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## **ASIC SOLUTIONS**

### **Fact Sheet**

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NEC Electronics America offers a comprehensive portfolio of custom and semi-custom semiconductor devices, including cell-based ASICs, gate arrays and embedded arrays. The cell-based ASICs achieve the high density needed for high-performance, system-level integration, while the gate arrays and embedded arrays provide cost-effective, small-die logic for applications with low- to mid-volume production levels. Applications for these products range from portable consumer devices to automotive and industrial systems to high-end broadband communications equipment and storage systems.

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### **CELL-BASED ASICS**

- Process technologies ranging from 150, 130 and 90 nm to the leading-edge 55 nm
- Low-power, high-performance system speeds ranging from 100 to 500 MHz
- Multiple, application-specific cell-based ASIC IP libraries
  - » Communications/gigabit passive optical networks (GPONs): ARM®-based ASIC subsystem, high-speed embedded DRAM and SerDes
  - » Consumer, mobile and digital home electronics: ARM-based ASIC subsystem, low-power embedded DRAM, High-Definition Multimedia Interface (HDMI), DDR2 SDRAM, USB 2.0, MPEG encoder/decoder, JPEG and modem codec
  - » Industrial: ARM-based ASIC subsystem, security IP, nonvolatile RAM (NVRAM) and USB 2.0
  - » Server: SAS/Serial ATA, PCI Express™, and DDR2 and DDR3 SDRAM
- Additional cell-based ASIC IP libraries
  - » 32-bit ARM-based CPU cores: ARM7, ARM9 and ARM11 (available as preverified subsystems)
  - » General IP such as digital and analog PLL, UART, A/D and D/A converter, SRAM, register file, scan, JTAG, CAM, ROM and FIFO
  - » High-speed interfaces such as PCI Express, SerDes, SAS/Serial ATA, USB 2.0, and DDR2 and DDR3 SDRAM
  - » Embedded DRAM in 150, 130 90 and 55 nm processes
- Wide range of packaging options: PBGA, ABGA, TBGA, QFP, FCBGA, CSP and SIP
- Applications
  - ≈ Highly complex, high-performance, high-volume designs for storage, communications and consumer markets
  - » Complex, high-performance, cost-sensitive, low-volume designs for industrial, communications and consumer markets

## GATE ARRAYS

- Process technologies ranging from 0.5 microns to 150 nm
- 5- to 6-metal layer structure in CMOS-12M, 3- to 4-metal layer structure in CMOS-9HD and -10HD gate arrays; 2-metal layer structure in CMOS-N5 gate arrays; 3- to 4-metal layer structure for EA-9HD embedded arrays
- Minimizes customer resources and risk with attractive product price points for both small and large volume needs
- Single and multi-supply voltages from 1.5 to 5V
- Enriched high-speed I/O interfaces, including LVDS, PCI, SSTL2, SSTL3, PECL and GTL+
- Library that includes I/O buffers, synchronous and asynchronous dual-port memory macros; SCAN and BSCAN, and UART and PCI
- For CMOS-12M, embedded IP that includes APLL, DLL and SRAM
- Pin-compatible packaging for FPGA conversion
- Low gate count and small package for logic consideration
- Applications: low- to mid-volume, low-power-consuming designs requiring high performance, low costs, short turnaround times and small die sizes

Lineup	CMOS-N5	CMOS-9HD	EA-9HD	CMOS-10HD	CMOS-12M
Master slices	13	19	38	60	10
Package types	27	47	47	33	14
Metal layers	2	3, 4	3, 4	3, 4	5, 6
Usable gates	1.5 to 120 Kg	11 Kg to 1.5 Mg	9.7 Kg to 1.5 Mg	6.8 Kg to 1.5 Mg	150 Kg to 2 Mg
Logic performance	60 MHz at 5V 33 MHz at 3V	100 MHz	100 MHz	133 MHz at 2.5V 66 MHz at 1.8V	200 MHz
Starting unit price	Below \$1				Below \$3
NRE mask charge	\$11K	\$21K (3 ML)	\$41K (3 ML)	\$33K (3 ML)	\$70K

## NEC Electronics America, Inc.

NEC Electronics America, Inc., headquartered in Santa Clara, California, is a wholly owned subsidiary of NEC Electronics Corporation (TSE: 6723), a leading provider of semiconductor products encompassing advanced technology solutions for the broadband and communications markets; system solutions for the mobile, PC, automotive and digital consumer markets; and multi-market IC solutions for a wide range of customer applications. NEC Electronics America offers a local manufacturing facility in Roseville, California, and the global manufacturing capabilities of its parent company. NEC Electronics America also serves as the marketing and sales channel in the Americas for industrial-type active-matrix LCDs from NEC Technologies, Ltd., a global leader in innovative display technologies. More information about the products offered by NEC Electronics America can be found at <http://www.am.necel.com>.

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