BGAE640 | eMMC | 153-ball/100-ball

SMART's BGAE640 eMMC is a soldered-down Flash storage solution that combines NAND Flash memory, an embedded MMC (MultiMediaCard) Controller, and advanced firmware in a small BGA (Ball Grid Array) package that provides stable, yet cost effective high-density embedded storage. The BGAE640 eMMC is designed to meet the rigid requirements of the industrial, medical and networking markets.

SMART's BGAE640 eMMC is compliant to eMMC v5.1 specifications and is available in the standard JEDEC 0.5mm pitch, 153-ball BGA package, as well 1.0mm pitch, 100-ball BGA package. The 100-ball package offers larger ball pitch and ball diameter enabling lower cost PCB designs and simplifies PCB routing with wider metal traces.

Features & Benefits

- Compliant to JEDEC v5.1 Standard
- BGAE640 TLC: Base eMMC, TLC NAND with Capacities from 16GB to 128GB
- BGAE640 pSLC: Pre-configured to pSLC Enhanced Storage Media Mode with User Capacities from 5GB to 40GB
- Industrial Temp (-40°C to +85°C)

Applications

- Factory Automation
- IIoT
- Medical Devices
- Networking Appliances
- POS Terminals
- RFID Scanners
- Single-Board Computers
- Telecom Infrastructure

Product Family Overview

Form Factor	Capacity	Sequential Performance
BGAE640 (TLC)	16GB to 128GB	Up to 320MB/s Read Up to 170MB/s Write
BGAE640 (pSLC)	5GB to 40GB	Up to 320MB/s Read Up to 250MB/s Write

BGAE640 TLC	100-ball
NAND Type	TLC
Performance	
Host Interface Rate (maximum)	eMMC v5.1 (HS400)
Capacities	16GB to 128GB
Sequential Read (maximum)	Up to 320 MB/s
Sequential Write (maximum)	Up to 170 MB/s
Random Read (maximum)	Up to 3.7K IOPS
Random Write (maximum)	Up to 6.5K IOPS
Reliability	
Endurance (JEDEC Sequential Workload)	128GB: 100 TBW 64GB: 50 TBW 32GB: 25 TBW 16GB: 25 TBW
Data Retention	10 years
Error Correction	LDPC
Power	
Input Voltage	3.3V ± 10%
Environmental	
Operating Shock	1500 g half-sine, 0.5 msec, 1 shock along each axis, X, Y, Z in each direction
Operating Vibration	20G 80-2000Hz, 1.52mm 20-80Hz, 3 axis
Operating Temperature	Industrial: -40°C to +85°C
Storage Temperature	-40°C to +85°C
Physical	
Length	14 mm
Width	18 mm
Height	2.2 mm

Part Number	Density
BGAE640 TLC | eMMC | 100-ball **Industrial Operating Temperature (-40°C to +85°C)**	
SP9QDGY1ASI01	128GB
SP9QCGY1ASI01	64GB
SP9QBGY1ASI01	32GB
SP9QAGY1ASI01	16GB

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Specifications (BGAE640 pSLC)

	BGAE640 pSLC | 153-ball	BGAE640 pSLC | 100-ball
NAND Type	pSLC	
Performance		
Host Interface Rate (maximum)	eMMC v5.1 (HS400)	
Capacities	5GB to 40GB	
Sequential Read (maximum)	Up to 320 MB/s	
Sequential Write (maximum)	Up to 250 MB/s	
Random Read (maximum)	Up to 3.7K IOPS	
Random Write (maximum)	Up to 6.5K IOPS	
Reliability		
Endurance (JEDEC Sequential Workload)	40GB: 768 TBW 20GB: 384 TBW 10GB: 192 TBW 5GB: 192 TBW	
Data Retention	10 years	
Error Correction	LDPC	
Power		
Input Voltage	3.3V ± 10%	
Environmental		
Operating Shock	1500 g half-sine, 0.5 msec, 1 shock along each axis, X, Y, Z in each direction	
Operating Vibration	20G 80-2000Hz, 1.52mm 20-80Hz, 3 axis	
Operating Temperature	Industrial: -40°C to +85°C	
Storage Temperature	-40°C to +85°C	
Physical		
Length	11.5 mm	14 mm
Width	13 mm	18 mm
Height	1.0 mm	2.2 mm

Ordering Information (BGAE640 pSLC)

Part Number	Density
BGAE640 pSLC | eMMC | 153-ball **Industrial Operating Temperature (-40°C to +85°C)**	
SP9MDGY1ASI11	40GB
SP9MCGY1ASI11	20GB
SP9MBGY1ASI11	10GB
SP9MAGY1ASI11	5GB
BGAE640 pSLC | eMMC | 100-ball **Industrial Operating Temperature (-40°C to +85°C)**	
SP9QDGY1ASI11	40GB
SP9QCGY1ASI11	20GB
SP9QBGY1ASI11	10GB
SP9QAGY1ASI11	5GB

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For more information, please visit: **www.smartm.com**

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