

# VIPerPlus



STMicroelectronics

Truly innovative AC-DC conversion

**Advanced solutions for switch-mode power supplies ..... 3**  
Key benefits .....3  
Main features.....3  
Main electrical parameters .....4

**Topologies and applications.....4**  
Home appliances: washing machines, dishwashers, dryers, ovens, fridges.....4  
Smaller home appliances: coffee makers, food processors, microwave ovens .....4  
Consumer electronics: LCD TVs, DVD players/recorders and set-top boxes, home theater.....5  
LED drivers: architectural lighting, interior decorating lighting, emergency lights .....5  
Computers: desktop PC, server.....5  
Adapters, chargers for: mobile/smart phones, cordless appliances, shavers, toys, digital cameras, MP3/portable audio.....5

**Product table.....6**  
Commercial code description .....6

**Evaluation boards .....7**

**Package options .....7**

# Advanced solutions for switch-mode power supplies

ST's VIPerPlus series of high-voltage converters combine the innovative avalanche-rugged SuperMESH™ power MOSFET with state-of-the-art PWM circuitry. The result is truly innovative AC-DC conversion that is efficient, simpler, quicker and, with component count halved, less expensive.

In addition to benefits such as optimized current-mode control and comprehensive built-in protection circuits, the VIPerPlus family represents the easiest solution to comply with the Blue Angel and Energy Star eco norms, with extremely low total power consumption from the mains when the system is in standby mode.

## Key benefits

- Ultra-low power-supply consumption: 30 mW standby at 265 V
- Easily meets all energy efficiency regulations
- Avalanche-rugged 800 V power section for high robustness and reduced clamp cost
- Jittering feature reduces EMI filter cost and helps meet the EN550022 class B specifications
- High efficiency using quasi-resonant version
- No auxiliary winding costs for very low-power SMPS
- Embedded advanced protection features for high PSU reliability
- Easily compliant with the 2002/95/EC European directive
- Extended pin creepage distance for safe operation in humid environments

## Main features

Features/products	VIPer06	VIPer15	VIPer16	VIPer17	VIPer25	VIPer26	VIPer27	VIPer28	VIPer35	VIPer37	VIPer38
High-voltage avalanche-rugged power MOSFET	*	*	*	*	*	*	*	*	*	*	*
PWM current-mode controller	*	*	*	*	*	*	*	*	*	*	*
Integrated high-voltage start up	*	*	*	*	*	*	*	*	*	*	*
Limiting drain current with adjustable set point	*	*	*	*	*	*	*	*	*	*	*
Fixed frequency	*		*	*		*	*	*		*	*
Quasi resonant		*			*				*		
Jittered frequency	*		*	*		*	*	*		*	*
No need for auxiliary winding	*		*								
Simplified non-isolated loop	*		*			*					
Auto restart mode after fault	*	*	*	*	*	*	*	*	*	*	*
Overload and short-circuit protection	*	*	*	*	*	*	*	*	*	*	*
Accurate output overvoltage protection		*		*	*		*	*	*	*	
Open loop failure protection	*		*			*					
Feed forward compensation		*		*	*		*	*	*	*	*
On-board soft start	*	*	*	*	*	*	*	*	*	*	*
Settable brown out		*		*	*		*		*	*	
Peak power management								*			*
High drain current protection (2nd OCP)		*		*	*		*	*	*	*	*

Main electrical parameters

Main parameters/products	VIPer06	VIPer15	VIPer16	VIPer17	VIPer25	VIPer26	VIPer27	VIPer28	VIPer35	VIPer37	VIPer38
Breakdown voltage	800 V	800 V	800 V	800 V	800 V	800 V	800 V	800 V	800 V	800 V	800 V
On-resistance	30 ohm	24 ohm	24 ohm	24 ohm	24 ohm	7 ohm	7 ohm	7 ohm	4.5 ohm	4.5 ohm	4.5 ohm
Fixed frequency	30 kHz 60 kHz 115 kHz	Quasi-resonant	60 kHz 115 kHz	60 kHz 115 kHz	Quasi-resonant	60 kHz 115 kHz	60 kHz 115 kHz	60 kHz 115 kHz	Quasi-resonant	60 kHz 115 kHz	60 kHz 115 kHz
Dain current limit	400 mA	400 mA	400 mA	400 mA	400 mA	700 mA	700 mA	800 mA	1000 mA	1000 mA	1150 mA
Output power @ 230 V <sub>AC</sub> ±10%	8 W	12 W	12 W	12 W	12 W	24 W	24 W	24 W	30 W	30 W	30 W
Output power @ 85 to 265 V <sub>AC</sub>	4 W	6 W	6 W	6 W	6 W	12 W	12 W	12 W	15 W	15 W	15 W
Package	SS010 DIP7	S016N DIP7	S016N DIP7	S016N DIP7	S016N DIP7	S016N DIP7	S016N DIP7	S016N DIP7 SDIP10	SDIP10	SDIP10	SDIP10

