高可靠性小功率AC-DC电源解决方案VIPer

Aug 2019

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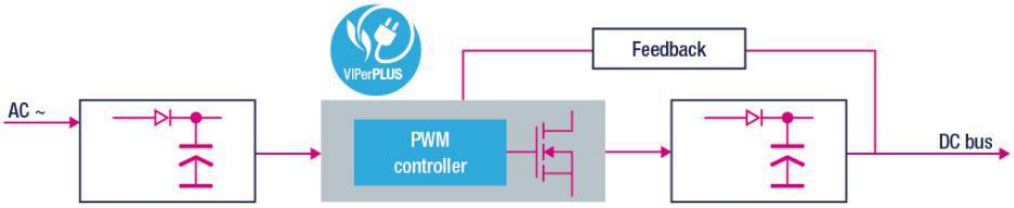
VIPerPLUS 概览

AC-DC开关电源高压转换器

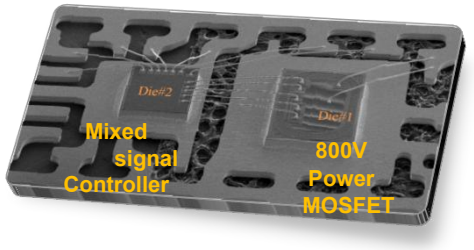


Bring a PLUS in your design

+ 待机功耗: <4 mW @ 265V_{AC}
+ 稳定性和可靠性: 800 V AR MOS & Protections
+ 全面性: Pin to Pin 支持 几瓦到20瓦
+ 有效的减少BOM

主要应用

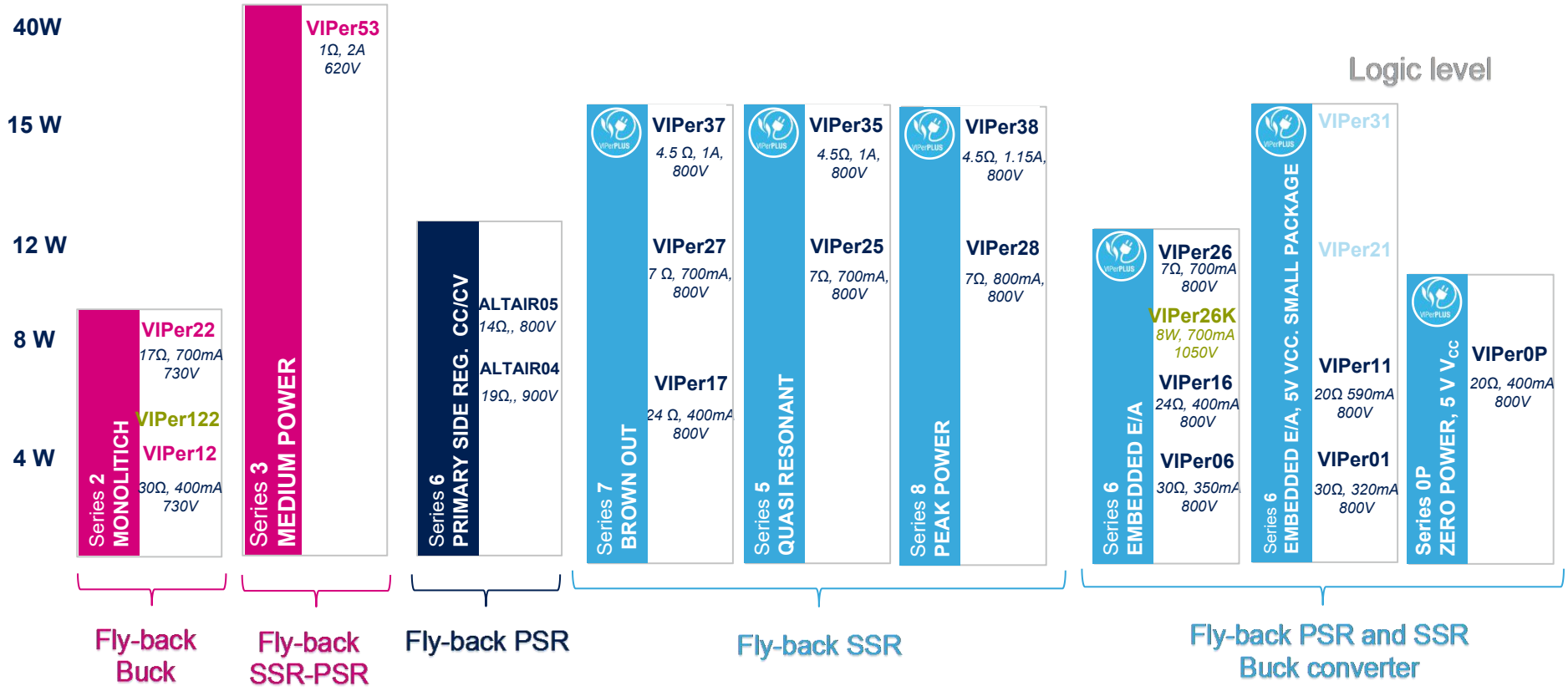
- 家用电器 35%
- 智能表计 20%
- 智能家居 15%
- 照明 10%
- 工业 10%
- 适配器 5 %



www.st.com/viperplus

产品介绍

VIPer AC-DC converters



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专为小功率电源优化

- 家用电器
- 智能家居
- 智能表计

主要特性

- 集成 带抗雪崩能力的730 V MOSFET
- 带高压启动 (730V)
- PWM 电流型控制器
- 450mA 漏极电流限制
- 带频率抖动的定频工作(60kHz)
- 集成误差放大器可用分压电阻直接反馈

主要应用

- 250mA 输出电流的降压电路
- 反激原边电阻分压反馈 (6W @85-265VAC)
- 带光耦的隔离反激 (6W @85-265VAC)

主要优势

- 很小的EMI滤波器得益于频率抖动
- 待机功耗小于40mW @ 230VAC
- 带短路和过温保护
- 很少的无件，较少的PCB
- 小型封装(SSO10)

生态系统

- 降压演示板：15V-200mA (STEVAL-VP12201B) – 原型机*
- 次级反馈隔离型反激 12V-450mA (STEVAL-VP12201F) – 开发中
- Spice 模型 – coming soon
- eDesign suite – coming soon

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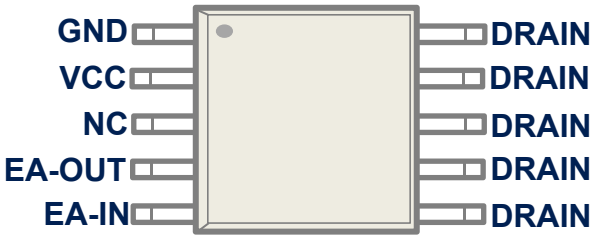
* STEVAL orderable from Sept 2019

