HHW Industrial microSD Card

Datasheet

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V1.1	First released	August, 2015
V1.2	Updated humidity information	March, 2017
V1.3	Part number updated	September, 2018

The Industrial microSD Card is designed for demanding industrial applications. The Industrial microSD Card is compatible with SD 3.0 and provides excellent performance. The built-in auto ECC function can detect and correct errors during data transfer. Moreover, the Industrial microSD Card supports Ultra High Speed (UHS) interface transfer mode, provides high write/read data transfer rate, high random IOPS, sudden Power-Fails protection, adaptive static wear-leveling, read/program disturb management, etc. It was designed to meet the high quality, high reliability, high performance, and versatile environmental requirements.

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Interface: 8 pins microSD standard interface

Compliant SD Card Specification 3.0

Density support:

SLC: 4GB~8GB

MLC: 4GB~128GB

aSLC (Super MLC, single bit per cell MLC): 4GB~64GB

Bus Speed Mode:

DS-Default Speed mode: 3.3V signaling, frequency up to 25MHz, up to 12.5MB/sec

HS-High Speed mode: 3.3V signaling, frequency up to 50MHz, up to 25MB/sec

SDR12: 1.8V signaling, frequency up to 25MHz, up to 12.5MB/sec

SDR25: 1.8V signaling, frequency up to 50MHz, up to 25MB/sec

SDR50: 1.8V signaling, frequency up to 100MHz, up to 50MB/sec

SDR104: 1.8V signaling, frequency up to 208MHz, up to 104MB/sec

DDR50: 1.8V signaling, frequency up to 50MHz, sampled on both clock edges, up to 50MB/s

Operating Temperature: N-Temp: at 0°C to 70°C

W-Temp: at -40°C to 85°C

E-Temp: at -25°C to 85°C

Flash: SLC and MLC NAND Flash

aSLC (Super MLC, single bit per cell MLC) support, enhance the performance and product endurance.

Read disturbance management

Adaptive wear leveling

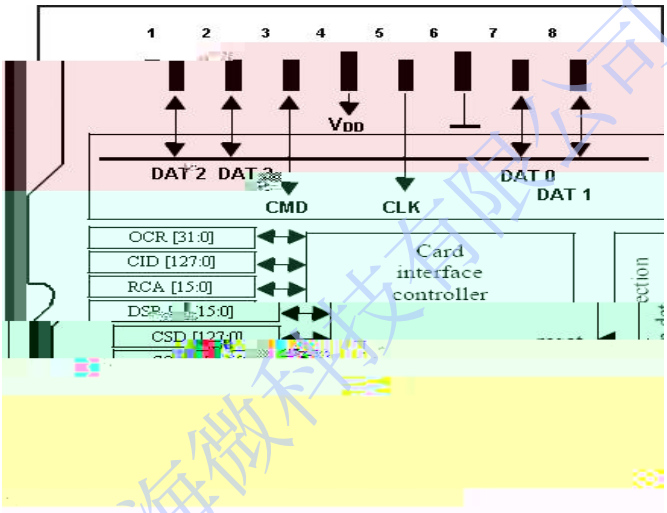
Management of sudden power-fails

SMART Function support

1	DAT2	I/O	Data Line [Bit 2]
2	CD/DAT3	I/O	Card Detect / Data Lin

(ACMD42) command.

1	RSV		Reserved
2	CS	I	Chip Select (neg true)
3	DI	I	Data In
4	VDD	S	Supply Voltage
5	SCLK	I	Clock
6	VSS	S	Supply Voltage Ground
7	DO	O	Data Out
8	RSV		Reserved



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Max. Data Transfer Rate

Read: 90MB/s; Write: 70MB/s

Industrial microSD Card uses Single Level Cell (SLC) and Multi Level Cell (MLC) NAND Flash memory, which is non-volatility, high reliability and high speed memory storage.

