CN8911B

4-Channel PMU with Fixed-3.3V and Adjustable Outputs

High-Voltage Bucks, 20V Boost and Super-Capacitor Charger

• Description

The CN8911B is a 4-channel PMU that includes two wide input, high efficiency synchronous buck converters, one low startup, high efficiency high voltage and high current output boost converter and a high accuracy super-capacitor charger. A HV buck outputs fixed-3.3V/500mA as the other HV buck could generate an adjustable output voltage by setting external resistor divider. The boost converter could provide up to 12V/300mA output from super capacitor or other backup power supply at 2.5V. Boost output is internally fixed 12V with saving external resistors. CN8911B also integrates a linear supercapacitor charger with a high accuracy CV voltage. When the supply power down detected from DET pin, boost will startup and provide backup 12V voltage. And a PD index signal will output.

The CN8911B also employs cycle by cycle current limit and hiccup OCP and Input OVP protections, as well as thermal shutdown.

CN8911B is available in space saving QFN4x4-16L package.

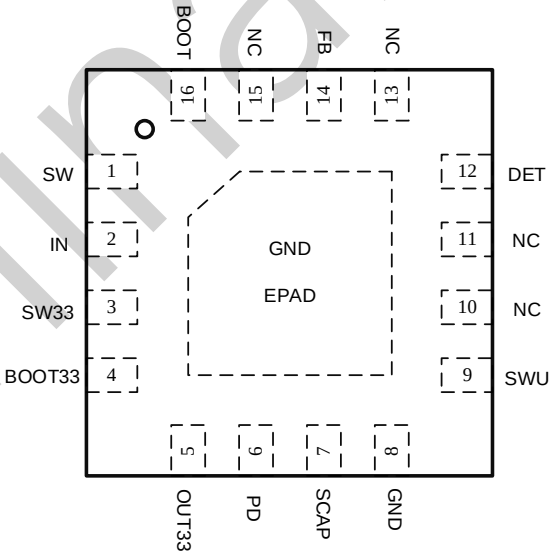
• Features

4 in 1 PMU, 2-Bucks, 1-Boost, 1-SuperCap Charger
1-Channel Fixed-3.3V/500mA Output HV Buck
1-Channel Adjustable Output HV Buck
1-Channel 12V/300mA Output Boost at 2.5V Input
Linear Charger for Super Capacitor with 60mA Current
High Efficiency Pulse Skip Mode at Light Load
Power Down Detection and Index
Auto-alternated Boost Mode and Charger Mode
Hic-cup Mode OCP protections
Thermal Shutdown

• Applications

Smart Power Meters
PLC Modules
System that needs backup power by super capacitors