Topologies and applications

SMPS topology / Products	VIPer06	VIPer15	VIPer16	VIPer17	VIPer25	VIPer26	VIPer27	VIPer28	VIPer35	VIPer37	VIPer38
Flyback (isolated output)	*	*	*	*	*	*	*	*	*	*	*
Flyback (non isolated output)	*☺	*	*☺	*	*	*☺	*	*	*	*	*
Flyback, primary regulation	*☺	*	*☺	*	*	*☺	*	*	*	*	*
Buck converter	*		*								
Buck boost converter	*		*								

☺ = high-performance topology

Home appliances: washing machines, dishwashers, dryers, ovens, fridges



VIPerPlus function

- Power supplies for microcontrollers and displays

Non-isolated PSU

VIPer06/16/26

Isolated PSU

VIPer06/16/26VIPer15/25VIPer17/27

Main benefits

- Robustness: 800 V avalanche-rugged power section plus embedded failure protection functions
- Cost saving: Easy design for positive and negative voltages with minimized total component count
- Flexibility: Same PCB for PSU from 1 W to 12 W
- Energy saving: 30 mW PSU standby and high efficiency

Smaller home appliances: coffee makers, food processors, microwave ovens



VIPerPlus function

- Replacement of capacitive power supplies

Non-isolated PSU

VIPer06/16/26

Main benefits

- Energy saving: 30 mW PSU standby and high efficiency
- Cost saving: Minimized design for positive or negative voltage without transformer and self supplied.
- In case of fly-back converter, eliminates the auxiliary winding.
- EMI: Easily meets the EN550022 class B specification
- Robustness: 800 V avalanche-rugged power section plus embedded failure protection functions

Consumer electronics: LCD TVs, DVD players/recorders and set-top boxes, home theater



VIPerPlus function

- Auxiliary power supplies

Isolated PSU

VIPer06/16/26VIPer15/25VIPer17/27/37VIPer28

Main benefits

- Energy saving: 30 mW PSU standby and high efficiency
- Robustness: 800 V avalanche-rugged power section plus embedded failure protection functions, brown-out function or peak power management
- Cost saving: Simple design with minimized total component count
- EMI: Easily meets the EN550022 class B specification
- Flexibility: Same PCB for PSU from 1 W to 12 W

LED drivers: architectural lighting, interior decorating lighting, emergency lights



VIPerPlus function

- Power supplies

Non-isolated PSU

VIPer06/16/26

Isolated PSU

VIPer06/16/26VIPer15/25VIPer17/27/37VIPer28

Main benefits

- Energy saving: 30 mW PSU standby and high efficiency
- Robustness: 800 V avalanche-rugged power section plus embedded failure protection functions
- Cost saving: Simple design with minimized total component count and high reliability
- Flexibility: Same PCB for PSU from 1 W to 12 W

Computers: desktop PC, server



VIPerPlus function

- Auxiliary power supplies

Isolated PSU

VIPer25VIPer26VIPer27VIPer28VIPer37

Main benefits

- Energy saving: 30 mW PSU standby and high efficiency
- Robustness: 800 V avalanche-rugged power section plus embedded failure protection functions and peak power management
- Cost saving: Simple design with minimized total component count
- EMI: Easily meets the EN550022 class B specification
- Flexibility: Same PCB for PSU from 1 W to 12 W

Adapters, chargers for: mobile/smart phones, cordless appliances, shavers, toys, digital cameras, MP3/portable audio



VIPerPlus function

- Power supply

Isolated PSU

VIPer06/16/26VIPer15/25VIPer17/27/37

Main benefits

- Energy: 30 mW standby and high efficiency compliant with all relevant standards
- Robustness: 800 V avalanche-rugged power section plus embedded failure protection functions and peak power management
- Cost saving: Simple design with minimized total component count
- Flexibility: Same PCB for PSU from 1 W to 12 W