2.7V to 3.6V

N-Temp:0°C to70°C
W-Temp:-40°C to +85°C
E-Temp:-25°C to+85°C

Relative Humidity: 5-95%, non-condensing

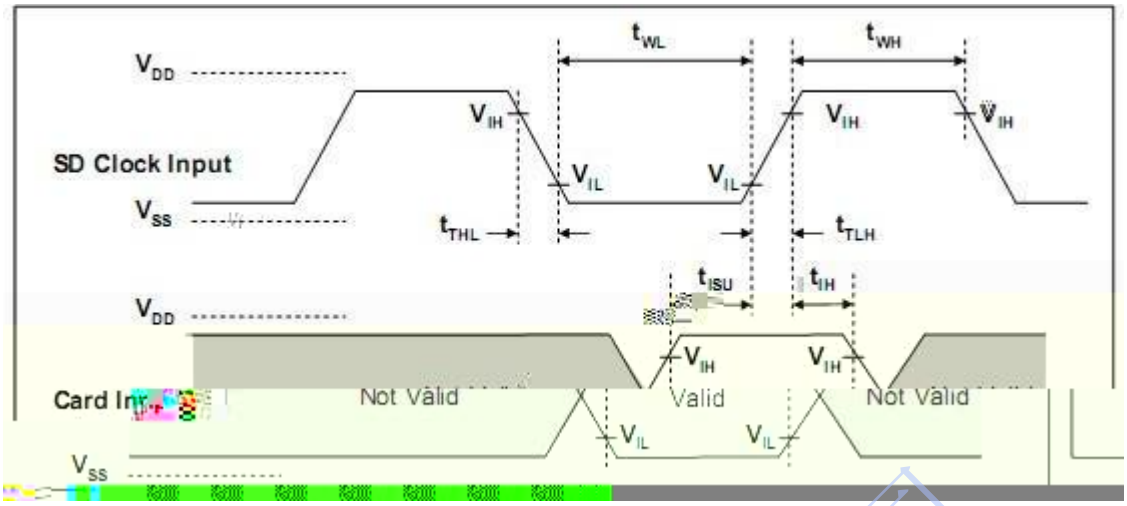
Ta	Ambient Operating Temperature	-25	85	°C	-
V_I	3.3V External Input Voltage	-0.3	3.6	V	-

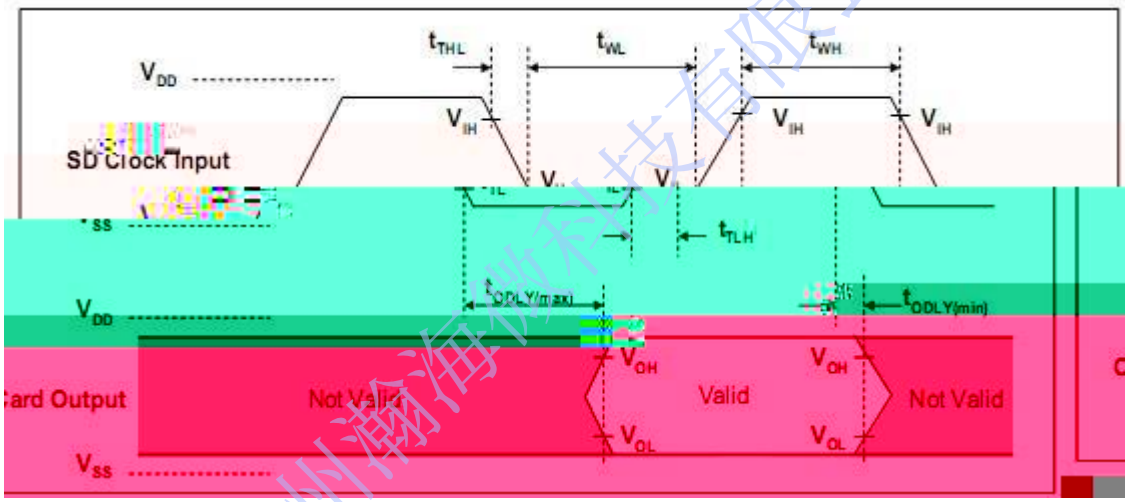
I_{Read}	Read Current at 3.3V	-	169	-	mA
I_{Write}	Write Current at 3.3V	-	89	-	mA
I_{STBY}	Standby Current at 3.3V	-	198	-	uA

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}		0.125* V_{DD}	V	I_{OL}=2mA $V_{DD\ min}$
Input High Voltage	V_{IH}	0.625* V_{DD}	V_{DD}+0.3	V	
Input Low Voltage	V_{IL}	V_{ss}-0.3	0.25* V_{DD}	V	
Power Up			25T	mצ	

Pull-up resistance	R_{CMD} R_{DAT}	10	100	KΩ	To prevent bus floating
Total bus capacitance for each signal line	C_L		40	pF	1 card $C_{HOST}+C_{BUS}$ shall not exceed 30pF
Card capacitance for each signal pin	C_{CARD}		10	pF	
Maximum signal inductance			16	nH	
Pull-up resistance inside card(pin1)	R_{DAT3}	10	90	KΩ	May be used for card detection
Capacity Connected to Power Line	C_C		5	uF	To prevent inrush current