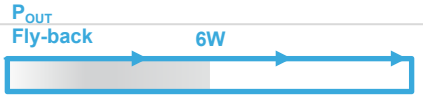
VIPer122
关键参数

专为小功率电源优化

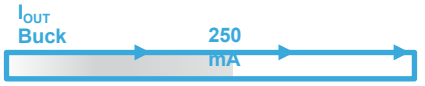


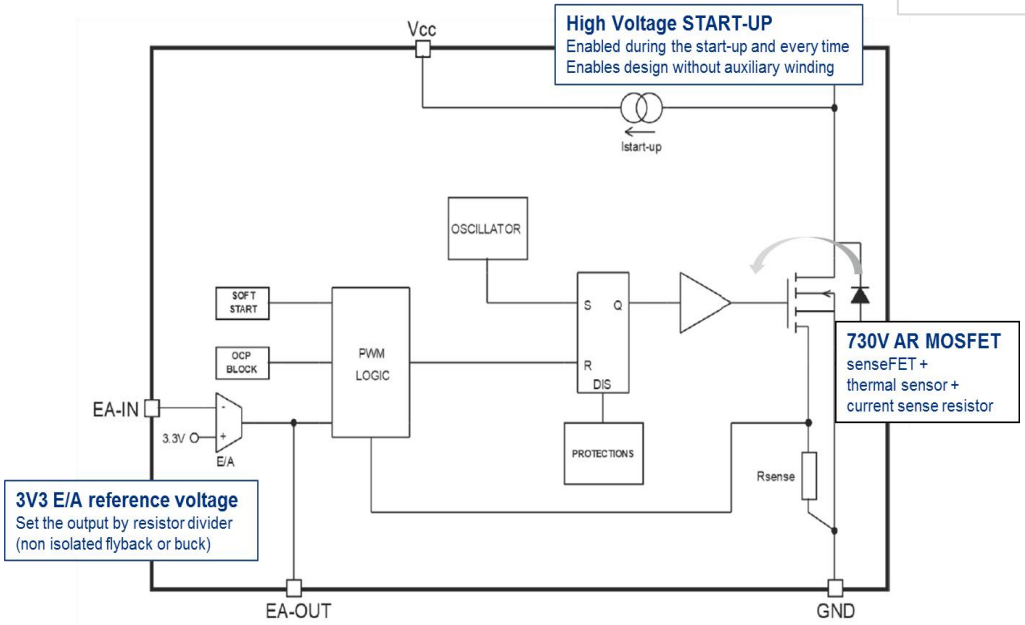
Compact SMPS

反激拓扑



降压拓扑



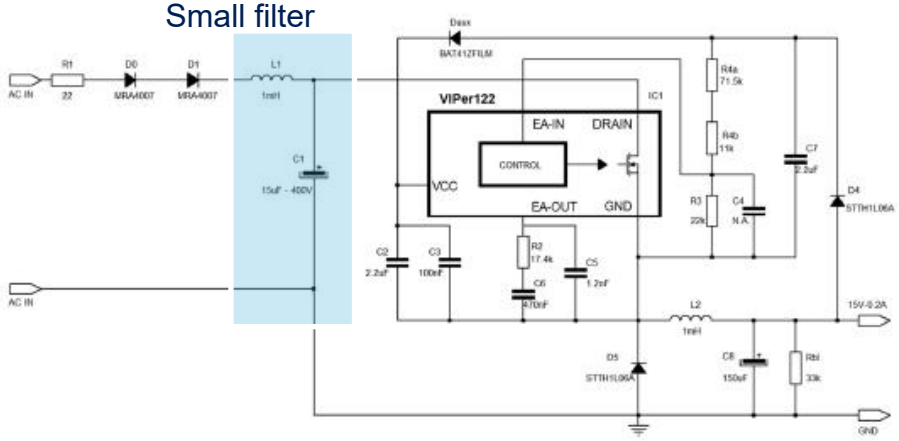


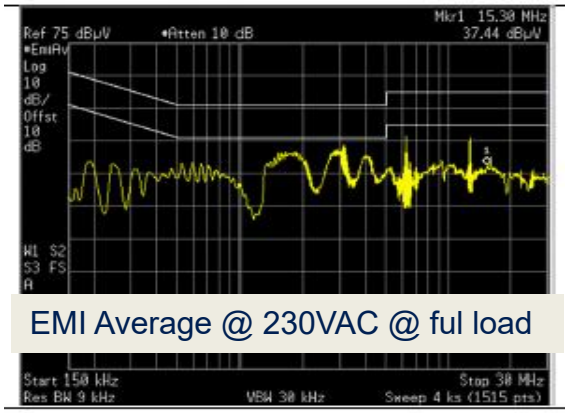
Parameter	VIPer122
B_{VDSS} [V]	730
Max R_{DSon} [Ω]	27 max.
V_{CC} [V]	11.5 ÷ 23.5
V_{DRAIN_START} [V]	45
F_{OSC} [KHz]	60 ± 7% **Jittering**

VIPer122
应用优势

STEVAL-V12201B (Buck 15V-200mA)

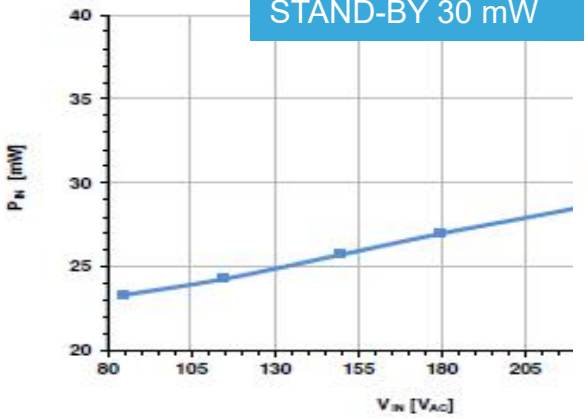
Small filter



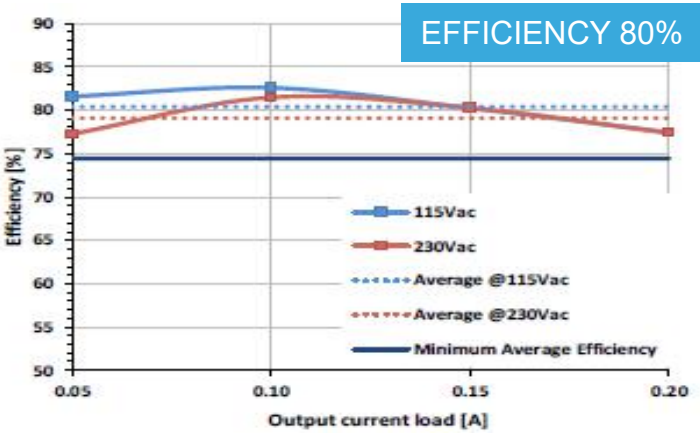


EMI Average @ 230VAC @ ful load

STAND-BY 30 mW



EFFICIENCY 80%



VIPer11 – VIPer01B

支持5V输出的节能开关电器在宽电压输入支持7 W输出

主要应用:

- 家庭自动化
- 智能电表
- LED照明辅助电源

主要优点&特性：

高效符合最严格节能规定

- 当负载较轻时，自动切换到脉冲频率调制，并允许待机功耗低于10 mW

可靠提升SMPS使用寿命

- 800V雪崩坚固功率的MOSFET，可覆盖超宽 Vac 输入范围
- **脉冲跳过保护**
- **禁用引脚来设置输入或输出OVP**

多功能性适用于最流行的拓扑和宽电压范围输入

- **支持的拓扑结构：反激式（包括隔离PSR/SSR反激和非隔离直接反激），降压和升降压转换器拓扑**
- **宽电源电压范围：4.5-30 Vcc**
- **超低启动电压（ 18VDC VIPer01, 30VDC VIPer11 ）**

高集成度最少外部元件

- 具有固定抖动频率（30/60/120kHZ）,可降低EMI并允许使用小型滤波器
- **具有1.2V参考电压的嵌入式误差放大器**
- 集成高压启动，感应FET，热关断和常见保护

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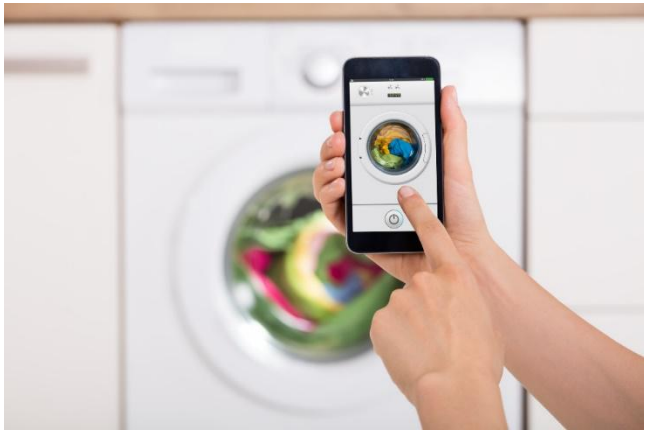
*In **bold** the adding features compared to the VIPer 6 family

智能零功耗



主要应用：

- 家电
- 家庭自动化
- 照明
- 空调

超级节能:

- 零功耗组件实现小于5mW待机
- 通过与微控制器的简单接口实现**智能待机管理**

可靠提升SMPS使用寿命

- 800V雪崩坚固功率的MOSFET，可覆盖超宽 Vac 输入范围
- 脉冲跳过保护

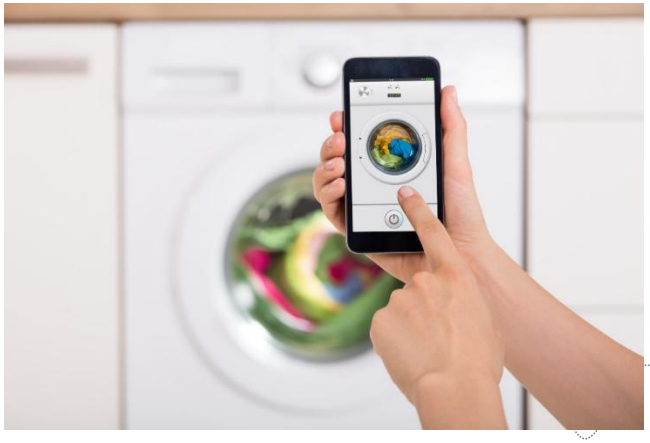
高通用性适用于最流行拓扑

- 可用于反激原边及副边反馈，降压和升降压转化器拓扑
- 支持4.5V电源电压
- 轻松设置负电压输出

高集成度 最少外部元件

- 固定频率抖动**降低了EMI**并允许使用小型滤波器
- 自供电选项允许移除辅助绕组或偏置组件
- 集成高压启动，检测FET，误差放大器

智能零功耗

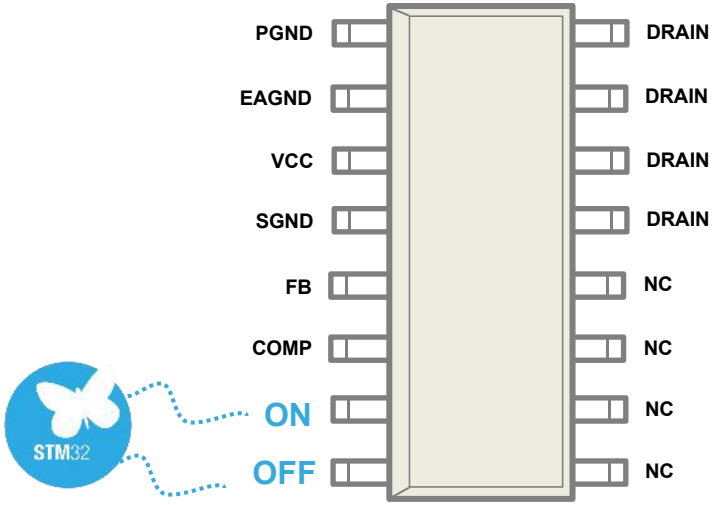


主要应用：

- 家电
- 家庭自动化
- 照明
- 空调

超级节能：

- 零功耗组件获得小于5mW待机
- 通过与微控制器的简单接口实现智能待机管理



MCU turns OFF & turn ON

PWM 停止 ➔ 无 SMPS 输出电压➔ 零功耗

MCU 通过ON引脚由VIper0P提供

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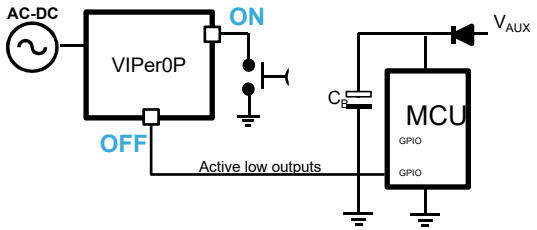
智能待机

机械按钮

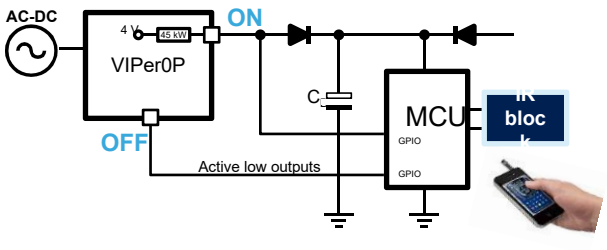


Fly-back converter:
- V_{IN} = 85 to 265 V_{AC}
- P_{OUT} = 7 W
- V_{OUT1} = -5 V
- I_{OUT1} = 0.84 A
- V_{OUT2} = 7 V
- I_{OUT2} = 0.4 A