Product table

Generic part number	Package	General description	R <sub>DS(on)</sub> max(Ω)	Transistor breakdown voltage V <sub>RR</sub> DSS or V <sub>RR</sub> CEO min (V)	Drain current (I <sub>dsr</sub> ) nom (A)
VIPER06 *	DIP7; SS010	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	30	800	0.35
VIPER15	DIP7; S016N	VIPerPlus family: quasi-resonant high-performance offline high-voltage converter	24	800	0.4
VIPER16	DIP7; S016N	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	24	800	0.4
VIPER17	DIP7; S016N	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	24	800	0.4
VIPER25	DIP7; S016N	VIPerPlus family: quasi-resonant high-performance offline high-voltage converter	7	800	0.7
VIPER26	DIP7; SDIP10; S016N	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	7	800	0.7
VIPER27	DIP7; S016N	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	7	800	0.7
VIPER28	DIP7; SDIP10; S016N	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	7	800	0.8
VIPER37	SDIP10	VIPerPlus family: fixed-frequency high-performance offline high-voltage converter	4.5	800	1.0

Note:  
\* in development, samples available

Commercial code description

Part number description	
VIPer Plus series number	
Frequency switching identifier	
X	30 kHz
L	60 kHz
H	115 kHz
Package identifier	
N	Plastic DIP7
E	Plastic SDIP10
S	Plastic surface mount SS010
D	Plastic surface mount S016N
Packaging	
blank	Tube
TR	Tape and reel

VIPER

16

L

D

TR

Evaluation boards

Products	Order code	Topology	Input V <sub>AC</sub>	Output power (W)	Output voltage (V)	Relevant document
VIPER17LN	STEVAL-ISA058V1	Flyback	85-265	5	5	AN2864
VIPER17HN	STEVAL-ISA060V1	Flyback	85-265	6	12	AN2753
VIPER17HN	EVLVIP17-5WCHG	Flyback	90-265	5	5	AN2840
VIPER17HN	STEVAL-ILL017V1	Flyback	220 ±20%	3.5	7	AN2811
VIPER17HN	STEVAL-ISA062V1	Flyback	85-265	5.5	5, 12	AN2934
VIPER17HN	EVLVIP27-7WLED*	Flyback	100-264	3.5	10	AN3212
VIPER27LN	EVLVIP27L-12WS*	Flyback	85-265	12	5	AN2929
VIPER27HN	EVLVIP27H-12SB*	Flyback	85-265	11	5	AN3011
VIPER27HN	EVLVIP27-7WLED*	Flyback	100-264	7	10	AN3212
VIPER37LE	EVLVIP37L-5V3A*	Flyback	85-265	15	5	-
VIPER37HE	In development	Flyback	85-265	15	5, 12	-
VIPER37LE	In development	Flyback	230 ±10%	22	12	-
VIPER06LS	STEVAL-ISA096V1*	Buck boost	85-265	1	-12, -5	-
VIPER06HS	In development	Flyback (non isolated)	85-265	4	12	-
VIPER06HS	In development	Flyback (non isolated)	85-265	4	5	-
VIPER16LN	STEVAL-ISA010V1	buck converter	85-500	1.8	5, 12	AN2872
VIPER16LN	EVLVIP16L-4WFN*	Flyback (non isolated)	85-265	4.5	16	AN3028
VIPER16LN	STEVAL-ISA071V1	Flyback (non isolated)	85-265	4	-5, 12	UM0920
VIPER16LN	EVLVIP16L-5WFL*	Flyback	85-265	5	12	-
VIPER16LD	EVLVIP16LD-1W5*	buck converter	85-265	1.8	5, 12	-
VIPER16HN	EVLVIP16H-4WFN*	Flyback (non isolated)	85-265	4.5	16	-
VIPER26LD	STEVAL-ISA081V1	Flyback (primary regulation)	85-265	12.5	3.3, 12	UM0984
VIPER26LN	In development	Flyback (non isolated)	85-265	12	12	-
VIPER15LN	STEVALVIP15L-6W*	Flyback (quasi-resonant)	90-265	6	12	AN3160
VIPER15LN	EVLVIP15L-5WSB*	Flyback (quasi-resonant)	90-265	5	5	-
VIPER25LN	EVLVIP25L-10WSB*	Flyback (quasi-resonant)	85-265	10	5	AN3286
VIPER28LN	EVLVIPER28L-10W	Flyback (peak power)	85-265	12	5	AN2950

Note:  
\* Boards already available but not yet orderable via st.com; contact ST sales office for more information

Package options



