

Description

The VCA-6 is a via-configurable array (VCA) that contains over 1,000,000 ASIC gates, 96 op-amps and supporting analog resources.

The fully differential, wideband devices in this VCA enable the design of high speed, high resolution data converters, analog filters, and mixed-signal DSP solutions. VCA-6 provides the resources needed to sweep up an entire printed circuit board (PCB) containing FPGAs, microcontrollers and surrounding analog ICs into a single integrated solution, thereby reducing the size, weight and power (SWAP) of the board-level implementation.

Like all of Triad’s configurable devices, VCA-6 uses patented via-only, single-mask configuration allowing design changes in weeks – not months, low development costs, reduced risk and support for any production volume.

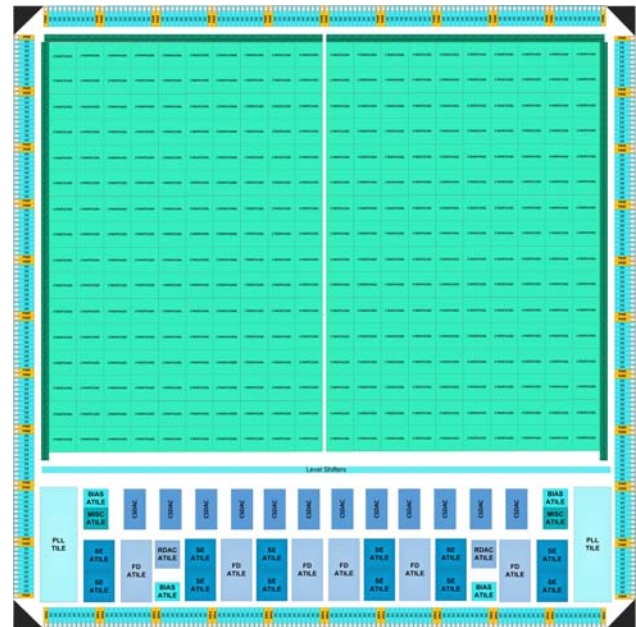


Figure 1 - VCA-6 Via Configurable Array

Resources & Capabilities

Resource	Quantity
Op-Amps	96
Single-ended op-amps	72
Differential op-amps	24
Unity gain bandwidth	50 MHz
DACs*	12
ASIC Gates	1,000,000+
Memory	1.28 Mbits
Configurable I/O	400
200 MHz PLL	2
Digital operating speed	125MHz system clock
Core logic voltage	1.8V
Analog & I/O voltage	up to 5V

Note *: ADCs built from DACs and analog tiles

Applications

- FPGA Plus Analog Replacement
- Multi-channel Data Acquisition
- Analog → DSP → Analog
- Software Defined Radio
- Size Weight and Power Critical Apps
- Combine ARM Cortex-M0 soft-core with custom digital and analog
- ITAR & Trusted Foundry Mixed Signal Applications

VCA-6 Features Summary

- **Technology**
 - 180nm IBM process technology
 - ITAR compliant design flow
 - 1.8V digital core voltage
 - 2.6 to 5V analog core voltage
- **Op-Amps**
 - 96 individual op-amps
 - 72 Single-ended op-amps
 - 24 Fully-differential op-amps
 - Rail-to-rail operation
 - Unit gain bandwidth to 50MHz
 - Via-configurable options per op-amp: input type, input noise, output drive, bandwidth selection,...
- **Capacitors**
 - 10,212 individual capacitors
 - 1,486pF of total capacitance
 - 0.1, 0.5, 0.8, 1pF capacitors
 - Excellent matching
- **Resistors**
 - 7,016 individual resistors
 - 48.2M Ω of total resistance
 - 700, 1K, 6.5K, 20K resistors
 - Excellent matching
- **MOSFETs**
 - 2,490 discrete transistors with various W/L ratios
 - 5V operation
 - 1,164 PFETs
 - 1,164 NFETs
 - 162 PNP BJTs
- **Switches**
 - 1,344 individual analog switches
 - Low resistance (<1k Ω) 5V t-gates
 - Low capacitance 5V t-gates
- **Resistive DAC Tiles**
 - 2 Resistive DAC tiles RDACs
 - 6-bit, 1 μ s setting time
 - Construct DACs of various resolutions
- **Current Steering DAC Tiles**
 - 12 Current steering DAC tiles
 - 6-bit, 5ns settling time
 - Thermometer "grayscale" coding minimizes digital noise injection
 - DAC tiles can be combined for higher resolution converters
- **Analog to Digital Converters**
 - ADCs with resolutions from 8 to 24 bits with sample rates up to 25MSPS can be constructed from the DAC and op-amp resources of the VCA
- **Digital**
 - 1,000,000+ ASIC gates
 - 1.28Mbits of dual port SRAM
 - RAMs Implemented as 320 128x36 DP SRAMs
 - 125MHz system speeds
 - 160kBytes of via-ROM implemented as 160 1k x 8 ROMs
- **PLL – 2 independent 200MHz PLLs**
- **Configurable I/O**
 - 400 Via configurable I/O
 - Digital I/O support LVCMOS, signaling to 5V, drive strength, slew rate, tri-state, Schmitt input
 - Analog I/O with 0 to 1.5k Ω resistance configurations
- **Package Options**
 - Wide variety of customer defined package choices: 100-pin QFP, 256-BGA to 400-BGA