• Pinout



QFN4x4-16L

• Marking

• Ordering Information

Part No.	Package Type	Qty/Tape

- **Typical Application**

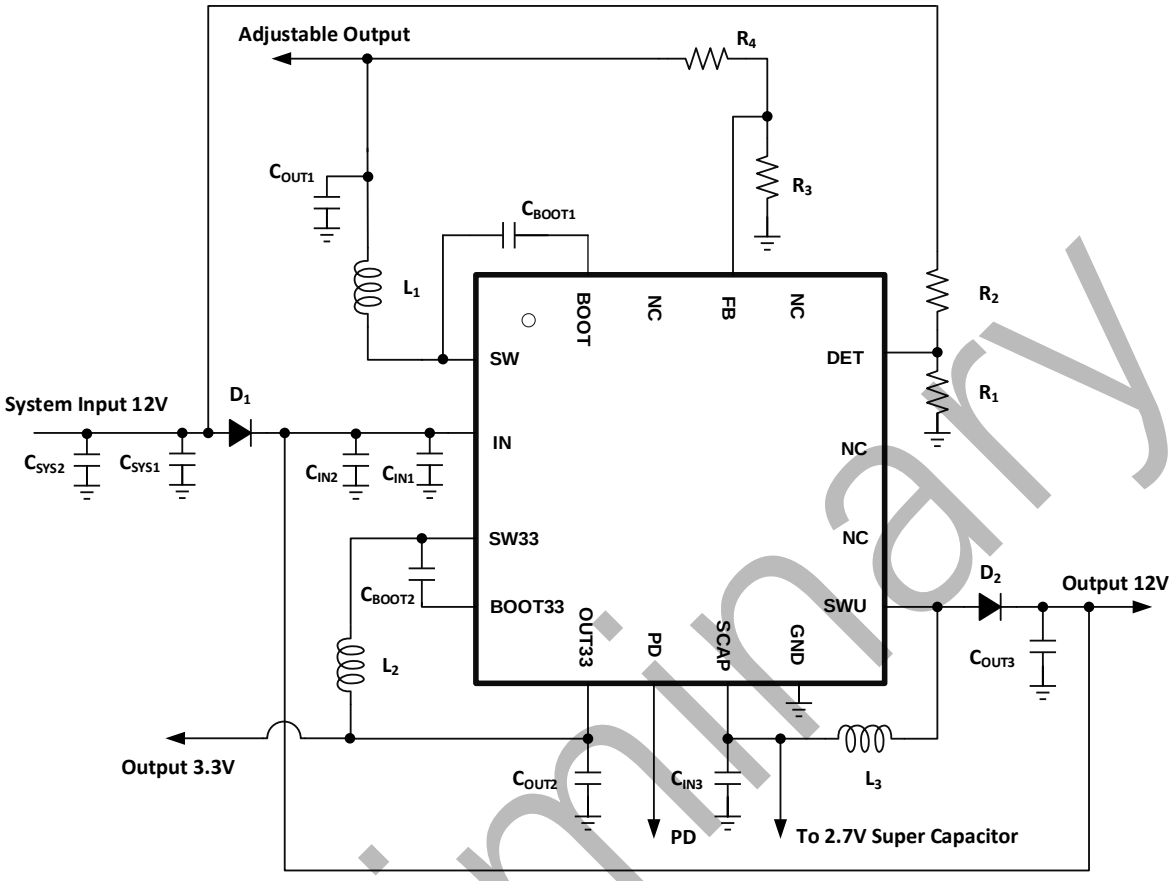


Figure 1. Typical Application

Note 1: System Input Power Down Threshold, $V_{PowerDown} = V_{DET-REF} \times (R_3+R_4) / R_3$

