

Description

The VCA-3/5/8 platforms belong to a family of via-configurable arrays (VCAs) that contain up to 150,000 ASIC gates, up to 44 op-amps and supporting analog resources (see Table 1 for a comparison). As an example, VCA-8 is shown in Figure 1.

The diverse mix of fully differential and single ended wideband devices which include op amps, FETs, switches, Rs and Cs, PLLs, and other supporting functions, enable the designer to select the right combination of resources to create circuits consisting of simple analog filters and amplifiers, all the way up to high speed, high resolution data converters and other mixed-signal DSP solutions. The plentiful logic resources allow implementation of glue logic functions, complex state machines, or soft-macro microcontrollers such as an 8-bit 8051 class or 32-bit ARM® Cortex-M0. There is also dual-port SRAM and via-ROM in each platform which can be used as code and parameter storage, or look-up table resources.

Like all of Triad’s configurable devices, the VCA-3/5/8 family 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.

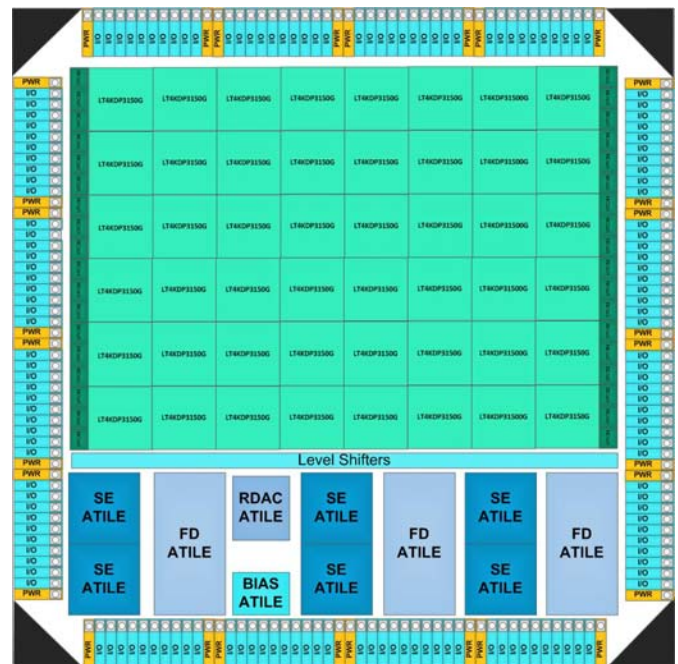


Figure 1: VCA-8 Via Configurable Array

Resources & Capabilities

Resource	Quantity
Op-Amps	40 to 44
Single-ended op-amps	28 to 32
Differential op-amps	8 to 16
Unity gain bandwidth	50 MHz
DACs*	Up to 5
ASIC Gates	56,000 to 150,000
Memory	81 Kbits to 216 Kbits
Configurable I/O	Up to 160
200 MHz PLL	Up to 1
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/CPLD Plus Analog Replacement
- Analog → DSP → Analog
- Size Weight and Power Critical Apps
- Combine ARM® Cortex-M0 soft-core with custom digital and analog
- ITAR & Trusted Foundry Mixed Signal Applications

VCA-3/5/8 Features Comparison

Resource	VCA-3	VCA-5	VCA-8
Single-Ended Op Amps	28	32	28
Fully-Differential Op Amps	16	8	12
Total Resistance	17.87M	21.54M	15.90M
Individual Resistors	3,030	2,996	2,582
Resistor Values	700Ω, 1KΩ, 6.5KΩ, 20KΩ		
Total Capacitance	625.8pF	614.8pF	542.6pF
Capacitor Values	0.1pF, 0.5pF, 0.8pF, 1.0pF		
Individual Capacitors	4,037	4,250	3,469
PFETs	334	524	270
NFETs	339	534	275
PNP BJTs	81	81	0
Switches	744	528	648
Current Steering DAC Tiles	0	5	0
Restive DAC Tiles	1	1	1
ASIC Gates	56,700	100,800	151,200
Total Dual Port SRAM Bits	82,944	147,456	221,184
Total Via-ROM Bytes	18K	24K	36K
200MHz PLLs	0	1	0
Max Configurable I/O	124	160	160

Table 1: Comparison of VCA-3/5/8 Features

VCA-3/5/8 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**
 - Rail-to-rail operation
 - Unit gain bandwidth to 50MHz
 - Via-configurable options per op-amp: input type, input noise, output drive, bandwidth selection,...
- **Resistors and Capacitors**
 - Thousands of individual elements
 - Excellent matching
- **MOSFETs**
 - Discrete transistors with various W/L ratios
 - 5V operation
 - PFETs, NFETs, and PNP BJTs
- **Switches**
 - Low resistance (<1kΩ) 5V t-gates
 - Low capacitance 5V t-gates

VCA-3/5/8 Features Summary (cont.)

- **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
- **Resistive DAC Tiles**
 - 6-bit, 1us setting time
 - Construct DACs of various resolutions
- **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**
 - RAMs Implemented as 128x36 Dual Port SRAMs
 - 125MHz system speeds
 - Via-ROM implemented as 1k x 8 ROMs
- **PLL**
 - 200MHz operation
- **Configurable I/O**
 - 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 1.5kΩ resistance configurations
- **Package Options**
 - Wide variety of customer defined package choices: 36-QFN to 80-QFN, 100-pin QFP, 256-BGA to 400-BGA
 - Range of LFGA & Chip-Scale packaging options
 - (Other options available upon request)