STEVAL-ISA174V1
AN4836

4 mW
Overall consumption

远程遥控

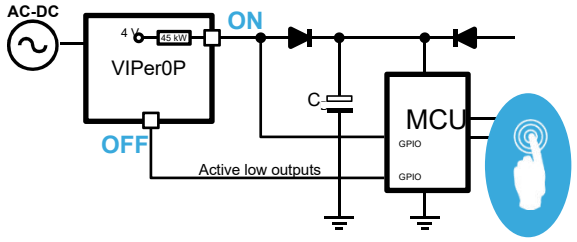


Fly-back converter:
- Isolated
- V_{IN} = 85 to 265 V_{AC}
- P_{OUT} = 7.2 W
- V_{OUT} = 12 V
- I_{OUT} = 0.6 A

STEVAL-ISA181V1
AN4940

8 mW
Overall consumption

触控面板



Flyback converter:
- V_{IN} = 85 to 265 V_{AC}
- P_{OUT} = 7 W
- V_{OUT1} = -5 V
- I_{OUT1} = 0.8 A
- V_{OUT2} = 7 V
- I_{OUT2} = 0.4 A

STEVAL-ISA192V1
AN4941

30 mW
Overall consumption

STM32

VIPerPLUS

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支持超宽电压输入的高压转换器

主要应用

三相电输入的智能电表电源

三相电输入的工业系统辅助电源

关键特性

高可靠性，支持超宽电压输入:

- 带频率抖动的PWM控制器加雪崩强固的 **1050V** power MOSFET
- 自带短路， 过温保护

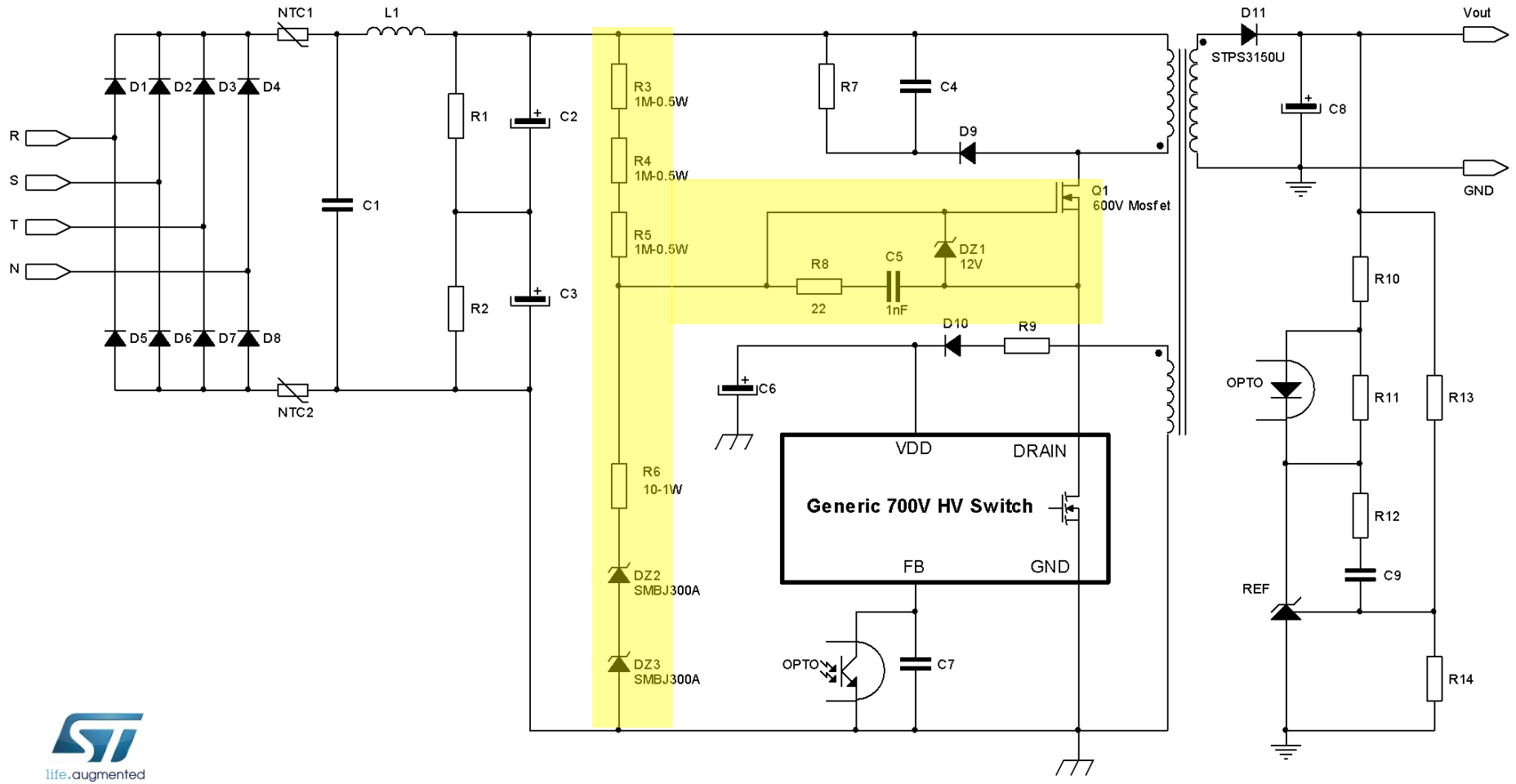
高灵活性，适应各种主流的高压转换拓扑

- 隔离反激 (光耦隔离 或 原边反馈), 非隔离反激 (支接电阻分压反馈), buck, and buck-boost 转换器
- 宽电压输入支持10WI输出
- 跳周期模式提高轻载的效率，实现低于30mW的空载损耗

高集成度， 实现外围器件的最少化

- 集成 **1050V BV** MOSFET 支持三相电输入无需串联外部 FET及外围驱
- 带频率抖动固定频率(60kHz)工作模式，减少EMI 滤波器体积
- 带自供电选项，可以省掉辅助绕组及供电器件
- 两个不同漏极限流点的型号可供选择 (500mA or 700mA) 用以优化磁性器件

