AM243x VCA Package

Sitara MCU

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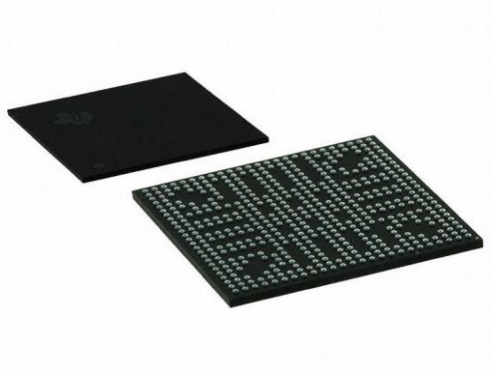
Texas Instruments

AM243x ALX Package



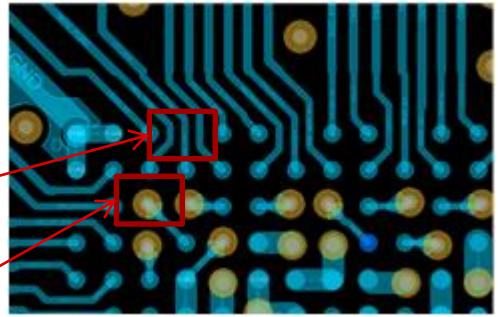
- Package information:
  - Body Size : 11mm x 11mm
  - Ball Pitch : 0.5mm with Via Channel Array Technology (VCA)
  - Interconnect Technology : Flip-Chip
  - Thermal enhancements : Thermal VIA’s in the center array

- Via-Channel Array technology
  - Careful de-population of BGA’s targeting lower cost PCB routing with smaller package size
  - PCB routing target:
    - # of layers for signal escape : 2 - 3
    - 3.2 - 4 mil trace width
    - 3.2 - 4 mil trace spacing
    - PTH VIA technology (no buried/blind, micro VIAs)
    - VIA dimensions: 18-16 mil VIA pad / 8 mil hole

AM243x VCA Package: Low cost PCB rules

- Less complex board routing rules (without full array)
- Reduces footprint of package significantly
- BGA de-population done to meet board/package requirements

Figure: VCA package with BGA de-pop for escaping inner row signals



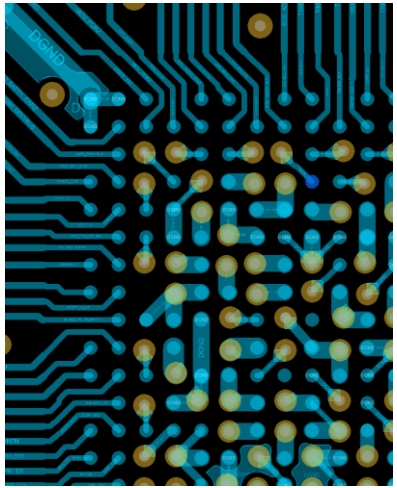


Figure: Signal escape with 2 outer rows escaped on layer 1 and inner rows escapes on secondary layers

PCB Parameter	AM243x	
	mil	um
Line width/ Spacing	4/4	101.6/ 101.6
Pad Dia	11.8	300
Via Drill	8	203.2
Via Pad	16	406.4
Via to Shape	4	101.6

Extensive System/Package Co-Design enables savings in PCB cost with AM243x and a smaller Package area

BGA vs. VCA Package Types

- All device package design seeks to maximize balls for supported features while minimizing total cost of an electronic system (die, package, PCB & components)
- One strategy for this is removing balls from a full Ball Grid Array (BGA) pattern from specific locations to create a Via Channel Array (VCA)

VCA packages and footprints:

- Enable routing channels to escape inner most BGA positions
- Reduce number routing layers for 100% signal breakout – typically achieved with 2 or 3
- Minimize package dimensions by using smaller ball pitch without PCB cost increase
- Allow larger breakout via land & drill diameters
  - Lowers PCB manufacturing costs
  - Improves PCB reliability performance
- Improve Power Integrity of Power & Ground plane
  - Lower Impedance vs. Frequency response that minimizes transient switching noise
  - Maintain current density/carrying capacity to inner most BGA positions

TI devices with VCA

Extensively used across all Sitara devices:

- AM243x: 11mm, 0.5mm VCA
- AM62x: 13mm, 0.5mm VCA
- AM37x: 16mm, 0.65mm VCA
- AM3517: 17mm, 0.65mm VCA
- AM335x: 13mm, 0.65mm VCA
- AM437x: 17mm, 0.65mm VCA
- AM57x: 17mm, 0.65mm VCA

Proven technology with several generations of devices (10+ years) across entire Sitara portfolio