



Datasheet

Industrial MicroSD Card Series Datasheet

Capacities: 4GB, 8GB, 16GB, 32GB, 64GB, 128GB,
256GB, 512GB, 1TB





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Revision record:

[illegible]

Note 1: Any related changes require a change notice to be issued.

Note 2: This form must be filled out every time the archived file is changed.

Note 3: When archiving the file for the first time, write "New" in the "Reason for Change" column and "None" in the "Main Change Content" column.

1.0 Product Parameters

Capacity	Grade	NAND	Interface	Read	Write	Temp	Endurance	Firmware Features	Application
4GB	Industrial	MLC	SD6.1/UHS-I + SPI	80MB/s	50MB/s	-40~85°C	High	ECC, Wear Levelling, Power Immunity	PLC, Medical
8GB	Industrial	MLC	SD6.1/UHS-I + SPI	80MB/s	50MB/s	-40~85°C	High	ECC, Wear Levelling, Power Immunity	PLC, Medical
16GB	Industrial	MLC	SD6.1/UHS-I + SPI	80MB/s	50MB/s	-40~85°C	High	PLC, HMI, Medical	Industrial Control
32GB	Commercial / Industrial	MLC	SD6.1/UHS-I + SPI	80MB/s	50MB/s	-40~85°C	Very High	Embedded Systems	Embedded Linux
64GB	Commercial / Industrial	TLC	SD6.1/UHS-I + SPI	100MB/s	80MB/s	0~70°C / -40~85°C	High	Industrial Controls	Automation
128GB	Commercial / Industrial	TLC	SD6.1/UHS-I + SPI	100MB/s	80MB/s	0~70°C / -40~85°C	High	Edge AI, NVR	Edge AI
256GB	Commercial / Industrial	TLC	SD6.1/UHS-I + SPI	100MB/s	80MB/s	0~70°C / -40~85°C	High	Surveillance	Surveillance
512GB	Commercial / Industrial	QLC / TLC	SD6.1/UHS-I + SPI	100MB/s	80MB/s	0~70°C / -40~85°C	Standard	AI Cameras	AI Cameras
1TB	Commercial	QLC	SD6.1/UHS-I + SPI	100MB/s	80MB/s	0~70°C / -40~85°C	Standard	Video Analytics	Video Analytics

