



FRONTGRADE

APPLICATION NOTE

51028XXX, 5402801, 59005333

ANVERSAL

Frontgrade Power Solutions for Versal

2/3/2025

Version #: 1.0.1

Xilinx's Versal SoC Processors

Versal is the first implementation of Xilinx's Adaptive Compute Acceleration Platform (ACAP). The Versal ACAP is an extremely comprehensive system-on-chip (SoC) that combines CPUs, DSPs, I/O and RAM control along with programmable hardware logic, the latter traditionally a stand-alone FPGA chip. Versal is first to combine so many disparate processors on one chip. Versal ACAP is a fully software-programmable, heterogeneous compute platform that combines programmable logic with vector and scalar processing elements to achieve dramatic performance improvements, up to 20X today's fastest FPGA implementations.

The processing power and versatility of Versal is quickly making it the FPGA of choice for a wide variety of processing applications.

Versal SoC FPGA's are available in a variety of configurations to best suite a particular application. See the AMD website for a full description of Versal FPGA features.

 <p>HBM Series</p> <p>Features hyper integration of fast memory, secure data, and adaptive compute for memory bound, compute intensive, high bandwidth applications.</p> <p>View HBM Series ></p>			
 <p>AI Core Series</p> <p>Delivers breakthrough AI inference and wireless acceleration with AI Engines that deliver over 100X greater compute performance than today's server-class CPUs.</p> <p>View AI Core Series ></p>	 <p>AI Edge Series</p> <p>Delivers over 4X AI performance/watt vs. leading GPUs for power- and thermally-constrained edge applications, accelerating the whole application from sensor to AI to real-time control.</p> <p>View Edge Series ></p>	 <p>Prime Series</p> <p>The foundational Versal™ adaptive SoC series, providing a wide range of devices with broad applicability across multiple markets.</p> <p>View Prime Series ></p>	 <p>Premium Series</p> <p>Breakthrough integration of networked, power-optimized cores on an adaptable platform for the most challenging compute and networking applications.</p> <p>View Premium Series ></p>

With its versatility and processing capabilities, supplying adequate core power and all ancillary voltages for Versal can be challenging. Frontgrade is committed to provide SPACE qualified power solutions for Versal and other high performance processors.

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FRONTGRADE POWER CONVERTER OFFERINGS-

- 1. Isolated, Single-Stage-Converters with the following features:**
 - Space Qualified
 - Rated 50krad TID and 60MeV for SEE
 - Converters cover the range of output voltage from 0.64V to 28V
 - Parallel two converters for higher current output
 - Output current up to 94A at 0.8V with two converters in parallel
 - Small volume, 2.5L x 1.5W x 0.67H inch max.
 - Low weight, 70g typ.
 - Input Over- and Under-Voltage protection
 - Overcurrent and short circuit protection
 - Optional synchronization to an external clock to control noise spectrum
- 2. POL Converters with the following features:**
 - Space Qualified
 - Rated 50krad TID and 43 MeV for SEE
 - Three converters in one convenient package
 - Adjustable outputs from 0.8V to 3.3V at up to 6A each from a 5V input
- 3. EMI Filters tailored for the Single-Stage Converters reduce conducted EMI at the board level:**
- 4. Space Qualified Linear Low-Dropout Regulators for low power rails:**

FRONTGRADE SOLUTIONS FOR VERSAL AND OTHER PROCESSORS

Frontgrade supplies a wide range of Space-Qualified converter solutions for powering VERSAL and other processor systems. We have direct, isolated, Single-Stage-Converters for high-efficiency core power, high efficiency Single-Stage-Converters for I/O and auxiliary power, low-power POL converters and linear regulators for low power auxiliaries.

CHOOSE FROM A WIDE RANGE OF ISOLATED, SINGLE-STAGE-CONVERTERS

Model	Vin, nominal	Vout Minimum	Vout Maximum	Iout Maximum
51028080	28V	0.64V	0.80V	54A
51028100	28V	0.80V	1.00V	50A
51028120	28V	0.96V	1.20V	41A
51028180	28V	1.44V	1.80V	27A
51028250	28V	2.00V	2.50V	20A
51028330	28V	2.64V	3.30V	15A
51028500	28V	4.00V	5.00V	10A
51028700	28V	5.60V	7.00V	7.1A
51028121	28V	9.6V	12.0V	4.2A
51070100	70V	0.80V	1.00V	50A
51070281	70V	22.4V	28.0V	2.7A
51100100	100V	0.80V	1.00V	50A
51100281	100V	22.4V	28.0V	2.7A

FRONTGRADE BOARD-LEVEL EMI FILTER

The Model 5402801 EMI Filter supports one or two Frontgrade 28V input Single-Stage Converter Modules. **It supports meeting conducted emissions to MIL-STD-461G CE101/CE102 at system levels**, instead of spreading conducted emissions through the PC board traces, backplanes, and other power distribution circuitry. It features a small footprint of 1.83"L x 1.85"W x 0.66"H max.

FRONTGRADE THREE-OUTPUT POINT-OF-LOAD REGULATOR

Model 59005333 Three-Output, Non-Isolated, Point-of-Load converter module consists of three independent buck converters in one convenient package. They share a single 5V input, but have independently adjustable outputs which may be set from 0.8VDC – 3.3VDC. Output current is up to 6A for each converter. All three POL converters fit in a compact 2.15L x 1.56W x 0.475H inch max package.

