HHW microSD Card

SD3.0 UHS-I

Datasheet

Rev. 1.0

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REVISION HISTORY

Revision	Description	Date
V1.1	First released	August, 2015
V1.2	Updated humidity information	March, 2017

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7	DO	O	Data Out
8	RSV		Reserved

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3. Specifications

3.1. Performance

Min. Data Transfer Rate

- Read: 60MB/s; Write: 30MB/s

3.2. NAND Flash Memory

microSD Card (3D TLC) NAND Flash memory, which is non-volatility, high reliability and high speed memory storage.

3.3. Power Requirement

3.3.1. DC Input Voltage

- 2.7V to 3.6V

3.4. Operature Temperature Range

- -40°C to+85°C

3.5. Humidity

Relative Humidity: 5-95%, non-condensing

4. Electrical Specifications

4.1. General DC Characteristic

W-Temp Table 3: Absolute Maximum Ratings

Symbol	Parameter

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Symbol	Parameter	Min.	Typ.	Max.	Unit
I_{Read}	Read Current at 3.3V	-	120	-	mA
I_{Write}	Write Current at 3.3V	-	110	-	mA
I_{STBY}	Standby Current at 3.3V	-	285	-	uA

4.2. Bus Operation Conditions for 3.3V Signaling

4.2.1 Threshold Level for High Voltage Range

Table 5: Threshold Level for High Voltage

Parameter	Symbol	Min	Max	Unit	Remark
Supply Voltage	V_{DD}	2.7	3.6	V	
Output High Voltage	V_{OH}	0.75* V_{DD}		V	I_{OH}=2mA $V_{DD\ min}$
Output Low Voltage	V_{OL}				<</MCIutput Low Voltage 4106 577.6 Tm ( )Tj 2 2934 (V)-9 ( )- 0

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4.2.3 Bus Signal Line Load

Table 7: Bus Operating Conditions - Signal Line's Load

Parameter	Symbol	Min	Max	Unit

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4.2.5 Bus Timing (Default)

Figure 3: Card input Timing (Default Speed Card)

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Figure 4: Card Output Timing (Default Speed Mode) Table 8: Bus Timing- Parameters Values (Default Speed)

Input hold time	t_{TH}	5		ns	C_{CARD}
Outputs CMD, DAT (referenced to CLK)					
Output Delay time during Data Transfer Mode	t_{ODLY}	0	14	ns	C_L
Output Hold time	t_{OH}	0	50	ns	C_L

(1) 0 Hz means to stop the clock. The given minimum frequency range is for cases were continues clock is required (refer to Chapter 4.4-Clock Control)

4.2.6 Bus Timing (High- Speed Mode)

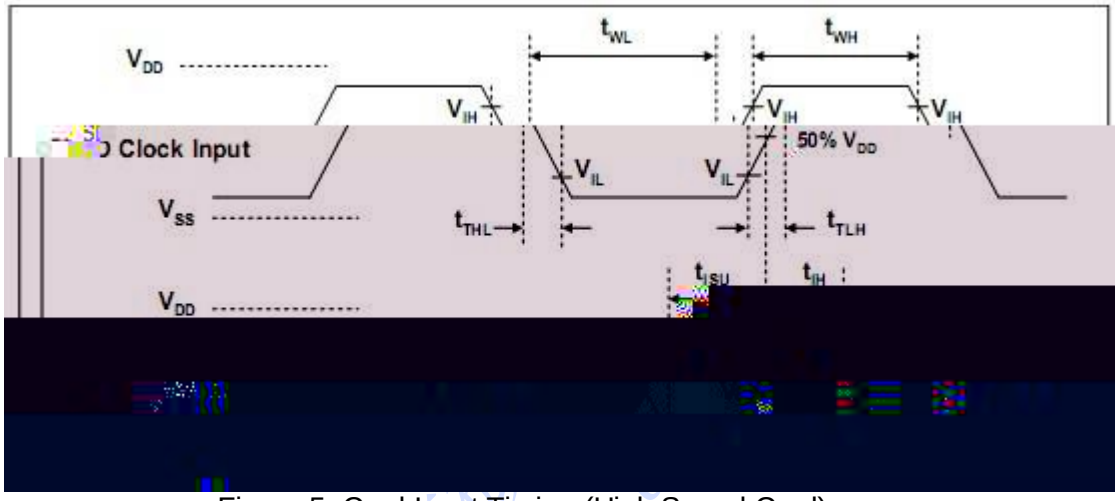


Figure 5: Card Input Timing (High Speed Card)