三相电输入反激 – 典型叠加解决方案



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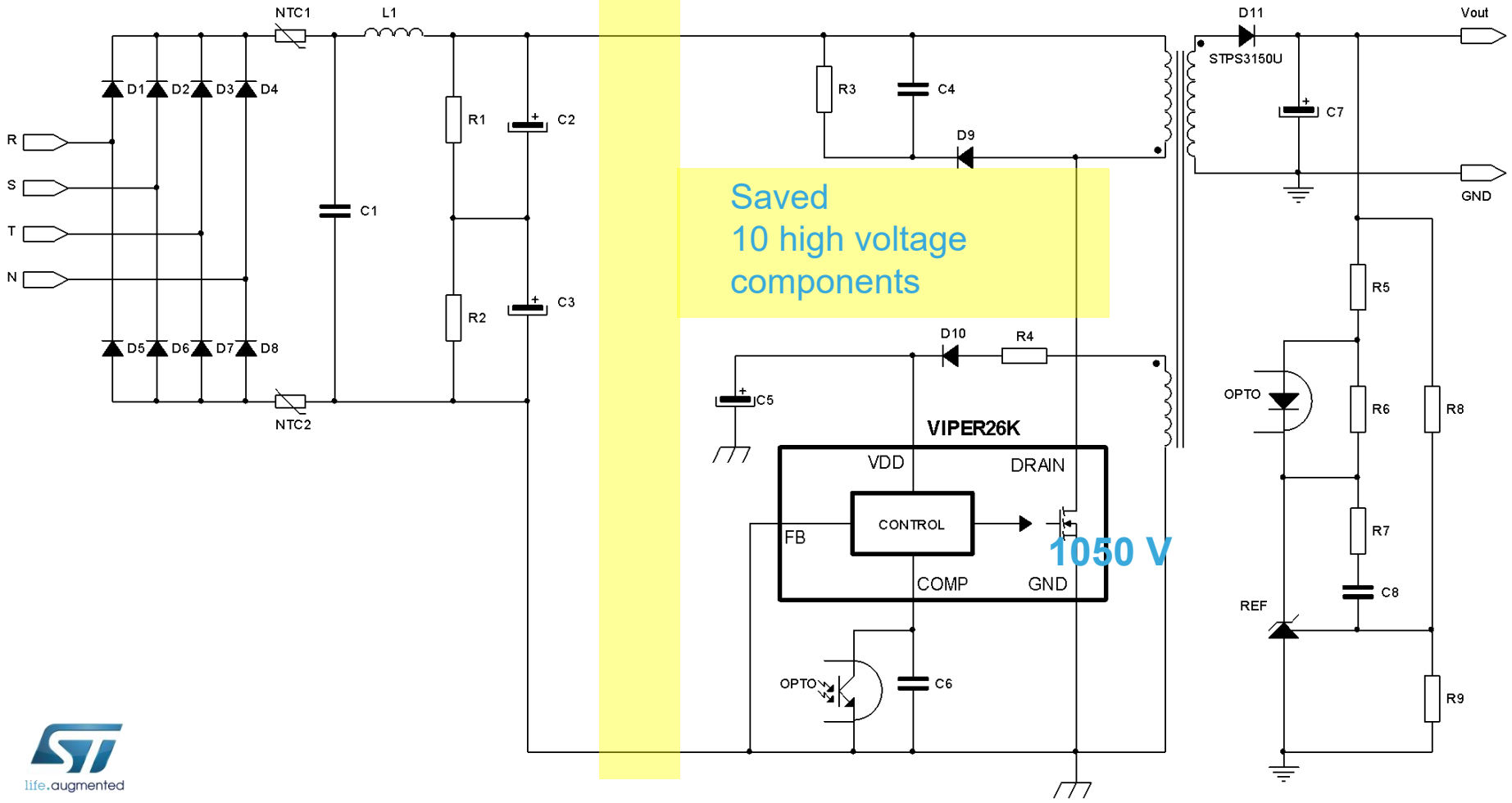
VIPer26K - 三相电输入反激



高抗干扰能力

标准试验，根据现行国际法规进行

	VIPer26K			
Electrostatic Discharge Immunity Test (EN/IEC 61000-4-2) (*)	Air Discharge		Contact Discharge	
	20 KV		10 KV	
BURST SIMULATION (EN/IEC 61000-4-4)	Common Mode		Differential Mode	
	4 KV	8kV	4 KV	8 KV
SURGE SIMULATION (EN/IEC 61000-4-5)	Common Mode		Differential Mode	
	2 KV		2 KV	

Criterion A	Normal performances
Criterion B	Temporary degradation or loss of functions or performances with automatic return to normal operationd
Criterion C	Temporary degradation or loss of functions or performances with external intervention to recover normal operation
Criterion D	Degradation ol loss of function, substitution of damaged components is needed to recover normal operation

(*) Test conditions:

Number of discharge: 10 positive / 10 positive

Repetition rate: 1 Hz

Polarity: 10 positive / 10 negative

高抗干扰能力

严酷条件 非标准试验

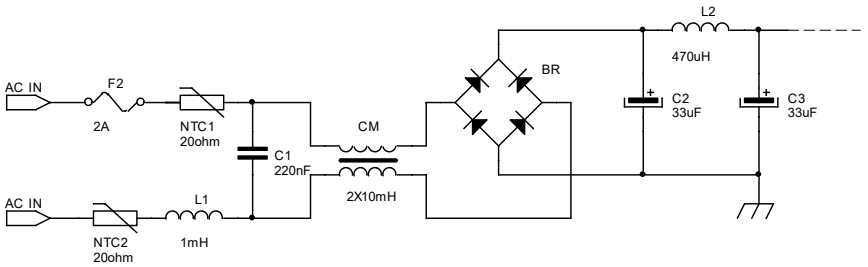
	VIPer26K	
Electrostatic Discharge Immunity Test (*)	Free ground plane discharge	
	30 KV	
LANGER TEST (Electrical Fast Transient)	B-field Probe	E-field Probe
	Max level	Max level

Criterion A	Normal performances
Criterion B	Temporary degradation or loss of functions or performances with automatic return to normal operationd
Criterion C	Temporary degradation or loss of functions or performances with external intervention to recover normal operation
Criterion D	Degradation ol loss of function, substitution of damaged components is needed to recover normal operation

(*) Test conditions:
Number of discharge: 9000 positive / 9000 negative
Repetition rate: 20 Hz
Polarity: 600 positive / 600 negative both for 15 run

