



Product Data Sheet
Addendum for 100-ball BGA

Industrial e•MMC Memory

EM-36 Series
JEDEC e•MMC 5.1 compliant,
BGA 100-ball

Industrial and Automotive
Temperature Grade

Date: March 11, 2025
Revision: 1.04

EM-36 Series – Industrial embedded MMC 5.1

5 – 80 GBytes, 100-ball BGA

1. Ordering Information

The following Table 1 lists the part number associated with the changes identified in this document.

Table 1: Available Part Numbers

Capacity	Part Number	Temperatur
5 GBytes (pSLC)	SFEM005GB1ED1T0-I-5E-31P-STD	Industrial
10 GBytes (pSLC)	SFEM010GB1ED1T0-I-5E-31P-STD	Industrial
20 GBytes (pSLC)	SFEM020GB1ED1T0-I-6F-31P-STD	Industrial
20 GBytes (pSLC)	SFEM020GB1ED1TB-I-CE-31P-STD	Industrial
20 GBytes (pSLC)	SFEM020GB1ED1TB-A-CE-31P-STD	Automotive
40 GBytes (pSLC)	SFEM040GB1ED1TB-I-EF-31P-STD	Industrial
40 GBytes (pSLC)	SFEM040GB1ED1TB-A-EF-31P-STD	Automotive
80 GBytes (pSLC)	SFEM080GB1ED1TB-I-VG-31P-STD	Industrial
80 GBytes (pSLC)	SFEM080GB1ED1TB-A-VG-31P-STD	Automotive

2. Product Changes

The 100-ball Industrial eMMC 5.1 is identical to the Swissbit standard EM-36 device with the exceptions defined in the following section.

2.1 Mechanical Specifications

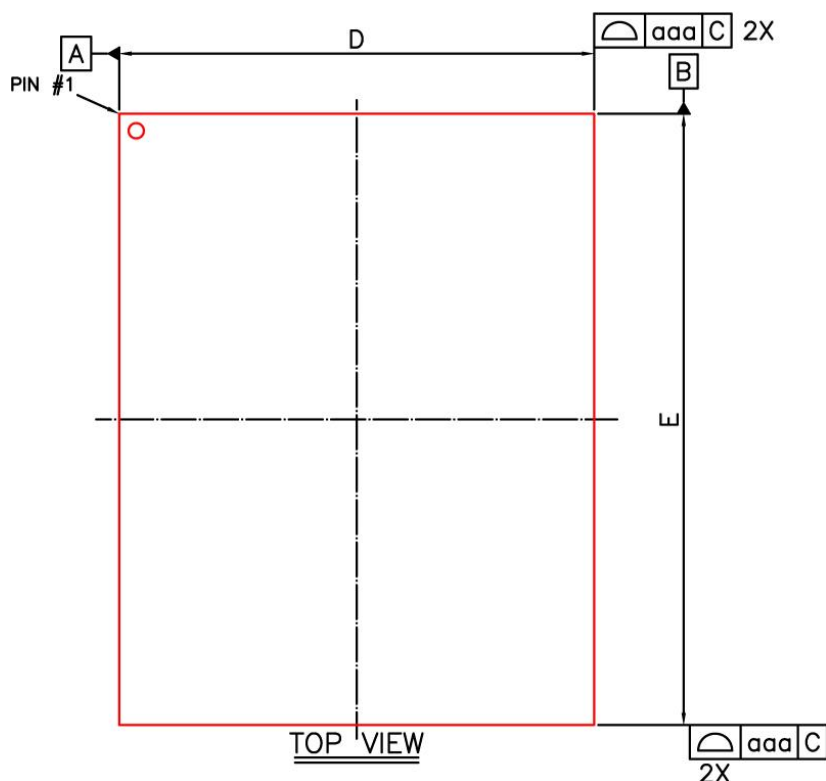
Table 2: Physical Dimensions

Physical Dimensions		Unit
Length	14±0.1	mm
Width	18±0.1	
Thickness (Max)	1.4 max.	
Weight (Max Capacity)	< 1	g

