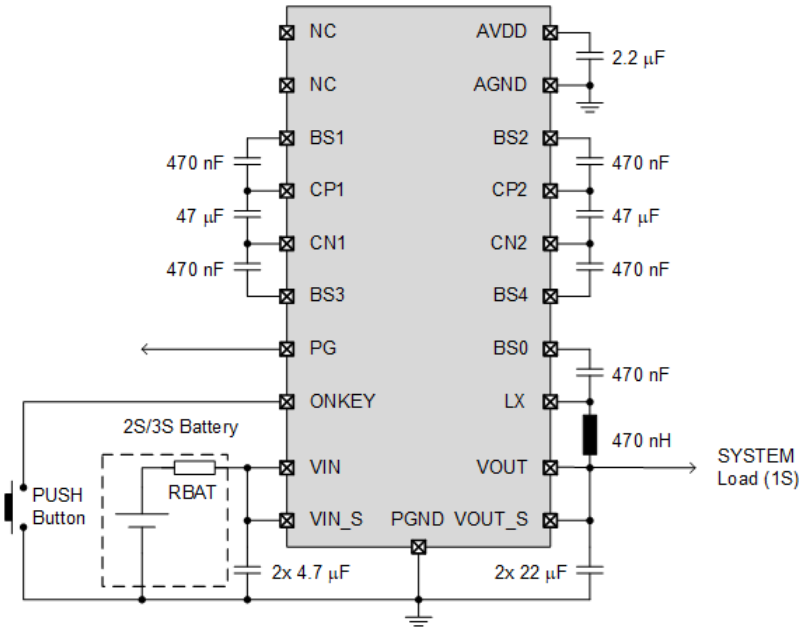
Electrical Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{DD}	Input Voltage		4		13.5	V
V_{OUT}	Output Voltage		2.8		5.5	V
C_{OUT}	Output Capacitance	Including Derating	62			µF
I_{OUT_MAX}	Maximum Output Current		8			A
I_{OUT_PEAK}	Peak Output Current	Pulses of < 20 ms duration @ duty cycle < 30%	10			A
f_{SW}	Nominal Converter Switching Frequency	Fixed frequency mode	344	416.5	500	kHz
η_{PEAK}	Peak Efficiency	1x 47 uF 0805 per phase, V_{DD} = 8 V, I_{OUT} = 2 A		98.5		%
η_{CCM}	High Current Efficiency	1x 47 uF 0805 per phase, V_{DD} = 8 V, I_{OUT} = 5 A		97.0		%
η_{DCM}	Light Load Efficiency	1x 47 uF 0805 per phase, V_{DD} = 8 V, I_{OUT} = 10 – 1000 mA		97.5		%

Efficiency vs. Output Current

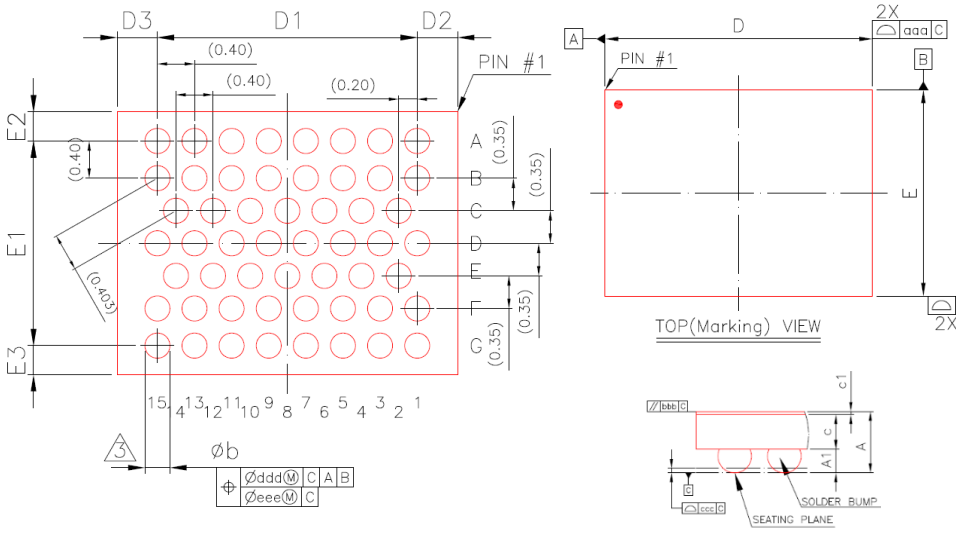


Application Diagram



The PUSH Button is an optional feature for terminating the application shelf mode with isolated battery pack.

Package Outline Drawing



Symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.464	0.494	0.524	0.0183	0.0194	0.0206
A1	0.175	0.190	0.205	0.0069	0.0075	0.0081
c1	0.022	0.025	0.028	0.0009	0.0010	0.0011
c	0.254	0.279	0.304	0.0100	0.0110	0.0120
D	3.645	3.670	3.695	0.1435	0.1445	0.1455
E	2.798	2.823	2.848	0.1102	0.1111	0.1121
b	0.240	0.270	0.300	0.0094	0.0106	0.0118
D1	---	2.8000	---	---	0.1102	---
E1	---	2.2000	---	---	0.0866	---
D2	---	0.4350	---	---	0.0171	---
E2	---	0.3115	---	---	0.0123	---
D3	---	0.4350	---	---	0.0171	---
E3	---	0.3115	---	---	0.0123	---
aaa	0.03			0.001		
bbb	0.10			0.004		
ccc	0.03			0.001		
ddd	0.15			0.006		
eee	0.05			0.002		

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