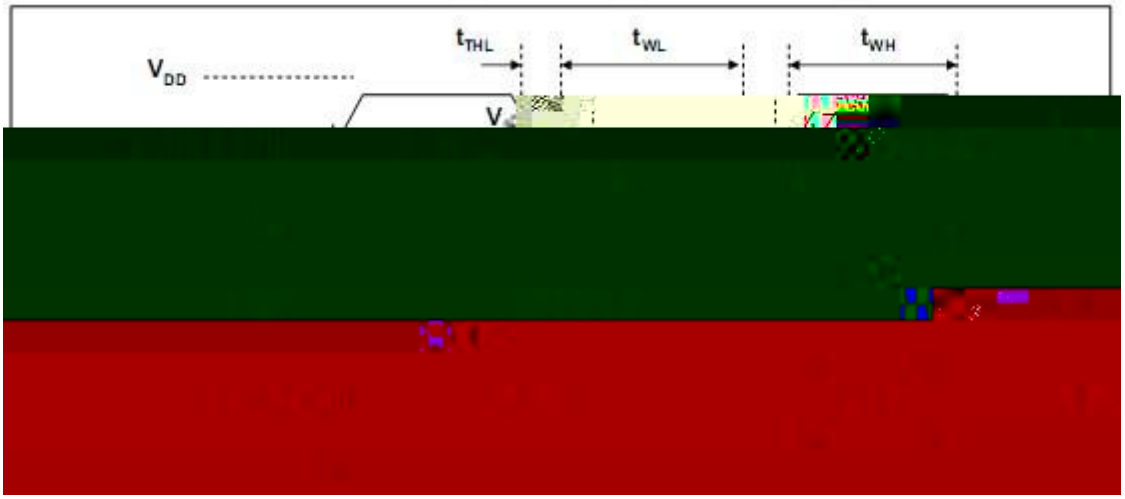


Figure6: Card Output Timing (High Speed Mode)

Table 9 : Bus Timing – Parameters Values(High Speed)

Parameter	Symbol	Min.	Max	Unit	Remark
Clock CLK All values are referred to min V_{IH} and max V_{IL}					
Clock frequency data transfer	fpp	0	50	MHz	C_{CARD}

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4.3.3.3 Card Output Timing

4.3.3.3.1 Output Timing of Fixed Data Window (SDR12, SDR25 and SDR50)

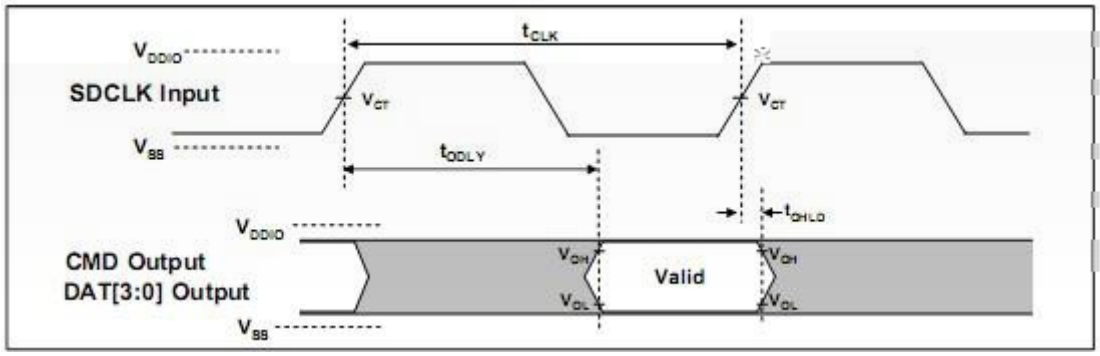


Figure 9: Output Timing of Fixed Date

Window Table 14: Output Timing of Fixed

Data Window

Symbol	Min	Max	Unit	Remark
t_{ODLY}	-	7.5	ns	t_{CLK} for SDR50.
t_{ODLY}		14	ns	t_{CLK} for SDR25 and SDR12.
t_{OH}	1.5	-	ns	Hold time at the t_{ODLY} (min.). CL=15pF