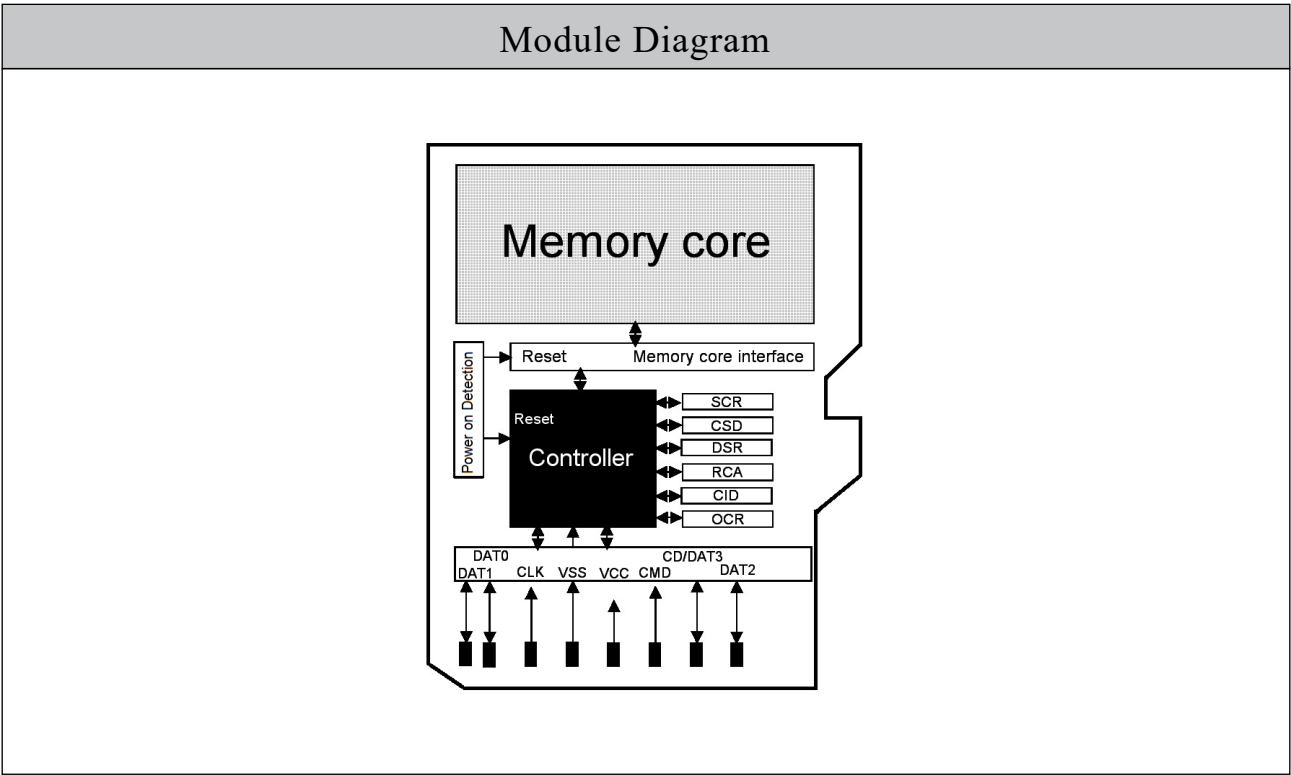
1.1 Ordering Information

Capacity	Grade	Performance	Part Number
4GB	Industrial	A1	ASC-T7-004G-I-A1
8GB	Industrial	A1	ASC-T7-008G-I-A1
16GB	Industrial	A1	ASC-T7-016G-I-A1
32GB	Industrial	A1	ASC-T7-032G-I-A1
64GB	Industrial	A2	ASC-T7-064G-I-A2
128GB	Industrial	A2	ASC-T7-128G-I-A2
256GB	Industrial	A2	ASC-T7-256G-I-A2
512GB	Industrial	A2	ASC-T7-512G-I-A2
1TB	Commercial	A2	ASC-T7-1TB-C-A2

1.2 Key Features

- Capacities from 8GB to 1TB
- Industrial-grade MicroSD form factor
- MLC, TLC, and QLC NAND options
- Operating temperature up to -40°C to +85°C
- SPI and SD interface support
- Read speeds up to 100 MB/s
- Write speeds up to 80 MB/s
- Embedded, industrial automation, surveillance, AI edge, and medical applications

2.0 Module Block Diagram



3.0 Port Definition

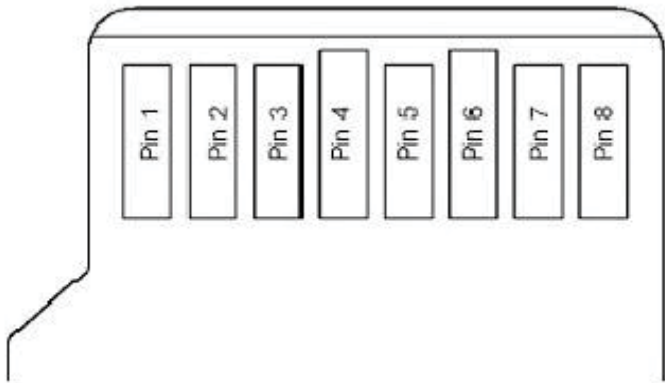


Figure: contact area

4.0 PIN Definition:

Pin No.	SDMode			SPI Mode		
	Name	Type	Description	Name	Type	Description
1	DAT2	I/O/PP	Data Line [Bit 2]	RSV		Reserved
2	CD/DAT3	I/O/PP	Card Detect / Data Line [Bit 3]	CS	I	Chip Select
3	CMD	PP	Command/Response	DI	I	Data In
4	V _{DD}	S	Supply voltage	V _{DD}	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	V _{SS}	S	Supply voltage ground	V _{SS}	S	Supply voltage ground
7	DAT0	I/O/PP	Data Line [Bit 0]	DO	O/PP	Data Out
8	DAT1	I/O/PP	Data Line [Bit 1]	RSV		Reserved