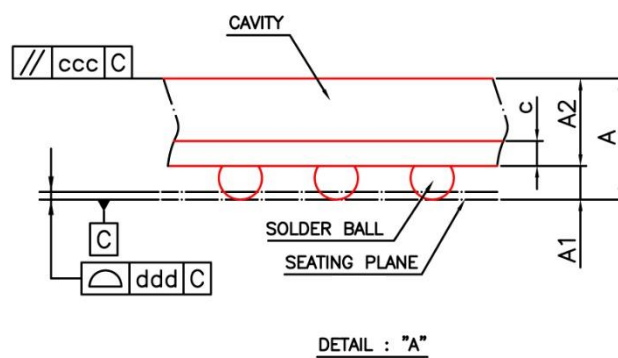
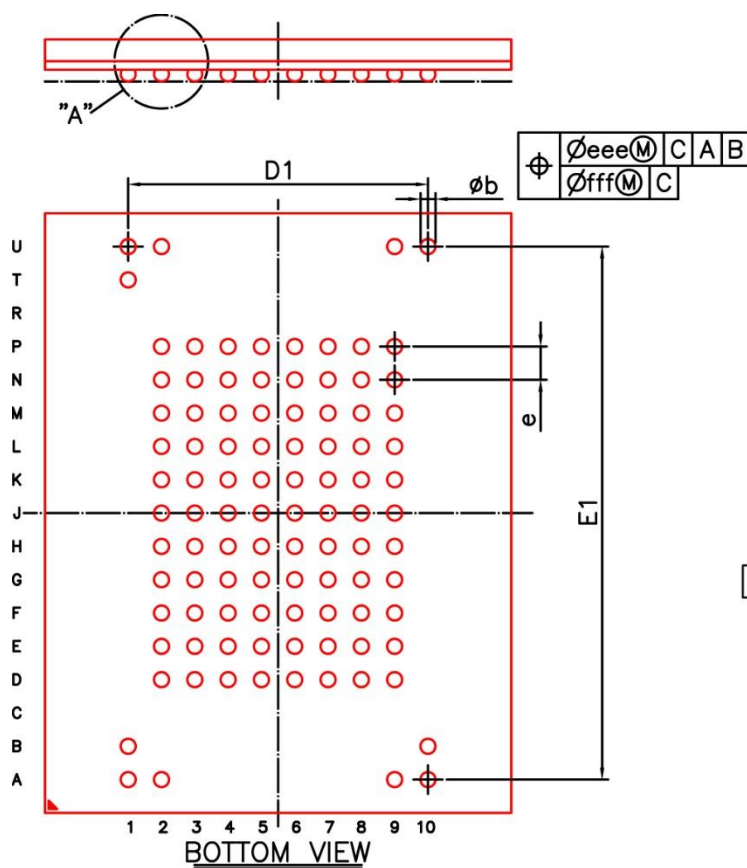
2.2 Physical description

Figure 1: Mechanical dimensions eMMC

Package Mechanical (14 x 18 x 1.4mm)



Symbol	Dimension in mm		
	MIN	NOM	MAX
A	---	---	1.40
A1	0.30	0.35	0.40
A2	0.86	0.91	0.96
c	0.22	0.26	0.30
D	13.90	14.00	14.10
E	17.90	18.00	18.10
D1	---	9.00	---
E1	---	16.00	---
e	---	1.00	---
b	0.40	0.45	0.50
aaa	0.15		
ccc	0.15		
ddd	0.12		
eee	0.15		
fff	0.08		



2.3 Pinout

Figure 2: Ball assignment (top view, ball down)

