

## NSEC Series Embedded Multimedia Card (eMMC) (MLC)

### Overview

Insignis Technology Corporation eMMC products follow the JEDEC eMMC 5.0 standard. It is an ideal universal storage solution for many electronic devices, including embedded, automotive and industrial electronic applications requiring high quality, wide temperature operation and high reliability. eMMC encloses the MLC NAND and eMMC controller inside as one JEDEC standard package, providing a standard interface to the host. The eMMC controller directly manages NAND flash, including ECC, wear-leveling, IOPS optimization and read sensing.

### Features

- Packaged NAND flash memory with eMMC 5.0 interface
- Compliant with eMMC Specification Ver. 4.4, 4.41, 4.5, 5.0
- Bus mode
  - High-speed eMMC protocol
  - Clock frequency: 0-200MHz.
  - Ten-wire bus (clock, 1 bit command, 8 bit data bus) and a hardware reset.
- Supports three different data bus widths: 1 bit (default), 4 bits, 8 bits
  - Data transfer rate: up to 52Mbyte/s (using 8 parallel data lines at 52 MHz)
  - Single data rate: up to 200Mbyte/s @ 200MHz
  - Dual data rate: up to 400Mbyte/s @ 200MHz
- Operating voltage range:
  - VCCQ = 1.8 V/3.3 V
  - VCC = 3.3 V
- Error free memory access
  - Internal error correction code (ECC) to protect data communication
  - Internal enhanced data management algorithm
  - Solid protection of sudden power failure safe-update operations for data content
- Security
  - Support secure bad block erase commands
  - Enhanced write protection with permanent and partial protection options
- Quality
  - RoHS compliant
- Supports Field Firmware Update (FFU)
- Enhanced Device Lifetime
- Support Pre EOL information
- Optimal Size
- Supports Production State Awareness
- Supports Power Off Notification for Sleep
- Supports HS400
- Also available in p-SLC mode
- Automotive temp (AT) parts are PPAP and AEC-Q100 compliant
- Temperature range
  - Operation:
    - 100ball eMMC
      - Automotive (AT): -40°C to 85°C
      - Industrial (IT): -40°C to 85°C
      - Extended Test (ET): -25°C to 85°C
    - 153ball eMMC
      - Automotive (AT) - MLC and pSLC: -40°C to 85°C
      - Industrial (IT) - MLC and pSLC: -40°C to 85°C
  - Storage:
    - 100ball eMMC
      - Automotive (AT): -40°C to 105°C
      - Industrial (IT)/Extended Test (ET): -40°C to 85°C
    - 153ball eMMC
      - Automotive (AT) - MLC only: -40°C to 105°C
      - Automotive (AT) - pSLC only: -40°C to 85°C
      - Industrial (IT) - MLC and pSLC: -40°C to 85°C
- Component weight:
  - One unit of 4Gb eMMC 100 ball: 0.54g
  - One unit of 4Gb eMMC 153 ball: 0.37g
- JEDEC Standard Package with a 0.5mm pitch.

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**How to Order****BGA100 Package**

Operating voltage	Package	NAND	Option	Usable Capacity	Insignis Part Number
VCC=3.3V, VCCQ=1.8V/3.3V	BGA100	MLC	Extended Test	4GB	NSEC00K004-ET
				8GB	NSEC00K008-ET
				16GB	NSEC00K016-ET
				32GB	NSEC00K032-ET
				64GB	NSEC00K064-ET
			Industrial Temperature	4GB	NSEC00K004-IT
				8GB	NSEC00K008-IT
				16GB	NSEC00K016-IT
				32GB	NSEC00K032-IT
				64GB	NSEC00K064-IT
			Automotive Temperature*	4GB	NSEC00K004-AT
				8GB	NSEC00K008-AT
				16GB	NSEC00K016-AT
				32GB	NSEC00K032-AT
				64GB	NSEC00K064-AT
		pSLC	Extended Test	2GB	NSEC00K002-ETJ
				4GB	NSEC00K004-ETJ
				8GB	NSEC00K008-ETJ
				16GB	NSEC00K016-ETJ
				32GB	NSEC00K032-ETJ
			Industrial Temperature	2GB	NSEC00K002-ITJ
				4GB	NSEC00K004-ITJ
				8GB	NSEC00K008-ITJ
				16GB	NSEC00K016-ITJ
				32GB	NSEC00K032-ITJ
			Automotive Temperature*	2GB	NSEC00K002-ATJ
				4GB	NSEC00K004-ATJ
				8GB	NSEC00K008-ATJ
			16GB	NSEC00K016-ATJ	
			32GB	NSEC00K032-ATJ	

\* Automotive Grade subject to spec agreement.

Visit: <http://insignis-tech.com/how-to-buy>

Engineering Specifications are available upon request by emailing [info@insignis-tech.com](mailto:info@insignis-tech.com)

**FBGA153 Package**

Operating voltage	Package	NAND	Option	Usable Capacity	NEW Insignis Part Number
VCC=3.3V, VCCQ=1.8V/3.3V	FBGA153*	MLC	Industrial Temperature	4GB	NSEC53K004-IT
				8GB	NSEC53K008-IT
				16GB	NSEC53K016-IT
			Automotive Temperature	4GB	NSEC53K004-AT
				8GB	NSEC53K008-AT
				16GB	NSEC53K016-AT
		pSLC	Industrial Temperature	2GB	NSEC53K002-ITJ
				4GB	NSEC53K004-ITJ
				8GB	NSEC53K008-ITJ
			Automotive Temperature	2GB	NSEC53K002-ATJ
				4GB	NSEC53K004-ATJ
				8GB	NSEC53K008-ATJ

\* Only customers who have previously qualified the 153ball MLC 32GB/64GB and 153ball pSLC 16GB/32GB parts can still order these parts. Customers who have not already qualified these parts can order our 3D TLC eMMC as a replacement for these higher capacity MLC/pSLC offerings.

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