

# ADVANCED FLASH STORAGE SOLUTIONS FOR (→) AUTOMOTIVE APPLICATIONS



**SANDISK**™

“BROCHURE”

AUGUST . 2025



### Key Advantages

- Decades of innovation in the flash memory industry
- Full portfolio of NAND flash products for automotive applications
- IATF 16949 certified on embedded automotive-grade products
- Automotive SPICE certified products
- Expertise in system-level architecture
- World-class fabs and manufacturing factories
- Close ties with global automotive OEMs and Tier-1 suppliers
- Partnerships with leading chipset vendors



## Driving Automotive Innovation

The automotive industry is going through a revolutionary stage — from the driver to the driverless vehicle — generating a whole new world of applications around safety, connectivity and entertainment. Among these applications, high-definition 3D maps, advanced driver-assist systems (ADAS), autonomous computers, AI databases, data recorders, enhanced infotainment, over-the-air updates, and V2X all require on-board data storage. While the cloud is an important component for analyzing data to improve algorithms and databases, it is not sufficient to meet the needs of real-time edge computing.

Sandisk enables Automobile OEMs and Tier-1 suppliers to create highly reliable systems for their customers.

## Providing a Complete Data Storage Solution

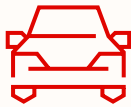
From the automobile to the cloud, Sandisk has a complete portfolio of storage products to support current and future vehicle system requirements. Sandisk offers embedded edge storage and removable storage for various automotive use cases and data center solutions for capturing and analyzing massive amounts of data collected from vehicles.

## Meeting Automotive's Stringent Quality Requirements

Sandisk's automotive-grade flash products are IATF 16949 certified and AEC-Q100/Q104 compliant. In addition, these products are fully vertically integrated, designed in-house and manufactured on dedicated production lines at Sandisk's state-of-the-art manufacturing facilities. Lastly, automotive-grade products go through rigorous testing to help ensure high reliability that is necessary for safety applications. This vertical integration enables Sandisk to have tight controls on every step of product development and manufacturing to achieve high-quality storage solutions. Sandisk also provides supply longevity to reduce costs of additional qualifications.

## A Trusted Partner

Sandisk has been a storage solution supplier to the automotive industry since 2015 when it launched its first automotive-grade NAND flash products and has been launching new products at a regular cadence since.



Autonomous Drive



ADAS



Nav/Infotainment



eCockpit



HD Mapping



Event/Drive Recorders



Telematics & OTA



V2X Communications

## iNAND® Automotive Embedded Flash Drives

iNAND Automotive Embedded Flash Drives (EFDs) are designed to support the harsh environments, high reliability and quality required by the automotive industry. The automotive iNAND product portfolio supports both UFS and e.MMC interfaces in a small 11.5x13mm package with a wide range of capacities to provide automotive OEMs and Tier-1 suppliers with choices that best meet their needs.

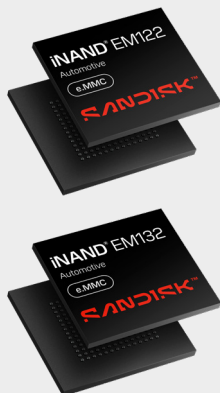


### UFS Embedded Flash Drive

The **iNAND® AT EU752 drive**, **iNAND® AT EU552 drive**, and **iNAND® AT EU312 drive** embedded storage solutions are designed to meet the demanding requirements for data-intensive automotive applications such as ADAS (Advanced Driver Assistance Systems), high-performance central computing, data rich 3D maps and data logging.

#### Features and Benefits

- Fast boot, auto refresh, manual refresh, enhanced health status
- UFS 4.1, UFS 3.1 and UFS 2.1 standard interface embedded flash drive for automotive applications
- Capacities up to 1TB<sup>1</sup> in small form-factor BGA
- AEC-Q100/Q104 temperature grade-2 and grade-3



### e.MMC Embedded Flash Drive

Automotive iNAND e.MMC embedded flash drives are based on e.MMC 5.1 standards and are available with 2D and 3D NAND technology.

The **iNAND® AT EM122 drive** is already qualified and in production for many automotive designs. The **iNAND® AT EM132 drive** is the first 256GB and 3D NAND-based e.MMC in the automotive market. The drives' advanced automotive feature set enables next-generation use cases in cars.

#### Features and Benefits

- Auto refresh, manual refresh, enhanced health status
- e.MMC 5.1 interface with additional automotive features
- Capacities up to 256GB<sup>1</sup> in small form-factor BGA
- AEC-Q100 temperature grade-2 and grade-3



## Industrial microSD™ Card

Sandisk also offers extended temperature industrial microSD cards to support customers who not only want a removable solution but also a small form factor. Sandisk offers both SLC and MLC solutions to meet a variety of use cases.