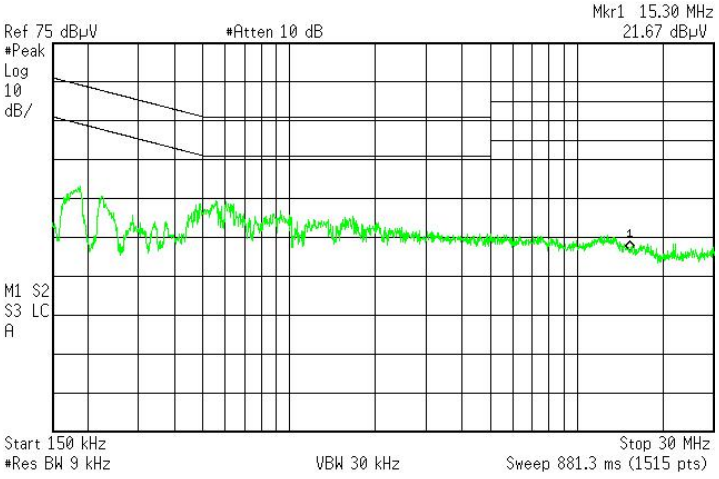
超低电磁干扰

EMI
符合EN55022
B级

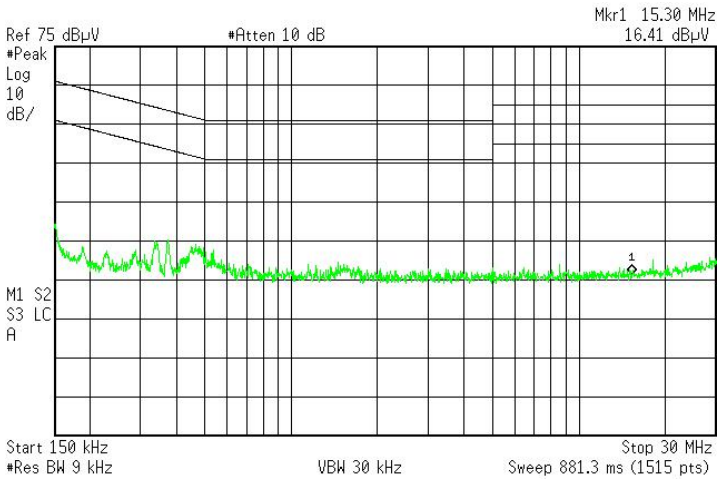


频率
抖动

Peak detector with max-hold function



Line



Neutral

生态系统一览

www.st.com/viperplus

Evaluation kits

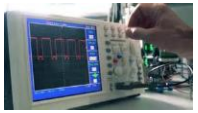
More than **55** evaluation kits
Buck, buck-boost, fly-back converters

Design Tools

eDesignSuite
The smart way to design your application

Excel
Spreadsheets
OrCAD PSpice®

Models



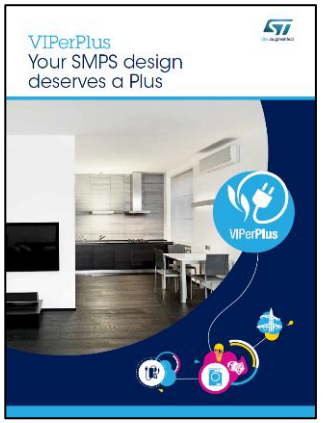
Technical / Educational note

User Manuals, Datasheets,
Application notes

Strong Application Support

Design Feasibility
PCB & BoM optimization
EMI pre-compliance
EMC (Burst-Surge) pre-compliance

BROCHURE



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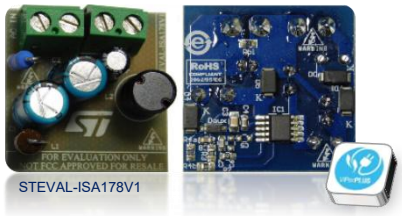
基于拓扑结构评估板

降压/升降压拓扑

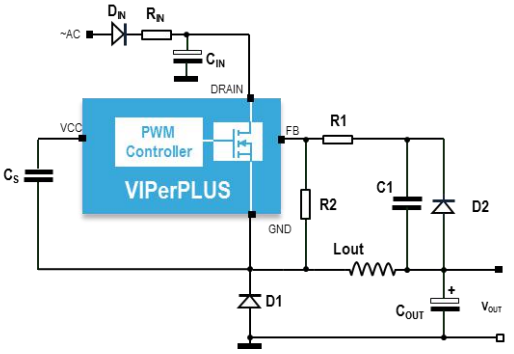
宽及超宽输入电压范围，高达I_{OUT} 200mA



Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA010V1	VIPER16LN	Not isolated buck converter, 60khZ, DIP7 package	85-500Vac	12V±10%, 5V±4%, 150mA	AN2872
STEVAL-ISA096V1	VIPER06XS	Not isolated buck boost converter, 30khZ, SSO10 package	85-265Vac	-12 V / 150mA	UM1470
STEVAL-ISA114V1	VIPER06XS	Not isolated buck converter, 30khZ, SSO10 package	80-265Vac	5V / 160mA	AN4273
STEVAL-ISA115V1	VIPER06XS	Not isolated buck converter, 30khZ, SSO10 package	85-265Vac	12V / 150mA	AN4260
STEVAL-ISA119V1	VIPER16LD	Not isolated buck converter, 60khZ, SO16N package	85-265Vac	12, 5V / 150mA	AN4345
STEVAL-ISA130V1	VIPER06XN	Not isolated buck converter, 30khZ, DIP7 package	85-375Vac	12V / 140mA	DN0009
NEW STEVAL-SA179V1	VIPER0PLD	Not isolated buck converter, 60khZ, SO16N package	85-265Vac	15V / 150mA	AN4857
NEW STEVAL-ISA178V1	VIPER013XS	Not isolated buck converter, 30khZ, SSO10 package	85-265Vac	5V / 200mA	AN4858
NEW STEVAL-LL003V1	VIPER0PLD	Not isolated buck converter, 60khZ, SO16N package	85-275Vac	8W / 130mA	AN5107

宽输入电压范围下，高达I_{OUT} 350mA

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA116V1	VIPER26LD	Not isolated buck converter, 60khZ ,SO16N package	85-265Vac	16 V, 5V / 300mA	AN4562
NEW STEVAL-ISA195V1	VIPER115XS	Not isolated buck converter, 30khZ, SSO10 package	85-265Vac	5V / 350mA	AN5081



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评估板

非隔离反激拓扑

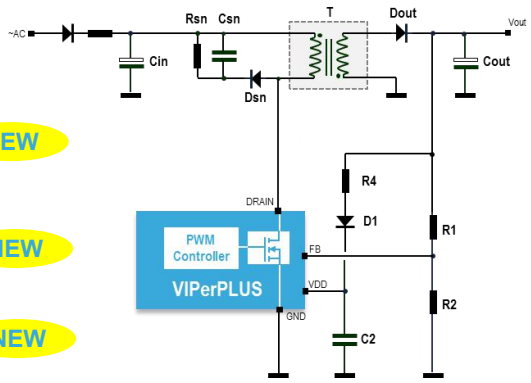
宽输入电压范围下， **高达4.5W**

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA112V1	VIPER06HN	Not isolated fly-back, 115khZ, DIP7 package	85-265Vac	12V / 350mA	AN4116
STEVAL-ISA113V1	VIPER06HS	Not isolated fly-back, 115khZ, SSO10 package	85-265Vac	12V / 350mA	AN4164
STEVAL-ISA177V1	VIPER013LS	Not isolated fly-back, 60khZ, SSO10 package	85-265Vac	5V / 800mA	AN4855

NEW

宽输入电压范围下，**高达7W**

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA071V2	VIPER16LN	Fly-back (non iso) (negative) ,60khZ ,DIP7 package	85-265Vac	-5V / 400mA, +7V / 160mA	UM0920
STEVAL-ISA118V1	VIPER16LN	Fly-back (non iso) ,60khZ ,DIP7 package	85-265Vac	16V / 280mA	AN3028
STEVAL-ISA129V1	VIPER16HN	Fly-back (non iso) ,115khZ ,DIP7 package	85-265Vac	16V / 280mA	DB1943
STEVAL-ISA174V1	VIPER0PLD	Fly-back (non iso) ,60khZ ,SO16N package Zero Power	85-265Vac	7V, -5V 7W	AN4836 NEW
STEVAL-ISA192V1	VIPER0PLD STM32L052	Fly-back (non iso) ,60khZ ,SO16N package Zero Power	85-265Vac	7V, -5V 7W	AN4941 NEW
STEVAL-ISA196V1	VIPER114LS	Fly-back (non iso) ,60khZ ,SO16N package	85-265Vac	5V/1.2A	AN5072 NEW



