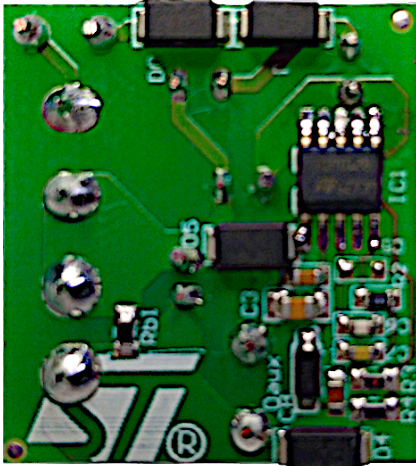


5 V / 100 mA high voltage optimized buck-converter based on VIPer013BLS



Features

- Buck topology
- Input power consumption:
 - 20 mW at 230 V_{AC} in no load condition
 - 400 mW at 230 V_{AC} in 250 mW load
- Input voltage: 60 to 300 V_{AC}
- Output voltage: 5 V
- Output current: 100 mA
- Switching frequency: 60 kHz with jittering
- Max ambient. temperature: 60 °C
- Automatic restart protections: OLP, short-circuit, VCC clamp, max duty cycle counter, thermal shutdown
- Pulse-skip protection to prevent flux-runaway
- Dimensions: 27 mm x 24 mm
- Meets IEC55022 Class B conducted EMI even with reduced EMI filter, thanks to the frequency jittering feature
- VIPer013B 800V avalanche rugged technology and embedded protections ensure enhanced system reliability
- RoHS compliant

Description

The **STEVAL-VP013B1B** is a compact and efficient solution for AC-DC power supplies, which can convert voltages from the main line down to 5 V output.

The board is highly efficient and features extremely low input power consumption under no load and light load conditions due to the low current consumption and low V_{CC} voltage of the **VIPer013B**. Also, the pulse skip feature embedded in the IC eliminates inductor flux-runaway that is typically present during the startup phase of a buck converter.

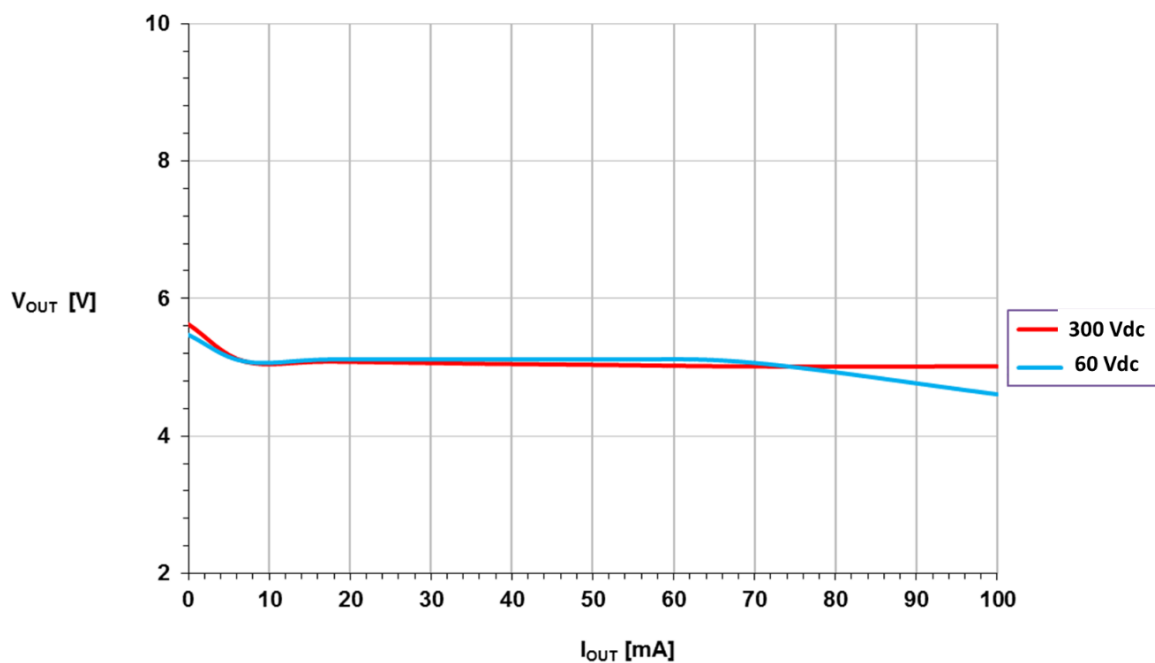
Product summary	
5 V / 100 mA high voltage optimized buck-converter based on VIPer013BLS	STEVAL-VP013B1B
energy saving off-line high voltage converter	VIPer013B