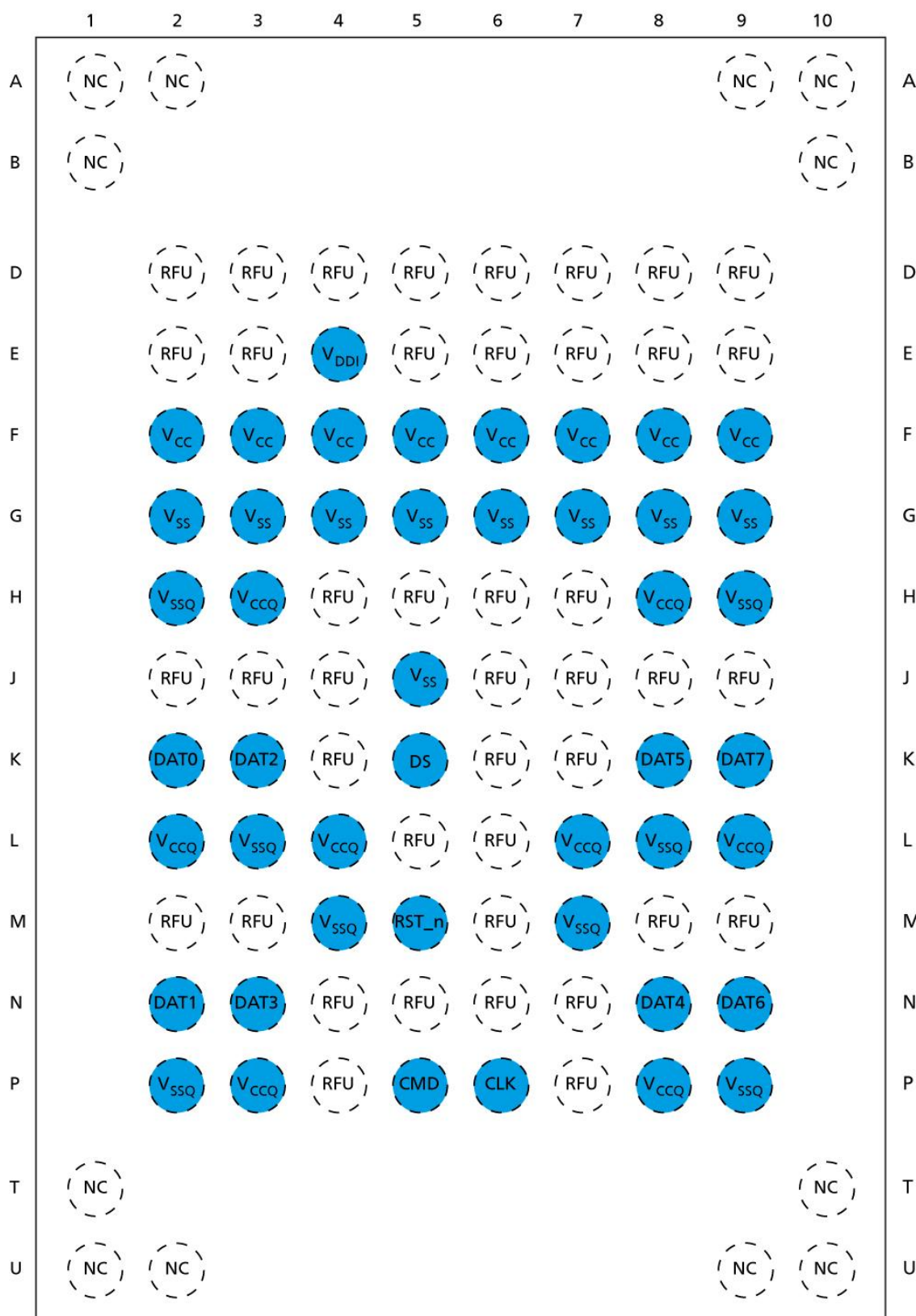


Table 3: Pinout

Name	Type	Ball No.	Description
CLK	I	P6	Clock: Each cycle directs a 1-bit transfer on the command and DAT lines.
CMD	I/O/PP/OD	P5	Command: A bidirectional channel used for device initialization and command transfer. Command has two operating modes: 1) Open-drain for initialization. 2) Push-pull for fast command transfer.
DAT0	I/O/PP	K2	Data I/O0: Bidirectional channel used for data transfer.
DAT1	I/O/PP	N2	Data I/O1: Bidirectional channel used for data transfer.
DAT2	I/O/PP	K3	Data I/O2: Bidirectional channel used for data transfer.
DAT3	I/O/PP	N3	Data I/O3: Bidirectional channel used for data transfer.
DAT4	I/O/PP	N8	Data I/O4: Bidirectional channel used for data transfer.
DAT5	I/O/PP	K8	Data I/O5: Bidirectional channel used for data transfer.
DAT6	I/O/PP	N9	Data I/O6: Bidirectional channel used for data transfer.
DAT7	I/O/PP	K9	Data I/O7: Bidirectional channel used for data transfer.
RST_n	I	M5	Reset signal pin
VCC	S	F2, F3, F4, F5, F6, F7, F8, F9	VCC: Flash memory I/F and Flash memory power supply.
VCCQ	S	H3, H8, L2, L4, L7, L9, P3, P8	VCCQ : Memory controller core and MMC interface I/O power supply.
VSS	S	G2, G3, G4, G5, G6, G7, G8, G9, J5	VSS: Flash memory I/F and Flash memory ground connection.
VSSQ	S	H2, H9, L3, L8, M4, M7, P2, P9	VSSQ: Memory controller core and MMC I/F ground connection.
VDDi		E4	VDDi : Connect capacitor Creg from VDDi to GND.
DS	O/PP	K5	Data Strobe: Newly assigned pin for HS400 mode.
NC			Not connected
RFU			Reserved for future use, leave floating

1. I: input; O: output; PP: push-pull; OD: open-drain; NC: Not connected; S: power supply.

2.4 Part Number change

To differentiate, the BGA form factor is encoded in the part number:

SFEM005GB1ED1T0-I-5E-x1P-STD
 SFEM010GB1ED1T0-I-5E-x1P-STD
 SFEM020GB1ED1T0-I-6F-x1P-STD
 SFEM020GB1ED1TB-I-CE-x1P-STD
 SFEM020GB1ED1TB-A-CE-x1P-STD
 SFEM040GB1ED1TB-I-EF-x1P-STD
 SFEM040GB1ED1TB-A-EF-x1P-STD
 SFEM080GB1ED1TB-I-VG-x1P-STD
 SFEM080GB1ED1TB-A-VG-x1P-STD

x = BGA form type

BGA form type	x
11.5 x 13mm, 153ball	1
14 x 18mm, 100ball	3

For further details about our Industrial eMMC 5.1, see our standard product data sheet or fact sheet of the EM-36 Series (<http://www.swissbit.com>).

3. Revision History

Table 4: Document Revision History

Date	Revision	Description	Revision Details
18-Jun-2020	0.90	Preliminary initial release	Doc. req. no. 3786
25-Feb-2021	1.00	Initial release	Doc. req. no. 4420
18-Jan-2022	1.01	Added product variants, updated footer (doc. classification), preliminary release	Doc. req. no. 5160
07-Jul-2022	1.02	Final release	Doc. req. no. 5551
19-Sep-2023	1.03	Added solder ball / SMD ball pad information.	Doc. req. no. 6568
11-Mar-2025	1.04	Added new variants and adjusted physical description	-

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