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Product Fact Sheet

Industrial e•MMC Memory

EM-30 Series

JEDEC e•MMC 5.1 compliant,
BGA 100 ball

Industrial Temperature Grade

Date: March 6, 2024
Revision: 1.01

Made in Germany

Product Fact Sheet
EM-30 Series

swissbit®

Product Summary

- **Capacities:** 16 GBytes, 32 GBytes, 64 GBytes, 128 GBytes, 256 GBytes
- **Operating Temperature Range[1]:** Industrial Operating Temperature (Tambient) -40 to 85°C
- **Endurance in TeraBytes Written (TBW) @ Max Capacity[2]:** up to 160

Product Features

- Fully compliant with JEDEC e•MMC 5.1 Standard (JESD84-B51)
- 100-ball BGA, 1.0mm pitch
- 14 x 18mm, RoHS compliant
- 3D TLC NAND base technology
- Industrial Operating Temperature -40 to 85°C
- Multiple 3D TLC or enhanced/reliable mode partitions user configurable according to e•MMC Spec 5.1
- High performance e•MMC 5.1 specification
  - Eleven-wire bus (clock, data strobe, 1 bit command, 8 bit data bus) and a hardware reset
  - Three different data bus width modes: 1-bit (default), 4-bit, and 8-bit
  - Clock frequencies 0-200MHz, High Speed Mode HS400
  - Command Queue Feature according to e•MMC Spec 5.1
  - Up to 300MB/s sequential read and up to 230MB/s sequential write
- Power Supply: (Low-power CMOS technology)
  - VCCQ 1.7V...1.95V or 2.7V...3.6V e•MMC supply
  - VCC 2.7V...3.6V NAND Flash supply
- Optimized FW algorithms
  - Power-fail data loss protection
  - Wear Leveling technology
    Equal wear leveling of static and dynamic data. The wear leveling assures that dynamic data as well as static data is balanced evenly across the memory. With that the maximum write endurance of the device is ensured
  - Read Disturb Management
    The read commands per region are monitored and the content is conditionally refreshed when critical levels have occurred
  - Auto Read Refresh
    The interruptible background process maintains the user data for Read Disturb effects or Retention degradation due to high temperature effects
  - Diagnostic features with Device Health Report according to e•MMC Spec 5.1, and detailed Lifetime Monitor data (Swissbit proprietary, accessible through standard e•MMC commands).
  - Field Firmware update[3]s according to e•MMC Spec 5.1
  - Discard and Sanitize, Trim
  - Boot Operation Mode and Alternative Boot Operation Mode
  - Replay Protected Memory Block (RPMB)
- High reliability
  - Designed with sophisticated firmware architecture for industrial and embedded markets.
  - Ideal for application like POS/POI, PLC, IoT, gaming, medical and use as general boot medium for embedded applications.
  - The product is optimized for long life cycle that requires superior data retention as well as power fail safety.
  - Intensive write applications should use the enhanced/reliable mode

[1] Adequate airflow is required to ensure the temperature Tcase does not exceed 95°C (industrial temperature drive)
[2] According to JEDEC (JESD47I), the time to write the full TBW is a minimum of 18 months. Higher average daily data volume reduces the specified TBW. The values listed are estimates and are subject to change without notice.
[3] The support of In-Field FW update capabilities on host systems is recommended. The update must be transferred with a CMD25. For Linux, kernel 4.4 or higher is required.

- Controlled BOM & PCN process

1 Order Information for EM-30

Density	Part Number	Industrial Temp. Range	Firmware	Flash Technology
16GB	SFEM016GB1ED1T0-I-5E-311-STD	-40°C to 85°C	FW1: default	3D TLC NAND Flash
32GB	SFEM032GB1ED1T0-I-5E-311-STD			
64GB	SFEM064GB1ED1T0-I-6F-311-STD			
128GB	SFEM128GB1ED1T0-I-7G-311-STD			
256GB	SFEM256GB1ED1T0-I-8H-311-STD			

1.1 System Performance

System Performance, HS400	Max. 3D TLC	Max. reliable mode	Unit
Burst Data transfer Rate HS400 (max clock 200MHz)	400		MB/s
Sequential Read	up to 300	up to 300	
Sequential Write	up to 230	up to 230	

1.2 Current consumption

Current Consumption, HS400, Max. Density	Typ. ICCQ current @ VCCQ 1.8V	Typ. ICC current @ VCC 3.3V	Unit
Write	102	101	mA
Read	153	102	
Sleep	0.07	0.07	

1.3 Physical Dimensions

Physical Dimensions	Value	Unit
Length	18±0.1	mm
Width	14±0.1	
Thickness	1.4 max.	

1.4 Recommended Temperature Conditions

Parameter	Min.	Typ.	Max.	Unit
Industrial Operating / Storage Temperature	-40	25	85*	°C

* High temperature storage without operation reduces the data retention, in operation the data will be refreshed, if data error issues were detected

For more information on e·MMC interface, please visit JEDEC homepage (www.jedec.org)

Why Swissbit?

Swissbit is focused on the design, development, manufacture, and support of leading edge memory and storage solutions for the worldwide OEM/ODM marketplace. As a global supplier, Swissbit recognizes and addressees the higher level of application requirements of today's industrial, Netcom, and automotive customers by providing best-in-class products and services, with uncompromised attention to driving overall value and quality.