4.3.3.3.2 Output Timing of Variable Window (SDR104)

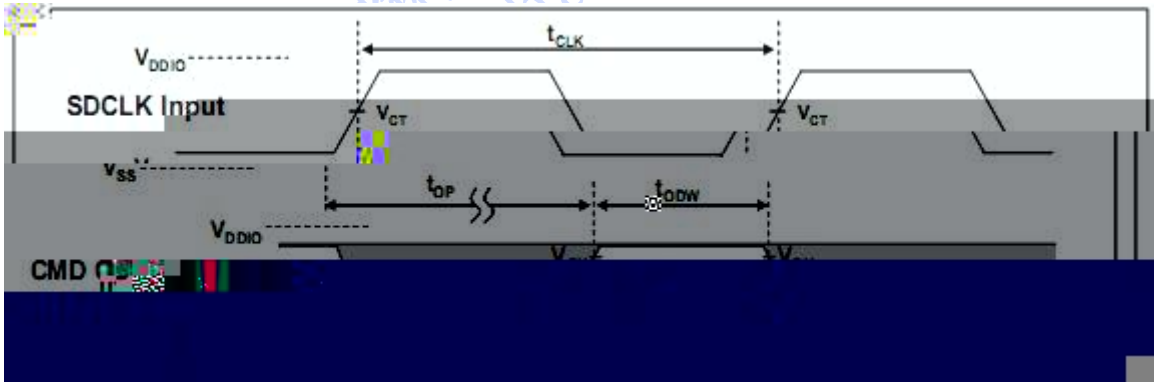


Figure 10: Output Timing of Variable Data

Symbol	Min	Max	Unit	Remark
t_{OP}	-	2	UI	Card Output Phase
t_{OP}	-350	+1550	ps	Delay variation due to temperature change after tuning
t_{ODW}	0.60	-	UI	t_{ODW} = 2.88ns at 208MHz

Window Table 15: Output Timing of Variable

Data Window

5. Mechanical Dimensions

The mechanical dimensions of Agrade Industrial microSD Card were basically followed the mechanical form factor definitions on microSD card specifications which constructed by SD card association.

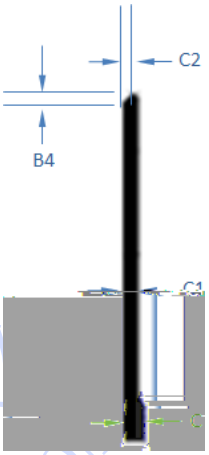


Figure 11: Top View
Figure 12: Side View

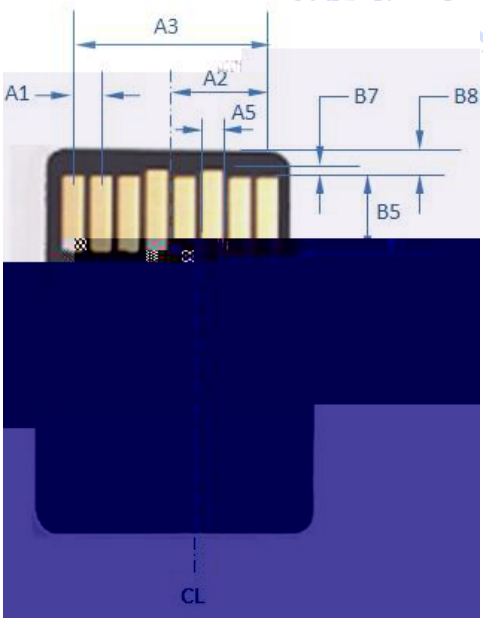


Figure 13: Bottom View

Criteria of microSD Unit: mm

Dimensions	Min	TYP	Max	Note
A	10.90	11.00	11.10	
A1	9.60	9.70	9.80	
A2		3.85		BASIC
A3	7.60	7.70	7.80	
A4		1.10		BASIC

6. Ordering Information

	microSD Card (MLC)	microSD Card(SLC)
Capacity	Normal-temperature	Wide-temperature

MicroSD Card(PSLC)			
Capacity	Normal-Temperature	Extended-Temperature	Wide-temperature
4GB			
8GB	HHW8GTFA-E1		
16GB	HHW16GTFA-E1		
32GB	HHW32GTFA-E1		
64GB	HHW64GTFA-E1		
128GB	HHW128GTFA-E1		

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