

## PRODUCT PROFILE

### microSD Cards

microSD cards have been mainstream for years as storage for mobile phones, action cameras and other consumer devices. More recently, the small, lightweight and rugged form factor has become one of the most popular storage media for industrial and OEM applications as well. For handheld devices and other real estate-constrained designs, across a wide range of applications including inventory management, telecommunications, medical devices, power and energy, infotainment and transportation, Delkin Devices offers a full menu of microSD cards, allowing the best product selection to match any use model. Delkin microSD products have many additional benefits over standard retail consumer-grade cards, including BOM control, life cycle management and outstanding applications support.

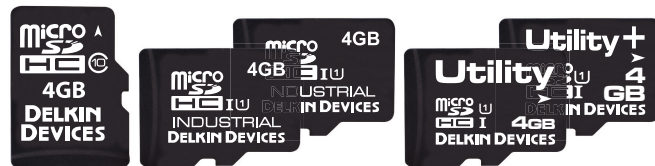
Whether the application calls for a few Megabytes of storage to launch an application, or several Gigabytes to store video data, Delkin has the solution.

For the most demanding applications, in terms of environmental conditions, write-intensive workload or the mission-critical nature of the stored data, Delkin offers true industrial SD controllers, high endurance SLC NAND flash, full industrial temperature range and long life cycles.

For more cost sensitive designs, Delkin offers lines of MLC-based cards – the Utility family in standard (-25°C to +85°C) and Utility+ family offering full industrial (-40°C to +85°C) temperature ranges.

Regardless of the microSD product family, Delkin ensures consistent performance and host compatibility through managed configurations. Delkin locks the card configuration down to the specific controller, firmware and flash chips, with a change to any of these components dictating a new part number. When an unavoidable EOL occurs to any of these items, Delkin communicates the discontinuation in advance, providing the opportunity to place a last time buy as well as to qualify the replacement solution.

Additionally, since the Delkin Devices facility in Poway, California is the headquarters for our design, manufacturing and support teams, we can also provide customized microSD solutions. Options include pad printing, content or image loading, conformal coating or other mechanical modifications to meet a specific need. Contact us to ask how a card can be customized for your application.



## HIGHLIGHTS

Five microSD Product Families

- SLC and MLC Flash
- Commercial & Industrial Temp
- SD 3.0 & SD 2.0

Wide Range of Capacities from 128MB to 128GB

Support for SD and SPI Modes

Controlled BOM

Life Cycle Management

Customization Options

# microSD CARDS PRODUCT MATRIX



SD Product Family	U300 Series		U330 Series		U331 Series		Utility microSD		Utility+ microSD	
Interface	SD 3.0, Class 10, UHS-I									
Connector	Standard microSD 8 pin									
Outline Dimensions	11 x 15 x 1 mm									
Flash Type	SLC					MLC				
Density Range	512 MB - 2GB (SD) 4GB - 16GB (SDHC)		256 MB - 2 GB (SD) 4 GB (SDHC)		128 MB - 2 GB (SD) 4 GB (SDHC)		4 GB - 32 GB (SDHC) 64 GB - 128 GB (SDXC)		4 GB - 32 GB (SDHC) 64 GB - 128 GB (SDXC)	
Data Retention	10 years - up to 10% of P/E cycles 1 year - at end of life / 100% of cycles					5 years - up to 10% of P/E cycles 1 year - at end of life / 100% of cycles				
Endurance (Raw Flash Level)	60,000 P/E cycles					3,000 P/E Cycles				
Operating Temperature	-40°C to +85°C					-25°C to +85°C		-40°C to +85°C		
Storage Temperature	-50°C to +100°C		-40°C to +85°C							
Sequential Read Performance (MB/s)	up to 24		up to 23		up to 20		up to 95			
Sequential Write Performance (MB/s)	up to 20		up to 19		up to 20		up to 90			
MTBF	≥ 2,000,000 hours (0 - 25°C)					≥ 3,000,000 hours (0 - 30°C)				
Shock*	1,500 G for 0.5msec									
Vibration*	20Hz ~80Hz/1.52mm displacement, 80Hz~2000Hz / 20G Acceleration									
Humidity	5 - 95% RH, non-condensing					95% RH under 40°C				
Voltage	2.7 - 3.6 V Normal									
Power Consumption	Read typically <50 mA Write typically < 100 mA Idle typically < 500 uA					Read typically <160 mA Write typically < 130 mA Idle typically < 300 uA				
Features & Tools	Proven Power Fail Safety Sophisticated Wear Leveling & Bad Block management Highest Endurance Longest Life Cycle					Robust Power Fail & Firmware Protection Sophisticated Wear Leveling & Bad Block Management Limited Life Cycle Management Cost Effective				
SMART Capability	CMD56, Emulation Dashboard Avail Q316		CMD56, Libraries Available Delkin Dashboard (Windows)			CMD56, Libraries Available Delkin Dashboard (Windows)				
Part Numbers	512MB: S351MMVAL-C1000-4 1GB: S30GMMUAL-C1000-4 2GB: S302MMZAL-C1000-4 4GB: S304MMZAL-U1000-4 8GB: S308MMZAL-U1000-4 16GB: S316MMZAL-U1000-4  Contact Delkin for other options		256MB: S325TLMBP-C1000-3 512MB: S351TLMBP-C1000-3 1GB: S30GTLDBP-C1000-3 1GB EM: S30GTLZK-C1179-3 2GB: S302TLDBP-C1000-3 2GB EM: S302TLZK-C1179-3 4GB: S304TLDBP-CX000-3 4GB EM: S304TLD5C-CX179-3  EM = Embedded Mode - for applications using Linux OS or Linux & Windows partitions, to ensure efficient wear-leveling.  Contact Delkin for other options		128MB: S312TLK7B-C1000-3 256MB: S325TLM7B-C1000-3 512MB: S351TLN7B-C1000-3 1GB: S30GTLN7B-C1000-3 2GB: S302TLN7B-C1000-3 4GB: S304TLN7B-U1000-3  All capacities include Embedded Mode.  Contact Delkin for other options		4GB: S404APY5Q-U1000-3 8GB: S408APG49-U1000-3 16GB: S416APG49-U3000-3 32GB: S432APG49-U3000-3 64GB: S464APG55-U3000-3 128GB: S41HAPGAC-U3000-3  Contact Delkin for other options, including pSLC configurations		4GB: S304APY5Q-U1000-3 8GB: S308APG49-U1000-3 16GB: S316APG49-U3000-3 32GB: S332APG49-U3000-3 64GB: S364APG55-U3000-3 128GB: S31HAPGAC-U3000-D  Contact Delkin for other options, including pSLC configurations	

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