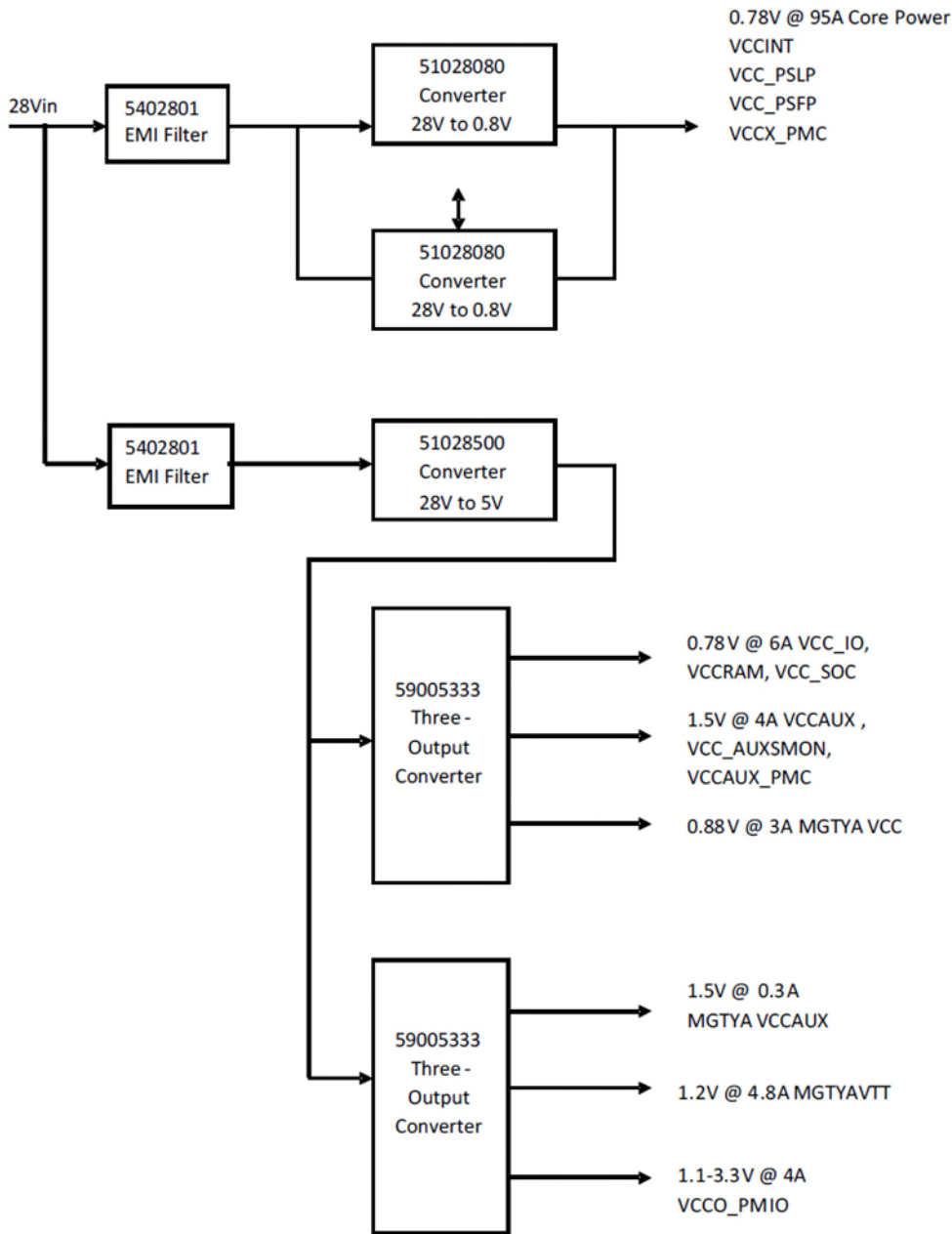
FRONTGRADE LOW DROPOUT LINEAR REGULATORS

Frontgrade supplies a variety of low dropout linear regulators for low power rails ranging in input voltages from 1V to 40V, with output voltages from 0V to 37V, and output currents from 1Amp to 3.5Amps.

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POWERING THE VERSAL PROCESSOR

The VERSAL processor typically uses 12 power rails. Some may be combined to reduce complexity. Frontgrade currently has solutions for core power up to 95 amps, and all the other rails. Here is a typical configuration:



TYPICAL CONFIGURATION FOR POWERING THE VERSAL PROCESSOR

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Revision History

Date	Revision #	Author	Change Description	Page #
	0.0.2		Import into Frontgrade format	

Datasheet Definitions

	Definition
Advanced Datasheet	Frontgrade reserves the right to make changes to any products and services described herein at any time without notice. The product is still in the development stage and the datasheet is subject to change . Specifications can be TBD and the part package and pinout are not final .
Preliminary Datasheet	Frontgrade reserves the right to make changes to any products and services described herein at any time without notice. The product is in the characterization stage and prototypes are available.
Datasheet	Product is in production and any changes to the product and services described herein will follow a formal customer notification process for form, fit or function changes.

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