

3 phase power supply with VIPer and Power MOSFETs

Data Brief

Features

- Minimum AC input voltage = 90 V_{AC}
- Maximum AC input voltage = 450 V_{AC}
- Time of hold up capability > 50 ms
- Mean input power < 6 W (in compliance with IEC62053-21)
- Input connections allowed:
 - 1-phase with neutral
 - 2-phase without neutral
 - 3-phase with neutral
- V_{OUT1} = 5 V, I_{OUT1} = 10 mA
- V_{OUT2} = 3.3 V, I_{OUT2} = 100 mA
- Maximum precision error = 3%
- Maximum ripple voltage = 50 mV
- Line regulation = +/- 1%
- Load regulation = +/- 1%
- Output power (peak) = 550 mW

Description

This reference design represents a cost effective solution for low power high voltage power supplies. It has been developed to cover applications requiring an ultra-wide input voltage range (between 90 and 450 V_{AC}), typical of three-phase applications. This requires the use of very high voltage components, which increases cost, size, weight and the overall complexity of the power supply. The circuit includes a switching transistor connected between the input rectifier and the DC bulk capacitor (STMicroelectronics patent). The series switch limits the DC input voltage of the power converter by means of a driving circuit; thus the SMPS primary transistor can be selected as a standard part as well as a smart power primary IC.



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Typical end applications for this solution can be found in the industrial market in the range below 5 W, such as three-phase and single-phase power meters, industrial bias power supplies and auxiliary SMPS for high voltage street lighting, where the input voltage can range from 90 V_{AC} to 450 V_{AC} and 1000 V Power MOSFETs are currently used.

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Figure 1. Schematic



Layout Hints: Q1 mounted on 1cm x 0.8cm copper area. C8&C10 have to be closed to the VIPer12AS. GND Pins for U2 have to be soldered to a unique copper area.

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
28-Nov-2007	1	Initial release

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