### Features and Benefits

- Health status, host lock
- Available in SLC
- Up to 128GB<sup>1</sup>
- Supports extended temperatures of -40°C to 85°C



## iNAND Automotive and Industrial PCIe® NVMe™ SSD

The iNAND® AT EN610 drive and iNAND® IX SN530 drive drives meet the increasing need for high-capacity NVMe solutions as the automotive industry develops more autonomous vehicles. Shared storage architectures along with the need to capture and analyze massive amounts of data from sensors and cameras requires terabytes of storage every day. This data is analyzed to develop better algorithms to help make vehicles safer. In addition, the data may be used as evidence in the event of an accident or a legal or an insurance claim.





### Features and Benefits

- PCIe Gen3x4 and Gen4x4 NVMe 1.4
- 16x20 BGA, M.2 2280 and M.2 2230 form factors
- TLC and SLC storage options for high endurance of up to 30 PBW<sup>2</sup>
- High capacities up to 2TB<sup>1</sup>
- Supports extended temperatures of -40°C to 105°C

# iNAND® Automotive Embedded Flash Drives

					
	<b>iNAND AT EU312</b>	<b>iNAND AT EU552</b>	<b>iNAND AT EU752</b>	<b>iNAND AT EM122</b>	<b>iNAND AT EM132</b>
Interface	UFS 2.1	UFS 3.1	UFS 4.1	e.MMC 5.1	e.MMC 5.1
Capacity <sup>1</sup>	16GB to 256GB	128GB to 512GB	256GB to 1TB	8GB to 64GB	32GB to 256GB
Operating Temperature	A: -40°C to +85°C ZA: -40°C to +105°C	XA: -40°C to +85°C ZA: -40°C to +105°C	ZA: -40°C to +105°C	XA: -40°C to +85°C ZA: -40°C to +105°C	XA: -40°C to +85°C ZA: -40°C to +105°C
NAND Flash Technology	3D TLC	3D TLC	3D TLC	2D MLC	3D TLC
<b>Package (mm)</b>					
8GB	—	—	—	11.5x13x0.8mm	—
16GB	11.5x13x1.2mm	—	—	11.5x13x0.8mm	—
32GB	11.5x13x1.2mm	—	—	11.5x13x1.0mm	11.5x13x1.0mm
64GB	11.5x13x1.2mm	11.5x13x1.2mm	—	11.5x13x1.2mm	11.5x13x1.0mm
128GB	11.5x13x1.2mm	11.5x13x1.2mm	—	—	11.5x13x1.0mm
256GB	11.5x13x1.2mm	11.5x13x1.2mm	11.5x13x1.2mm	—	11.5x13x1.2mm
512GB	—	11.5x13x1.2mm	11.5x13x1.2mm	—	—
1TB	—	—	11.5x13x1.2mm	—	—
<b>Ordering Information</b>					
8GB	—	—	—	SDINBDG4-8G-XA3 SDINBDG4-8G-ZA3	—
16GB	SDINDDH-16G-XA2 SDINDDH-16G-ZA2	—	—	SDINBDG4-16G-XA3 SDINBDG4-16G-ZA3	—
32GB	SDINDDH-32G-XA2 SDINDDH-32G-ZA2	—	—	SDINBDG4-32G-XA3 SDINBDG4-32G-ZA3	SDINBDA6-32G-XA1 SDINBDA6-32G-ZA1
64GB	SDINDDH-64G-XA2 SDINDDH-64G-ZA2	SDINFQ6-64G-XA1 SDINFQ6-64G-ZA1	—	SDINBDG4-64G-XA3 SDINBDG4-64G-ZA3	SDINBDA6-64G-XA1 SDINBDA6-64G-ZA1
128GB	SDINDDH-128G-XA2 SDINDDH-128G-ZA2	SDINFQ6-128G-XA1 SDINFQ6-128G-ZA1	—	—	SDINBDA6-128G-XA1 SDINBDA6-128G-ZA1
256GB	SDINDDH-256G-XA2 SDINDDH-256G-ZA2	SDINFQ6-256G-XA1 SDINFQ6-256G-ZA1	SDINHDL6-256G-ZA	—	SDINBDA6-256G-XA1 SDINBDA6-256G-ZA1
512GB	—	SDINFQ6-512G-XA1 SDINFQ6-512G-ZA1	SDINHDL6-512G-ZA	—	—
1TB	—	—	SDINHDL6-1T00-ZA	—	—






## Industrial microSD Cards

	 Industrial Wide Temp <b>SANDISK IX QD332</b>	 Industrial Ext Temp <b>SANDISK IX QD332</b>	 Industrial Ext Temp High Endurance <b>SANDISK IX QD334</b>	 Industrial Wide Temp <b>SANDISK IX QD342</b>
Interface	UHS-1 104	UHS-1104	UHS-1104	UHS-1104
Form Factor	microSD	microSD	microSD	microSD
Capacity <sup>1</sup>	8GB to 128GB	8GB to 128GB	8GB to 64GB	16GB to 256GB
Operating Temperature	-25°C to 85°C	-40°C to 85°C	-40°C to 85°C	-25°C to 85°C
NAND Flash Technology	2D MLC	2D MLC	2D SLC	3D TLC
Speed Class	C10, U1	C10, U1	C10, U3	C10, U1, U3, V10, V30
Performance R/W <sup>4</sup>	Up to 80/50 MB/s	Up to 80/50 MB/s	Up to 90/50 MB/s	Up to 100/50 MB/s