Note 2: $V_{OUT} = V_{FB-REF} \times (R_3+R_4) / R_3$

- **Block Diagram**

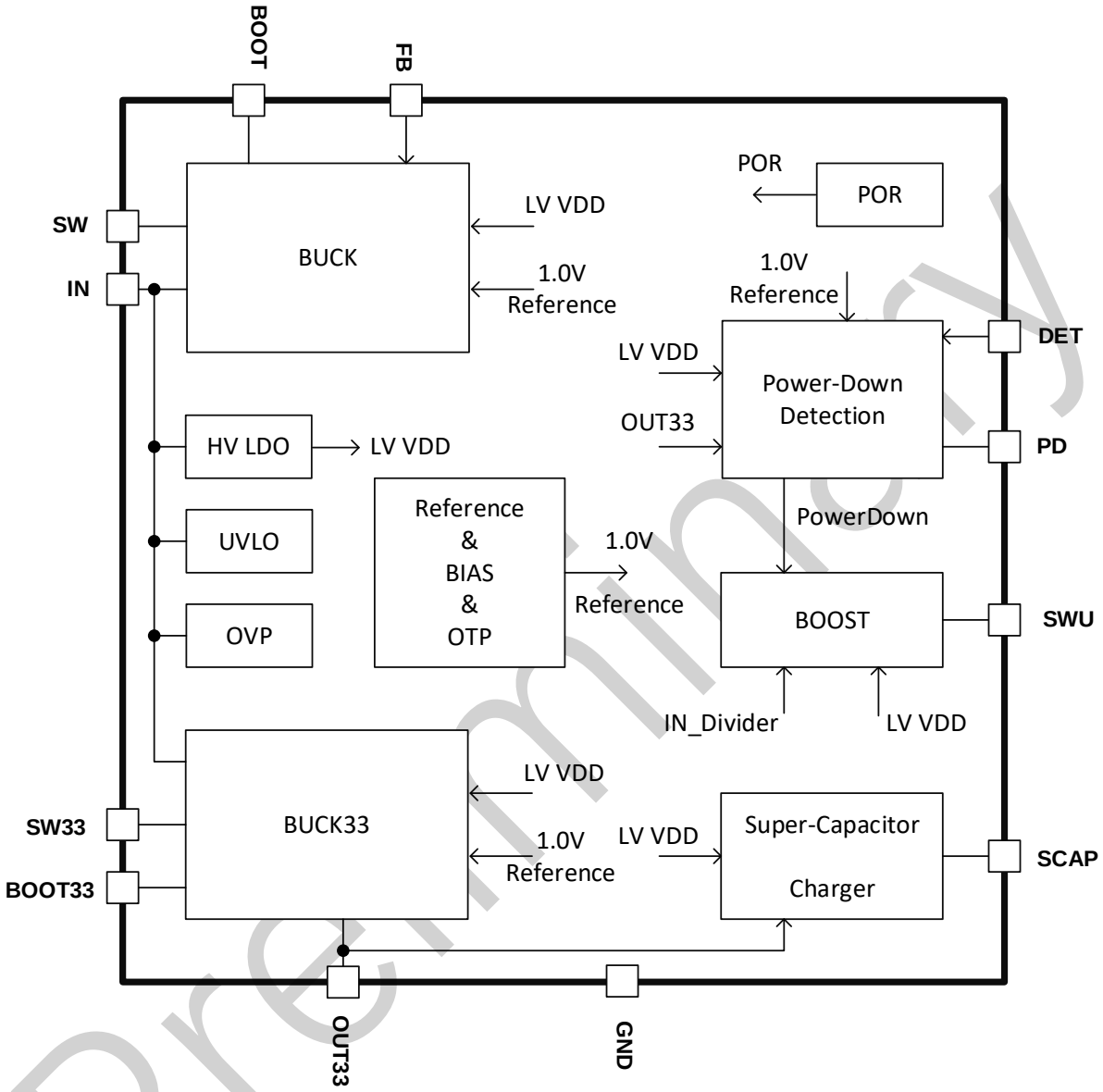


Figure 2. Function Block Diagram

- **Pin Descriptions**

Pin No.	Pin Name	Descriptions
1	SW	Adjustable Buck Converter Switch Node
2	IN	IC Power Supply Input Pin
3	SW33	Fixed 3.3V Buck Converter Switch Node
4	BOOT33	Bootstrap Pin for Fixed 3.3V Buck Converter
5	OUT33	Output Pin for Fixed 3.3V Buck Converter
6	PD	CMOS Output Pin for Power Down Index to SOC. Active High. High Level = Fixed 3.3V Buck Output
7	SCAP	Connect to Super Capacitor. It is Internally Programmed to CV at 2.5V
8	GND	Connect to Ground
9	SWU	Boost Converter Switch Node
10~11, 13	NC	No-Connect
12	DET	System Input Voltage Power Down Detect Pin. Connect a Resistor Divider from System Input to DET pin and Ground to Set System Input Voltage Power Down Threshold
14	FB	Adjustable Buck Converter Feedback Pin
15	NC	No-Connect
16	BOOT	Bootstrap Pin for Adjustable Buck Converter
EPAD	GND	Connect to Ground. Analog and Power Ground Pin. Must Connected.

• Absolute Maximum Ratings (1)

Parameter		Symbol	Value	Units
Supply Input Voltage，EN Voltage		V_{IN}, V_{EN}	-0.3 ~ 45	V
3.3V Buck and Buck Switch Node Voltage		V_{SW33}, V_{SW}	-0.3 ~ V_{IN} + 0.3	V
3.3V Buck and Buck Bootstrap Voltage		V_{BOOT33}, V_{BOOT}	-0.3 ~ Max. (V_{SW} + 6, 45)	V
Boost Switch Node Voltage		V_{SWU}	-0.3 ~ 22	V
Other Pins Voltage			-0.3 ~ 6.5	V
Operating Junction Temperature Range		T_J	-40 ~ 150	°C
Operating Ambient Temperature Range		T_A	-40 ~ 85	°C
Storage Temperature Range		T	-55 ~ 150	°C
Thermal Resistance	Junction to ambient	θja		°C/W
	Junction to case	θjc		°C/W

Note1: Stress exceeds these ratings listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Expose to absolute-maximum-rated conditions for extended periods may affect device reliability.

• Recommended Operating Range

Parameter	Symbol	Value		Units
		Min.	Max.	
Operating Supply Voltage	V_{IN}	6.5	24	V
Adjustable Buck Output Voltage	V_{OUT_ADJ}	1	0.85×V_{IN}	V
Fixed 3.3V Buck Output Voltage	V_{OUT_33}	3.3		V
Boost Output Voltage	V_{OUT_BOOST}	12		V
IC Input Capacitor Range	C_{IN}	10	1000	μF
System Input Capacitor Range	C_{SYS}	10	1000	μF
Adjustable Buck Output Capacitor	C_{OUT1}	22	220	μF
Fixed 3.3V Buck Output Capacitor	C_{OUT2}	22	220	μF
Boost Output Capacitor	C_{OUT3}	10	100	μF
Bootstrap Capacitor Range	C_{BOOT1}, C_{BOOT2}	22 ~ 220, Typical 100		nF

Adjustable Buck Inductor	L_1	Min. 10, Typical 22	μH
Fixed 3.3V Buck Inductor	L_2	Min. 10, Typical 22	μH
Boost Inductor	L_3	4.7	μH