5.0 Applications

- PLCs 
- HMIs 
- Industrial PCs 
- Medical Devices 
- Security Panels 
- NVRs 
- IP Cameras 
- AI Cameras 
- Edge Computing 
- Data Loggers 
- Industrial Gateways 

6.0 Dimensional Block Diagram

Type	Measurement
Length	15mm +/- 0.1mm(B)
Width	11mm +/- 0.1mm(A)
Thickness	1.0mm +/- 0.1mm(C)
	0.7mm +/- 0.1mm(B)
Weight	0.33 gram Max

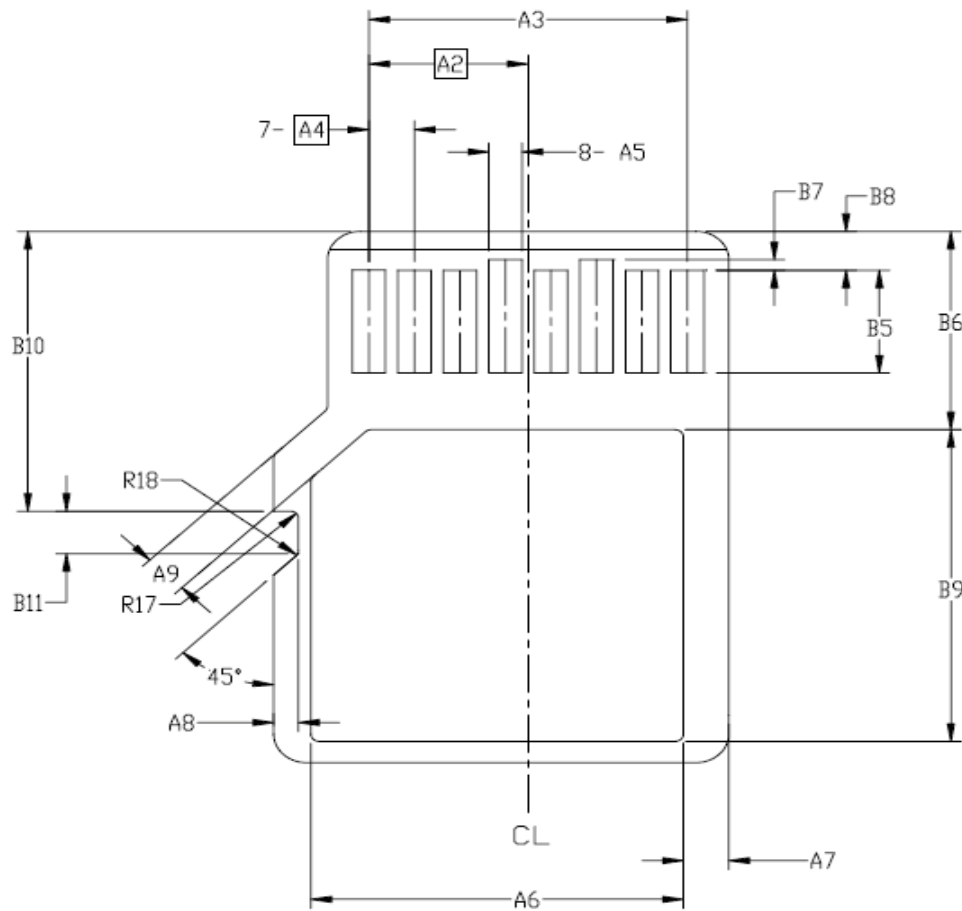


Figure E-1: Mechanical Description - Bottom View

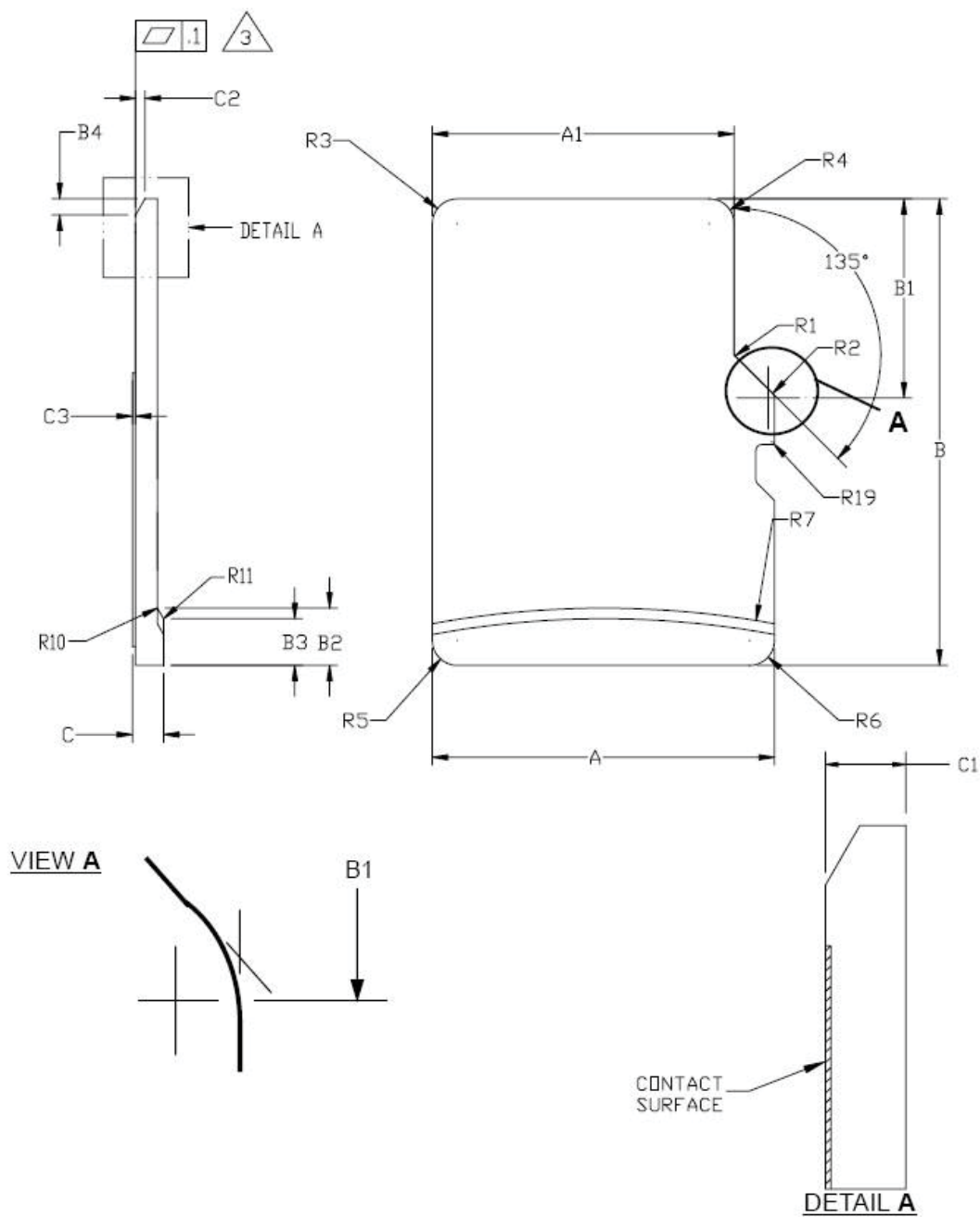


Figure E-1: Mechanical Description - Top View

7.0 Functional Testing

Test platform:

System: Windows10*64 Professional Edition
CPU: Intel (R) Core i7-10700 @2.90GHz
Memory: DDR4 8GB 2666MHz
Mother board: ASUSB460M
CrystalDiskMark 8.0.1*64