### Ordering Information

8GB	SDSDQAF3-008G-I	SDSDQAF3-008G-XI	SDSDQED-008G-XI	—
16GB	SDSDQAF3-016G-I	SDSDQAF3-016G-XI	SDSDQED-016G-XI	SDSDQAF4-016G-I
32GB	SDSDQAF3-032G-I	SDSDQAF3-032G-XI	SDSDQED-032G-XI	SDSDQAF4-032G-I
64GB	SDSDQAF3-064G-I	SDSDQAF3-064G-XI	SDSDQED-064G-XI	SDSDQAF4-064G-I
128GB	SDSDQAF3-128G-I	SDSDQAF3-128G-XI	—	SDSDQAF4-128G-I
256GB	—	—	—	SDSDQAF4-256G-I

## Solid State Drives

	 Automotive <b>iNAND® AT EN610</b>	 Industrial-grade <b>SANDISK® IX SN530</b>	 Industrial-grade <b>SANDISK® IX SN530</b>	 Industrial-grade <b>SANDISK® IX SN530</b>	 Industrial-grade <b>SANDISK® IX SN530</b>
Interface	PCIe Gen4x4 NVMe 1.4	PCIe Gen3x4 NVMe 1.4	PCIe Gen3x4 NVMe 1.4	PCIe Gen3x4 NVMe 1.4	PCIe Gen3x4 NVMe 1.4
Form factor (per PCI-SIG)	M.2 Type 1620-S5 BGA	M.2 2280-S3-M	M.2 2280-S3-M	M.2 2280-S3-M	M.2 2280-S3-M
Capacity <sup>1</sup>	256GB to 1TB	256GB to 2TB	85GB to 340GB	256GB to 1TB	85GB to 340GB
Operating Temperature	-40°C to +105°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
NAND Flash Technology	3D TLC	3D TLC	3D SLC	3D TLC	3D SLC
Performance R/W <sup>5</sup>	Up to 3,700/3,000 MB/s	Up to 2,500/1,800 MB/s	Up to 2,400/1,950 MB/s	Up to 2,400/1,950 MB/s	Up to 2,400/1,950 MB/s
Performance Sustain W <sup>6</sup>	Up to 800 MB/s	Up to 540 MB/s	Up to 1,950 MB/s	Up to 540 MB/s	Up to 1,950 MB/s
Endurance <sup>7</sup>	Up to 2,800 TBW (TLC) / 30,000 TBW (SLC)	Up to 5,200 TBW	Up to 24,000 TBW	Up to 2,600 TBW	Up to 24 PBW

### Ordering Information

256GB (TLC) / 85GB (SLC)	SDDQUGD-256G-ZA	SDBPNPZ-256G-XI	SDBPNPZ-085G-XI	SDBPTPZ-256G-XI	SDBPTPZ-085G-XI
512GB (TLC) / 170GB (SLC)	SDDQUGD-512G-ZA	SDBPNPZ-512G-XI	SDBPNPZ-170G-XI	SDBPTPZ-512G-XI	SDBPTPZ-170G-XI
1TB (TLC) / 340GB (SLC)	SDDQUGD-1T00-ZA	SDBPNPZ-1T00-XI	SDBPNPZ-340G-XI	SDBPTPZ-1T00-XI	SDBPTPZ-340G-XI
2TB (TLC)	—	SDBPNPZ-2T00-XI	—	—	—

- 1GB = 1 billion bytes, 1TB = 1 trillion bytes and 1PB = 1 quadrillion bytes. Actual user capacity may be less depending on operating environment.
- PBW = Petabytes Written. Projected endurance is calculated based on sustained sequential write operation without frequent idle.
- Operational temperature is defined such as -40°C refers to ambient temperature. 85°C or 105°C refers to SMART composite temperature reported by the drive (when thermal throttling is triggered).
- Based on Sandisk internal testing. Performance based on e.MMC high speed interface, using an 8-bit bus. Read and write speeds may vary depending on read/write conditions. 1 megabyte (MB) = 1 million bytes.
- Measured with CrystalDiskMark, 1000MB LBA range, secondary 1TB drive. Sequential: 1T QD32, Random: 8T QD32. Performance may vary based on host device.
- Sustained performance is measured by FIO 1.97, using 100% LBA range as a secondary drive. Performance may vary based on host device.
- Endurance is calculated based on sustained sequential write operation without frequent idle.



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