• Electrical Characteristics

(V_{IN}=12V, T_A=25°C, unless otherwise specified.)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Power Supply						
Quiescent Current	I_Q	EN on, I_{LOAD} = 0A, V_{FB} = 1.1V_{REF}, no Switching		450		μA
Supply Current	I_{SW}	EN on, I_{LOAD} = 0A, V_{FB} = 0.9V_{REF}, Switching		2		mA
VIN Under Voltage Lockout	$UVLO_{,R}$	VIN Rising	8.5	8.9	9.3	V
	$UVLO_{,F}$	VIN Falling	5.5	5.8	6.1	V
VIN UVLO Hysteresis	V_{HYS}	UVLO Hysteresis		3.1		V
VIN Over Voltage Threshold	$OVP_{,R}$	VIN Rising	23	24.5	26	V
	$OVP_{,F}$	VIN Falling		23		V
VIN Over Voltage Hysteresis		OVP Hysteresis		1.5		V
Buck Characteristics						
Buck Switching Frequency	$F_{OSC,BK}$	EN on, Buck Switching		400		kHz
Buck Maximum Duty Cycle	$D_{MAX,BK}$			85		%
Buck Minimum On Time	$T_{ON\_MIN,BK}$			100		ns
High Side MOSFET On-Resistance	R_{ONH1}			690		mΩ
Low Side MOSFET On-Resistance	R_{ONL1}			370		mΩ
Soft Start-Up Time	T_{SS1}			0.8		ms
High Side Current Limit	$I_{LIMITH1}$			950		mA
Low Side Current Limit	$I_{LIMITL1}$			750		mA
Feedback Reference Voltage	V_{FB1}		0.98	1	1.02	V
Feedback Input Bias Current	I_{FB}	V_{FB} = 1.2 × V_{REF}		10	100	nA
High Side MOSFET Leakage	$I_{LKH,BK}$				1	μA

Current						
Low Side MOSFET Leakage Current	$I_{LKL, BK}$				1	μA
3.3V Buck Characteristics						
3.3V Buck Switching Frequency	$F_{OSC, BK33}$	EN on, 3.3V Buck Switching		400		kHz
3.3V Buck Minimum On Time	$T_{ON\_MIN, BK33}$			100		ns
High Side MOSFET On-Resistance	R_{ONH2}			690		mΩ
Low Side MOSFET On-Resistance	R_{ONL2}			370		mΩ
Soft Start-Up Time	T_{SS2}			0.8		ms
High Side Current Limit	$I_{LIMITH2}$			1100		mA
Low Side Current Limit	$I_{LIMITL2}$			750		mA
3.3V Buck Output Voltage	V_{OUT_33}		3.2	3.3	3.4	V
High Side MOSFET Leakage Current	$I_{LKH, BK33}$				1	μA
Low Side MOSFET Leakage Current	$I_{LKL, BK33}$				1	μA
Boost Characteristics						
Boost Switching Frequency	$F_{OSC, BST}$	EN on, Boost Switching		750		kHz
Boost Maximum Duty Cycle	$D_{MAX, BST}$			90		%
Boost Minimum On-Time	$T_{ON\_MIN, BST}$			120		ns
Power MOSFET On-Resistance	R_{ONL3}			110		mΩ
Soft Start-Up Time	T_{SS3}			--		
Boost Current Limit	$I_{LIMITL3}$			3		A
Boost 12V Output Voltage	V_{OUT_12}		11.6	12	12.4	V
Power MOSFET Leakage Current	$I_{LKL, BST}$	Boost off			1	μA
Super Capacitor Charger						
Super Capacitor Charging Current	I_{SCAP}			60		mA
SCAP Charge Voltage	V_{SCAP}			2.5		V
SCAP Charge Voltage Accuracy				2		%

Power Down Detection						
DET Reference Voltage	V_{DET}		0.98	1	1.02	V
PD Output Voltage	$V_{PD,H}$	High Level, 10mA	3			V
	$V_{PD,L}$	Low Level, 10mA			0.2	V
PD Source Current	I_{PD}	V_{OUT33}=3.3V, V_{DET}=0.8V, V_{PD}=2V		50		mA
PD Sink Current	I_{PD}	V_{OUT33}=3.3V, V_{DET}=1.2V, V_{PD}=1V		150		mA
Thermal Shutdown						
Thermal Shutdown Threshold	T_{SD}	Rising		155		°C
T_{SD} Hysteresis	T_{HYS}	Hysteresis		30		°C