1 Electrical characteristics

Table 1. STEVAL-VP013B1B electrical characteristics

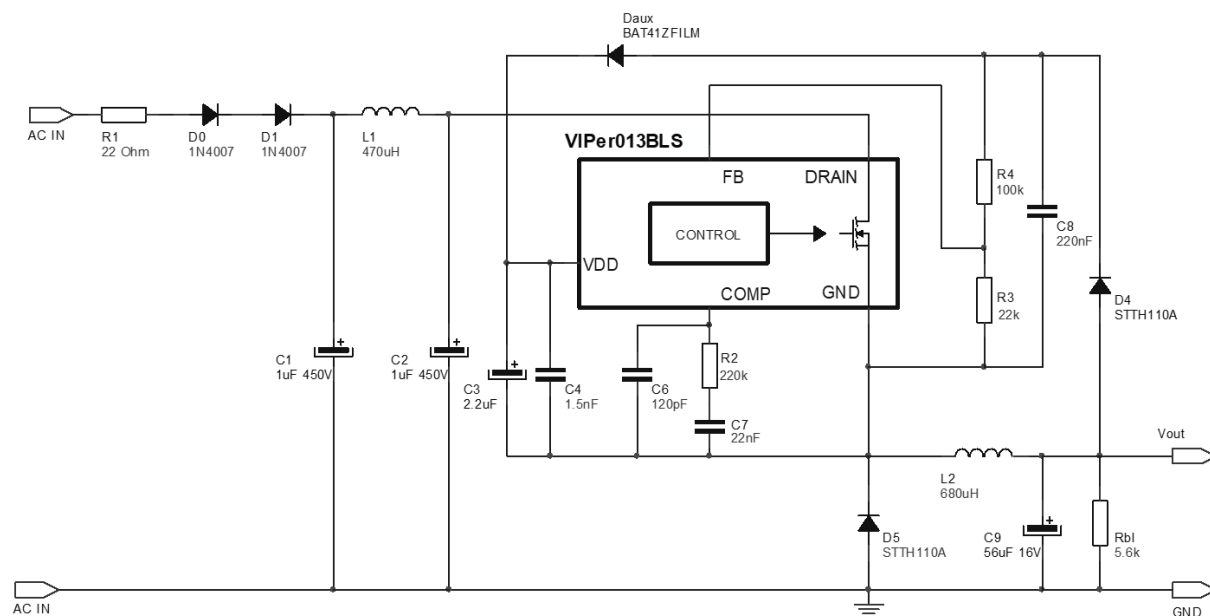
Parameter	Min.	Typ.	Max
Operative AC Main Input voltage	60 V _{AC}	-	300 V _{AC}
Mains frequency	50 Hz	-	60 Hz
Output Voltage V _{OUT}	4.75 V	5 V	5.25 V
Output Current I _{OUT} at V _{IN} ≥ 80 V _{AC}	-	100 mA	-
Output Current I _{OUT} at V _{IN} ≥ 60 V _{AC}	-	75 mA	-
Maximum peak power	-	-	0.75 W
Maximum rms power	-	-	0.5 W
Efficiency at full load	-	62%	-
Ambient operating temperature	-40 °C	-	85 °C

Figure 2. STEVAL-VP013B1B load regulation



2 Schematic diagrams

Figure 3. STEVAL-VP013B1B schematic



3 Bill of materials

Table 2. STEVAL-VP013B1B bill of materials

Item	Q.ty	Ref.	Part / Value	Description	Manufacturer	Order code
1	1	Daux	0.15 A / 100 V	signal Schottky diode, SOD-123	STMICROELECTRONICS	BAT41ZFILM
2	2	D4, D5	1 A / 600 V	ultrafast diode, SMA	STMICROELECTRONICS	STTH1L06A
3	1	IC1		Power Switcher, SO-16N	STMICROELECTRONICS	VIPer013BLS
4	1	D0	1 A / 1000 V	power rectifier diode, SMA	ON SEMICONDUCTOR	MRA4007T3G
5	1	D1	1 A / 1000 V	power rectifier diode, SMA	ON SEMICONDUCTOR	MRA4007T3G
6	1	L1	470 μ H, 400 mA	axial inductor	WE	7447462471
7	1	L2	680 μ H, 420 mA	axial inductor	WE	744732681
8	2	C1, C2	1 μ F, 450 V, $\pm 20\%$	electrolytic capacitor, $\varnothing 6.3$ mm – p2.5mm – h11mm	RUBYCON	450PK1MEFC
9	1	C3	2.2 μ F, 50 V	ceramic multilayer cap, 0805	MURATA	GRM21BR61H225KA73L
10	1	C4	100 nF, 50 V	ceramic multilayer cap, 0603	MURATA	GRM188R71H104KA93D
11	1	C5	not mounted	not mounted		-
12	1	C6	120 pF, 50 V	ceramic multilayer cap, 0603	MURATA	GRM1882C1H121JA01D
13	1	C7	22 nF, 50 V	ceramic multilayer cap, 0603	Vishay	VJ0603Y223KXAAT
14	1	C8	1 μ F, 50 V	ceramic multilayer cap, 0603	MURATA	GRM188R61H105KAALD
15	1	C9	100 μ F, 16 V, $\pm 20\%$	ultra-low ESR Electrolytic cap, $\varnothing 5$ mm – p.2mm – h12.5mm	RUBYCON	16ZLH100MEFC5X11
16	1	R1	22 Ω , 1 W, $\pm 1\%$	Metal Oxide Film Resistor, $\varnothing 3$ mm – p9mm	TE Connectivity	ROX1SJ22R
17	1	R2	220 k Ω , $\pm 1\%$	SMD thick film resistor, 0603	Vishay	CRCW0603220KFKEA
18	1	R3	22 k Ω , 0.25 W, $\pm 1\%$	SMD thick film resistor, 0603	Panasonic	ERJU03F2202V
19	1	R4	78.7 k Ω , 0.1 W, $\pm 1\%$	SMD thick film resistor, 0603	Panasonic	ERA3AEB7872V
20	1	Rbl	5.6 k Ω , 0.25 W, $\pm 1\%$	SMD resistor, 0603	Panasonic	ERJPA3F5601V
21	2	IN, OUT		2-way output connector	TE Connectivity	282837-2

Revision history

Table 3. Document revision history

Date	Version	Changes
01-May-2019	1	Initial release.

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