宽输入电压范围下，**高达12W**

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA110V1	VIPER26LN	Fly-back (non iso), 60khZ, DIP7 package	85-265Vac	12V / 1A	AN4106
STEVAL-ISA111V1	VIPER26HN	Fly-back (non iso), 115khZ, DIP7 package	85-265Vac	12V / 1A	AN4165

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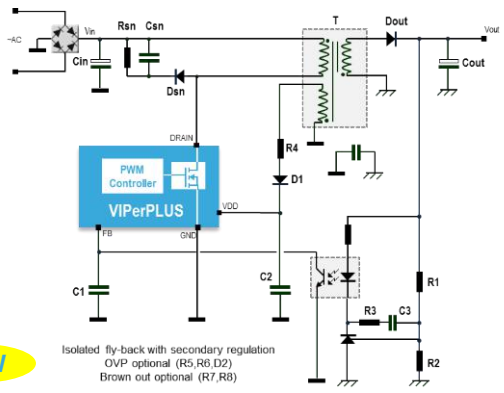
宽输入电压范围下，**高达4.5W**

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ILL017V1	VIPER17HN	Isolated fly-back (LED driver),115khZ, DIP7 package	220±20%	7V / 500mA	AN2811
STEVAL-ISA134V1	VIPER06HN	Isolated fly-back, 115khZ, DIP7 package	85-265Vac	12V / 330mA	AN4372
STEVAL-ISA135V1	VIPER06HS	Isolated fly-back, 115khZ, SSO10 package	85-265Vac	12V / 330mA	AN4404
STEVAL-ISA136V1	VIPER06HN	Isolated fly-back, 115khZ, DIP7 package	85-265Vac	5V / 600mA	AN4410
STEVAL-ISA137V1	VIPER06HS	Isolated fly-back, 115khZ, SSO10 package	85-265Vac	5V / 600mA	AN4418

宽输入电压范围下，**高达8W**

Order code	p/n	Short Description	Vin	Vout/Iout	Document	
STEVAL-ISA060V1	VIPER17HN	Fly-back (iso),115khZ, DIP7 package	85-265Vac	12V / 500mA	AN2753	
STEVAL-ISA062V1	VIPER17HN	Fly-back (iso) (double out), 115khZ, DIP7 package	85-265Vac	5V,12V / 750mA	AN2934	
STEVAL-ISA117V1	VIPER16LN	Fly-back (iso), 60khZ, DIP7 package	85-265Vac	12 / 400mA	AN4259	
STEVAL-ISA124V1	VIPER17HN	Fly-back (iso) (CC/CV charger), 115khZ, DIP7 package	85-265Vac	5V / 1A	AN2840	
STEVAL-ISA125V1	VIPER28LN	Fly-back (iso) (PEAK Power), 60khZ, DIP7 package	85-265Vac	5V / 2.4A	DB1985	
STEVAL-ISA126V1	VIPER28HN	Fly-back (iso) (PEAK Power), 115khZ, DIP7 package	85-265Vac	5V / 2.4A	AN2950	
STEVAL-ISA180V1	VIPER0PLD	Fly-back (iso), 60khZ, SO16N package Zero Power	85-265Vac	12V / 0.5A	AN4905	NEW
STEVAL-ISA181V1	VIPER0PHD STM32L151C6	Fly-back (iso), 120khZ, SO16N package Zero Power Remote control	85-265Vac	12V / 0.5A	AN4940	NEW
STEVAL-ISA197V1	VIPER114LS	Fly-back (iso), 60khZ, SO16N package	85-265Vac	12V / 0.65A	AN5057	NEW



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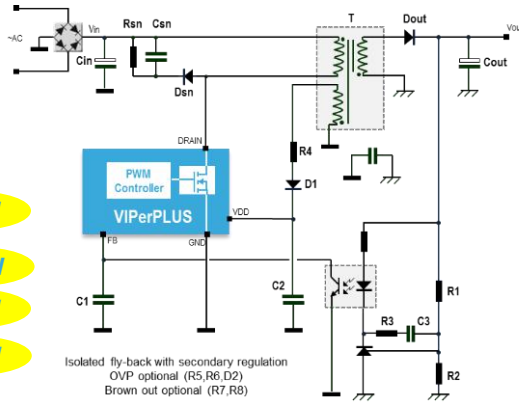
Up to 12W 宽输入电压范围

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA081V1	VIPER26LN	Fly-back (iso) (PRIMARY reg) ,60khZ, DIP7 package	85-265Vac	12V, 3.3V / 1A	UM0984
STEVAL-ISA103V1	VIPER27LN	Fly-back (iso) ,60khZ, DIP7 package	85-265Vac	5V / 2.4A	AN2929
STEVAL-ISA120V1	VIPER27HN	Fly-back (iso) (LED driver), 115khZ, DIP7 package	85-265Vac	10V / 750mA	AN3212
STEVAL-ISA122V1	VIPER27HN	Fly-back (iso),115khZ, DIP7 package	85-265Vac	5V / 2.2A	AN3011
STEVAL-ISA162V1	VIPER25HD	Quasi resonant fly-back (iso), 225kHz frequency limit	85-265Vac	12V / 840mA	AN4685
AN	VIPER27LN	Fly-back (iso) ,60khZ, for STB adapter	100-320Vac	12V / 1A	AN4583
NEW STEVAL-ISA175V1	VIPER26HD	Three outputs, isolated flyback converter for Smart meter and Power Line Communication system using Viper26HD	85-265Vac Peak 440Vac	16V / 500mA (700mA pk) 5V / 100mA 3.3V / 200mA	AN4878
NEW STEVAL-ISA182V1	VIPER38HD	Peak power fly-back (iso),115khZ, SO16N package	85-132Vac	12V / 0.7A (2.5A peak for 10ms)	AN4924
NEW STEVAL-VP26K01F	VIPER267K	Three outputs, isolated flyback converter (1 phase)	85-440Vac	15V, 5V, 3.3V / 11W	draft
STEVAL-VP26K02F	VIPER267K	Double outputs, isolated flyback converter (3 phase)	85-440Vac	12V, 6V / 10W	draft

