



DuraFlash™

BGAE540 | eMMC | 153-ball/100-ball

SMART's DuraFlash BGAE540 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 BGAE540 eMMC is designed to meet the rigid requirements of the industrial, medical and networking markets.

SMART's BGAE540 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
- BGAE540 SE: Base eMMC, TLC NAND with Capacities from 16GB to 128GB
- BGAE540 UE: Pre-configured to pSLC Enhanced Storage Media Mode with User Capacities from 5GB to 40GB
- Industrial Temp (-40°C to +85°C)

Product Family Overview

Capacity	Sequential Performance
BGAE540 SE eMMC 153-ball/100-ball 16GB to 128GB	Up to 320MB/s Read; Up to 45MB/s Write
BGAE540 UE eMMC 153-ball/100-ball 5GB to 40GB	Up to 320MB/s Read; Up to 215MB/s Write



Applications

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

Specifications (BGAE540 SE)

	BGAE540 SE 153-ball	BGAE540 SE 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 45 MB/s	
Random Read (maximum)	Up to 9.3K IOPS	
Random Write (maximum)	Up to 2.1K IOPS	
Reliability		
Endurance	128GB: 40 TBW	
(JEDEC Enterprise Workload)	64GB: 20 TBW	
	32GB: 10 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	11.5 mm	14 mm
Width	13 mm	18 mm
Height	1.0 mm	2.45 mm

Ordering Information (BGAE540 SE)

Part Number	Density
BGAE540 SE eMMC 153-ball	
Industrial Operating Temperature (-40°C to +85°C)	
SP9MDGP3AMI01	128GB
SP9MCGP3AMI01	64GB
SP9MBGP3AMI01	32GB
SP9MAGP3AMI01	16GB
BGAE540 SE eMMC 100-ball	
Industrial Operating Temperature (-40°C to +85°C)	
SP9QDGP3AMI01	128GB
SP9QCGP3AMI01	64GB
SP9QBG3AMI01	32GB
SP9QAGP3AMI01	16GB

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Specifications (BGAE540 UE)

	BGAE540 UE 153-ball	BGAE540 UE 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 215 MB/s	
Random Read (maximum)	Up to 9.3K IOPS	
Random Write (maximum)	Up to 2.1K IOPS	
Reliability		
Endurance	40GB: 88 TBW	
(JEDEC Enterprise Workload)	20GB: 44 TBW	
	10GB: 22 TBW	
	5GB: 11 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	2.45 mm

Ordering Information (BGAE540 UE)

Part Number	Density
BGAE540 UE eMMC 153-ball	
Industrial Operating Temperature (-40°C to +85°C)	
SP9MDGP3AMI11	40GB
SP9MCGP3AMI11	20GB
SP9MBGP3AMI11	10GB
SP9MAGP3AMI11	5GB
BGAE540 UE eMMC 100-ball	
Industrial Operating Temperature (-40°C to +85°C)	
SP9QDGP3AMI11	40GB
SP9QCGP3AMI11	20GB
SP9QBG3AMI11	10GB
SP9QAGP3AMI11	5GB

DuraFlash Product Grading System

SE Standard Endurance | TLC

HE High Endurance | eTLC

PE Premium Endurance | eTLC (OP 28%)

UE Ultra Endurance | pSLC



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

Headquarters/North America:

T: (+1) 800-956-7627 • T: (+1) 510-623-1231
F: (+1) 510-623-1434 • E: info@smartm.com

Latin America:

T: (+55) 11 4417-7200 • E: sales.br@smartm.com

Asia/Pacific:

T: (+65) 6678-7670 • E: sales.asia@smartm.com

EMEA:

T: (+44) 0 7826-064-745 • E: sales.euro@smartm.com

Customer Service:

T: (+1) 510-623-1231 • E: customers@smartm.com