7.1 Speed test:

Capacity	Read Speed	Write Speed	Speed Class
4GB	Up to 80 MB/s	Up to 50 MB/s	Industrial
8GB	Up to 80 MB/s	Up to 50 MB/s	Industrial
16GB	Up to 80 MB/s	Up to 50 MB/s	Industrial
32GB	Up to 80 MB/s	Up to 50 MB/s	Industrial
64GB	Up to 100 MB/s	Up to 80 MB/s	UHS-I
128GB	Up to 100 MB/s	Up to 80 MB/s	UHS-I
256GB	Up to 100 MB/s	Up to 80 MB/s	UHS-I
512GB	Up to 100 MB/s	Up to 80 MB/s	UHS-I
1TB	Up to 100 MB/s	Up to 80 MB/s	UHS-I

Note1:

Measurement based on VTE3100 & VTE4100 Test Metrix device, SW 3.2A software or up version; The card must be reformatted between each script test.

. Speed may vary due to host and device configuration.

. Test scripts:

- SD_Card(Spec3.0_High&Extended-Capacity_UHS-I and Non-UHS-I)_Compliance [rev32A]-B87.vte
- SD_Card (Spec2.0-3.0 High&Extended-Capacity_UHS-I) Performance-Speed (Multiple Block Sequential) [rev31M] - SDR104-With Background Data.vte
- SD_Card (Spec3.0-4.0 HC & XC -UHS-I) SD 3.0 Speed Class (Grade 1/3) [rev32A].vte
- SD [Spec 5.1_HC&XC_UHS-I] Speed Class (Grade 1) & VSC_6_10_30 [VTE4100, Rail_UHS-I+II] SK1 [5.2.0.2-52B-A05].vte
- SD [Spec 5.1_HC&XC_UHS-I] A1/A2 Test - SDR50 (w CMD12_DB) [VTE4100, Rail_UHS-I+II] SK1 [5.2.0.1-52A-A00].vte

· Maximum speed differs from the bus I/F speed. It varies depending upon the card performance. The average speed that a device writes to an SD memory card may vary depending upon the device and the operation it is performing. Normal and high-speed cards can also be used with UHS-I host devices, but the high performance enabled by a UHS-I host device can only be achieved with a UHS-

I memory card.

Product Performance is based on VTE TestMetrix compliance Tool. Note that the performance measured by VTE TestMetrix does not represent real performance in various circumstances.

7.2 Reliability test

Item	Condition
Temperature	Operation: -40°C/85°C Storage: -40°C/85°C
Moisture and corrosion	Operation: 25°C/95% rel. humidity Storage: 40°C/93% rel. hum./500h
Durability	10,000 insertion/removal cycles
Bending	10[N] Center 200[mm/minute] 60[sec]
Torque	0.10Nm, +/-2.5 deg.max.
Drop test	1.5m free fall
Electrostatic Discharge (ESD)	IEC 61000-4-2 contact discharge: +/- 2[kV] and +/- 4[kV] 150[pF], 330[Ohm] air discharge: up to +/- 15[kV]
X-ray Exposure	ISO7816-1 0.1Gy of medium-energy radiation (70keV to 140keV, cumulative dose per year) to both sides of the card.

7.3 Voltage parameter

Parameter	Symbol	Min	Max	Unit	Remark
Supply Voltage	V_{DD}	2.7	3.6	V	
Output High Voltage	V_{OH}	$0.75 \cdot V_{DD}$		V	$I_{OH}=2mA$ V_{DD} min
Output Low Voltage	V_{OL}		$0.125 \cdot V_{DD}$	V	$I_{OL}=2mA$ V_{DD} min
Input High Voltage	V_{IH}	$0.625 \cdot V_{DD}$	$V_{DD}+0.3$	V	
Input Low Voltage	V_{IL}	$V_{SS}-0.3$	$0.25 \cdot V_{DD}$	V	
Power Up Time			250	ms	From 0V to V_{DD}

7.4 Clock signal parameters:

Symbol	Min	Max	Unit	Remark
t_{CLK}	20	-	ns	50MHz (Max.), Between rising edge
t_{CR}, t_{CF}	-	$0.2 \cdot t_{CLK}$	ns	$t_{CR}, t_{CF} < 4.00ns(max.)$ at 50MHz, $C_{CARD}=10pF$
Clock Duty	45	55	%	