Up to 15W 宽输入电压范围

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA121V1	VIPER37LE	Fly-back (iso) ,60khZ ,SDIP10 package	85-265Vac	5V / 3A	AN4007
STEVAL-ISA140V1	VIPER37HE	Fly-back (iso) ,60khZ ,SDIP10 package	85-265Vac	12V / 1.2A	AN4419
STEVAL-ISA153V1	VIPER38LE	Fly-back (iso) (PEAK Power) ,60khZ ,SDIP10 package	90-265Vac	12V / 1.25A peak 1.8A	AN4479
STEVAL-ISA171V1	VIPER35HD	Quasi resonant fly-back (iso), 225kHz frequency limit	85-265Vac	12V / 1.25A	AN4812
NEW STEVAL-ISA183V1	VIPER35LD	Quasi resonant triple output fly-back (iso), 116kHz frequency limit	175-275Vac	12V / 1A 15V / 0.2A 5V / 0.2A	AN5030
NEW STEVAL-ISA184V1	VIPER37LD	Double output fly-back (iso), 60kHz, SO16N package	85-265Vac	5V / 1.2A 12V / 0.75A	AN4830
NEW STEVAL-ISA191V1	VIPER37LE	Double output fly-back (iso), 60kHz, SDPI10 package	85-265Vac	5V / 1.2A 12V / 0.75A	AN4830



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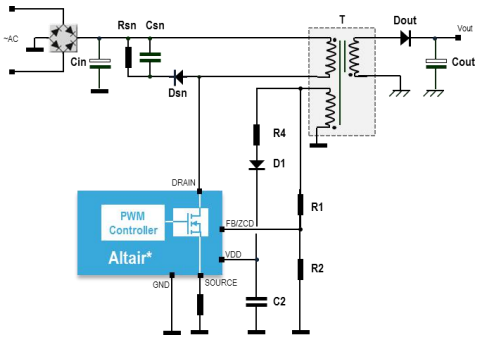
宽输入电压范围下，**高达7W**

Order code	p/n	Short Description	Vin	Vout/Iout	Document
STEVAL-ISA176V1	ALTAIR05T-800	CV-CC opto-less adapter Quasi Resonant – Primary side Regulation Fly-back	90-265Vac	5V / 1A	AN3093
STEVAL-ISA133V1	ALTAIR04-900	Quasi Resonant – Primary side Regulation Fly-back Power Supply for Energy meter	85-265Vac	13V @ 550mA, 3.3V @ 100mA	AN3290
STEVAL-ISA105V1	ALTAIR04-900	Power supply for energy meter and power line modem Quasi Resonant – Primary side Regulation Fly-back	90-440Vac	5V @ 70mA, 1A max, 3.3V @ 30mA, 150mA max 12V @ 2mA, 100mA max 5V ISO @ 2mA, 80mA max	AN4154

< 5% CV accuracy



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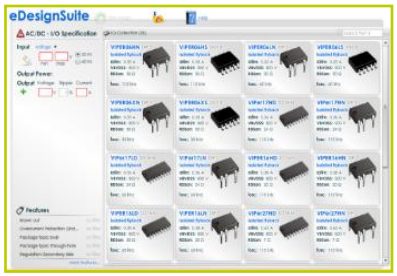
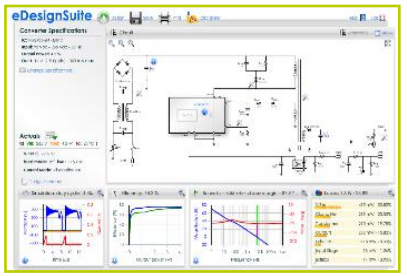


输入您I/O规格并选择任何一款推荐的VIPer 器件产品



您的设计完成!

1 → 2 → 3 → 4

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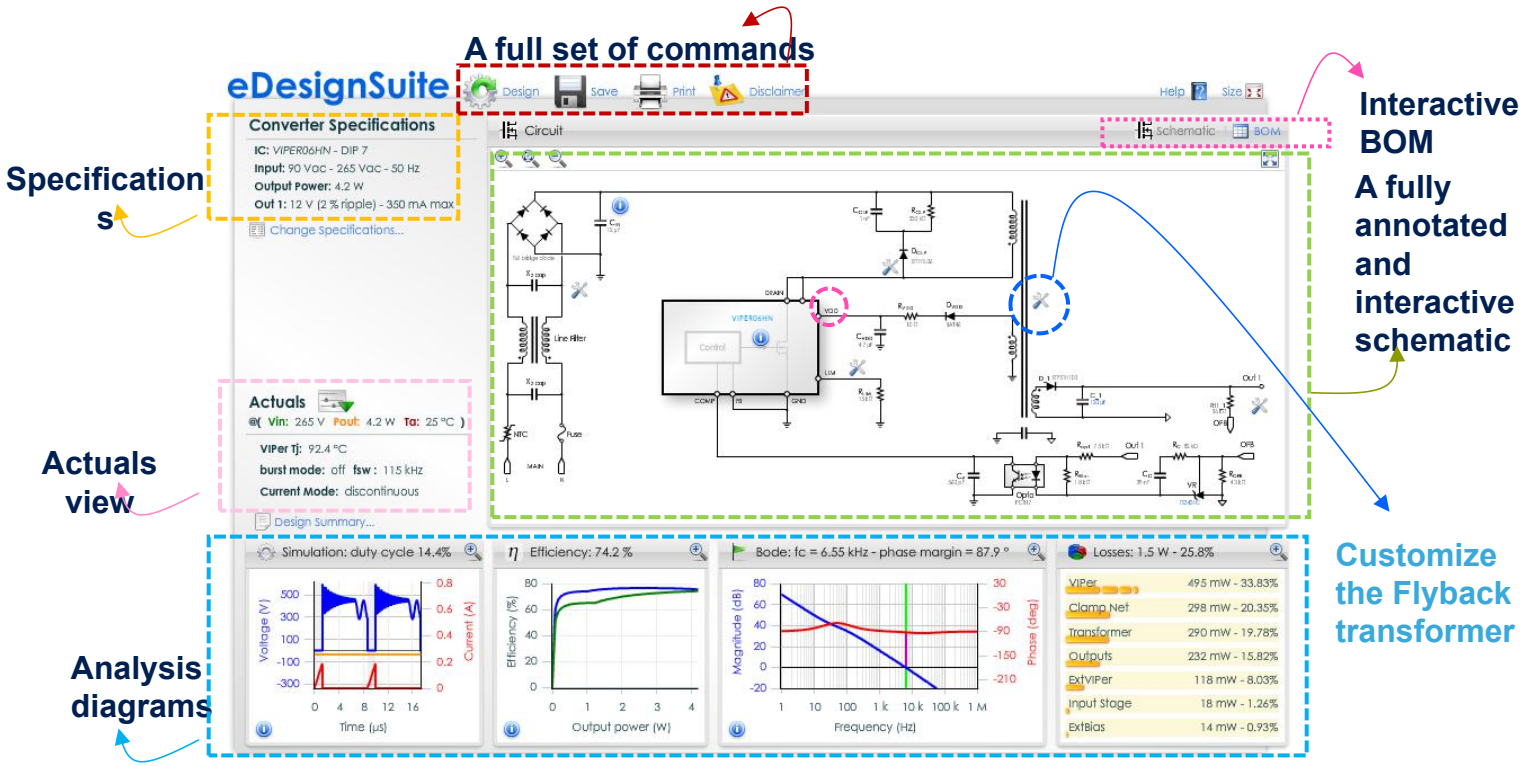


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