

goodram
industrial

Industrial eMMC

GOODRAM Industrial is a brand of industrial memory manufactured by the Polish manufacturer of computer memories and flash memories, Wilk Elektronik SA, whose factory is located in Poland.

The industrial brand was created out of the need to create reliable and durable memory products for advanced technologies. It includes a series of memory cards, USB, SSD and memory modules, used in internal and external industrial applications, often operating in extreme environmental conditions.

The manufacturer provides customized memory for customers, in line with their expectations and meeting the technical requirements. Finished products go hand in hand with service and technical support for business partners.



eMMC				
Form factor	153 Ball FPGA			
Flash type	3D TLC	3D pSLC	MLC	2D pSLC
Capacity	16GB – 256GB	8GB – 32GB	8GB – 16GB	4GB
Program / Erase cycles	3000	30 000	3000	20 000
Interface	eMMC 5.1			
Key features	Power off notification HS400 Speed Mode available Enhanced Device Lifetime Command Queuing Enhanced Strobe Cache Flushing Report BK OPS Control Cache Barrier RPMB Through Improve Secure Write Protection Secure Erase and Trim commands available Enhanced Write Protection Build from major IC grades Fixed BOM (optional) PCN and EOL notification Customized engraving (optional)			
Operating temperature (°C)	-40 to +85			
Storage Temperature (°C)	-40 to +85			
Max transfer speed (°C)	Read: up to 320 Write: up to 260	Read: up to 320 Write: up to 260	Read: up to 225 Write: up to 140	Read: up to 225 Write: up to 140
Max power consumption (mW)	< 175			< 170
Dimensions (LxWxH) (mm)	11.5 x 13 x 1			



About eMMC

eMMC (Embedded MultiMediaCard) is a type of small solderable memory device used where removability is not important, but space is. Unlike removable microSD/SD cards or SSDs, the eMMC refers to a non-volatile memory chip embedded on the motherboard of a device.

Features of Goodram Industrial eMMC

- **JEDEC eMMC Standard 5.1**
The modules comply with the eMMC 5.1 standard, ensuring modern performance and compatibility
- **Various NAND Technologies**
Different NAND types are available, such as MLC, pSLC, industrial 3D-TLC (gTLC), and pSLC based on 3D-TLC. This allows for a choice between higher performance, longer endurance, or lower cost depending on requirements
- **Wide Operating Temperature Range**
Goodram offers standard temperature ranges (e.g. -25°C to $+85^{\circ}\text{C}$) as well as extended industrial ranges (-40°C to $+85^{\circ}\text{C}$), in some cases even up to $+105^{\circ}\text{C}$ depending on the variant
- **High Reliability and Long Endurance**
 - MTBF (Mean Time Between Failures) $> 2,000,000$ hours.
 - Extended lifetime thanks to pSLC mode or more robust NAND types.
- **Data Integrity and Wear-Management Mechanisms**
 - ECC (Error Correction), such as LDPC / BCH depending on the NAND type.
 - Wear-levelling to distribute writes evenly across memory blocks, avoiding premature wear.
 - Bad block management for reliability.
- **Customizable Production / Customer-Specific Features**
 - Fixed BOM (bill of materials) available, ensuring stability in re-orders.
 - Options such as logo engraving, special markings, and small MOQs (minimum order quantities).
- **Physical Form Factor and Interfaces**
 - Package type: FBGA with 153 balls.
 - Compact design, suitable for space-constrained devices (embedded systems, IoT, automotive, etc.).
- **Strong Performance Metrics**
 - Read and write speeds depending on the variant, with values like up to $\sim 225\text{-}320$ MB/s (read) and $\sim 140\text{-}260$ MB/s (write).
 - Optimized for relatively low power consumption.