

### Description

VCA-12 is a small, high-voltage, high-current Via-Configurable Array (VCA) optimized for low-cost, volume-constrained applications. Despite its small size, VCA-12 includes over 5,000 configurable mixed signal resources.

Fabricated on a high-voltage, 0.18-micron, ITAR-certified process, the VCA-12 is ideal for defense, medical, industrial and consumer applications seeking to cost effectively integrate circuits such as op-amps, filters, voltage regulation, data converters, and sensor interfaces.

The array supports 12V operation for high-voltage analog circuits, 5V operation for low-voltage analog, 3.3V or 5V operation for digital circuits and configurable I/O pads to support 3.3V to 12V operation.

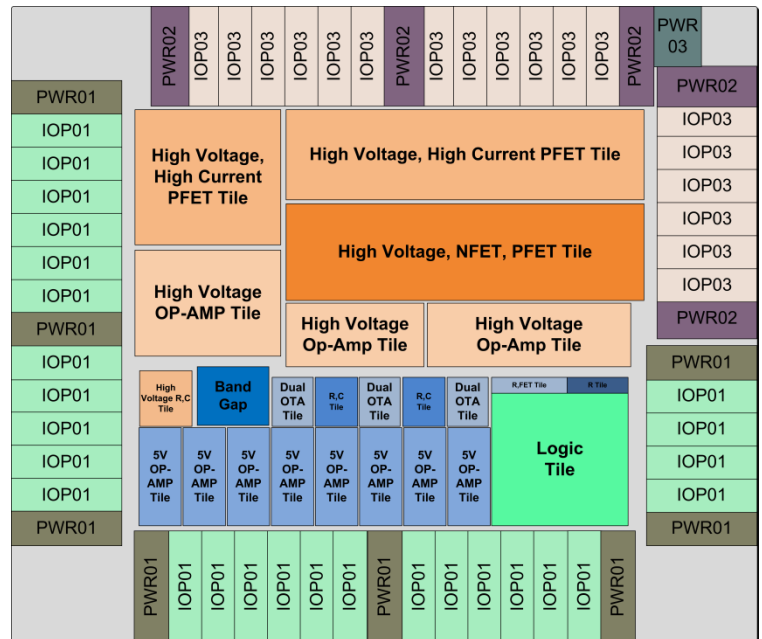


Figure 1: VCA-12 Via Configurable Array

### Resources & Capabilities

Resource	Quantity
5V op-amps	14
HV op-amps	5
HV PMOS transistors	63
HV NMOS transistors	48
HV Capacitors	138
LV Capacitors	600
Resistors	1,120
ASIC Gates	5,000
Configurable I/O	46
Analog voltages	up to 12V

### Applications

- Cost and size optimized mixed signal applications
- CPLD Plus Analog Replacement
- Integration of High Voltage Discrete Components
- Boost, Buck, and LDO Regulators
- Defense, ITAR applications
- Sweep-up of analog discrete components for cost and board area savings
- Precision Sensor Interfaces
- Circuits comprised of Op-amps, filters, gain stages, linearization, 16-bit ADCs, etc.

## VCA-12 Features Summary

- **Technology**
  - 0.18 $\mu$ m high voltage process technology
  - 3.3V to 5V digital core voltage
  - 3.3V, 5V, and up to 12V analog core voltage
  - North American, ITAR foundry
- **Op-Amps**
  - 14 single-ended 5V operational-transconductance amplifiers (OTA) with unity gain bandwidth up to 20MHz
  - Sleep-mode current consumption of 1nA
  - 8 5V output stages that can be combined with the 5V OTAs to create 8 op-amps for driving larger loads
  - 5 single-ended 12V OTAs with unity gain bandwidth up to 10MHz
- **Capacitors**
  - 600 low-voltage (5V) capacitors
  - 60pF of total capacitance
  - 0.1pF unit capacitors
  - Excellent matching
  - 138 high-voltage (12V) capacitors
  - 25.2pF of total capacitance
  - 0.1, 0.2, 0.4pF unit capacitors
  - Excellent matching
- **Resistors**
  - 520 individual 5K $\Omega$  resistors
  - 400 50K $\Omega$  of resistors
  - 23.6M $\Omega$  of total resistance
  - Excellent matching
- **MOSFETs**
  - 2,116 discrete transistors with various W/L ratios
  - 48 12V NMOS transistors
  - 63 12V PMOS transistors
  - 136 5V PMOS transistors
  - 136 5V NMOS transistors
- **Switches**
  - 160 5V switches with 1K $\Omega$  resistance
  - 48 5V switches with 400 $\Omega$  resistance
  - Switches configurable as simple transmission gates, single-pole double-throw (SPDT) switches, and Schmitt trigger buffers
- **Data Converters**
  - ADCs utilizing Sigma-Delta or Successive-Approximate-Register (SAR) architectures can be created from the mixed signal tile resources of the array.
  - DACs utilizing as R2R or C2C ladders or Sigma-Delta architectures can be created from the mixed signal tile resource of the array.
- **Digital**
  - 5,090 ASIC gates
  - 1,278 AL01 blocks configurable as any 3-input combinatorial logic function
  - 1,712 AL02 blocks configurable as latch or flip-flop sequential logic functions
  - 300 AL05 blocks configurable as digital multiplexers or analog transmission gates
- **Configurable I/O**
  - 88 Via-Configurable analog I/O
  - 25 Via-Configurable digital I/O
  - Digital I/O configuration options include: drive strength, tri-state, Schmitt input, pull-up/dn, ...
  - Analog I/O configuration options include 0, 50, and 1.5k $\Omega$  series resistance
- **Package Options**
  - Wide variety of customer defined package choices: 14-SOIC to 28-SOIC, 28-QFN and larger, 36-BGA to 121-BGA, 32-TQFP to 120-