As the bus can be supplied with a variable supply voltage, all signal levels are



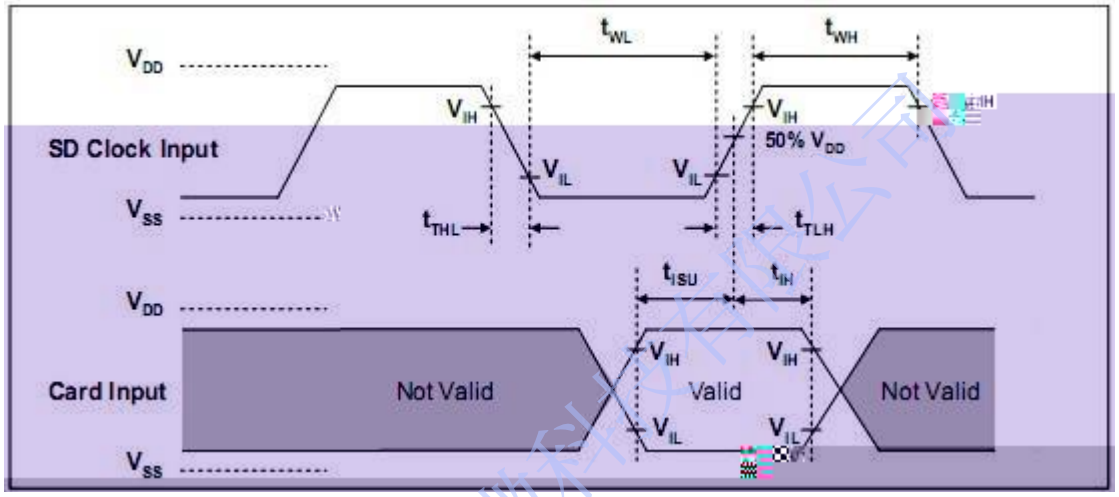


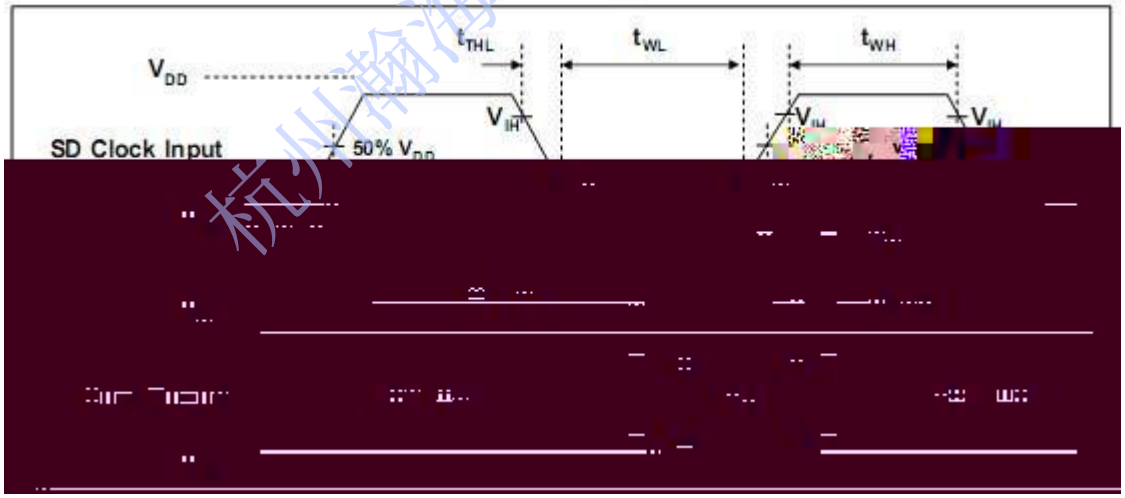
lj All values are referred to min lj V_{IH}NJand max lj V_{IL}NJ					
Clock frequency data transfer	fpp	0	25	MHz	C_{CARD} ≤ 10pF (1 card)
Clock frequency Identification	f_{OD}	0(1)/100	400	KHz	C_{CARD} ≤ 10pF (1 card)
Clock low time	t_{WL}	10		ns	C_{CARD} ≤ 10pF (1 card)
Clock high time	t_{WH}	10		ns	C_{CARD} ≤ 10pF (1 card)
Clock rise time	t_{TLH}		10	ns	C_{CARD} ≤ 10pF (1 card)
Clock fall time	t_{THL}		10	ns	C_{CARD} ≤ 10pF (1 card)
(referenced to CLK)					
Input set-up time	t_{ISU}	5		ns	C_{CARD} ≤ 10pF (1 card)

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Input hold time	t_{TH}	5		ns	C_{CARD} ≤ 10pF (1 card)
(referenced to CLK)					
Output Delay time during Data Transfer Mode	t_{ODLY}	0	14	ns	C_L ≤ 40pF (1 card)
Output Hold time	t_{OH}	0	50	ns	C_L ≤ 40pF (1 card)

(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)

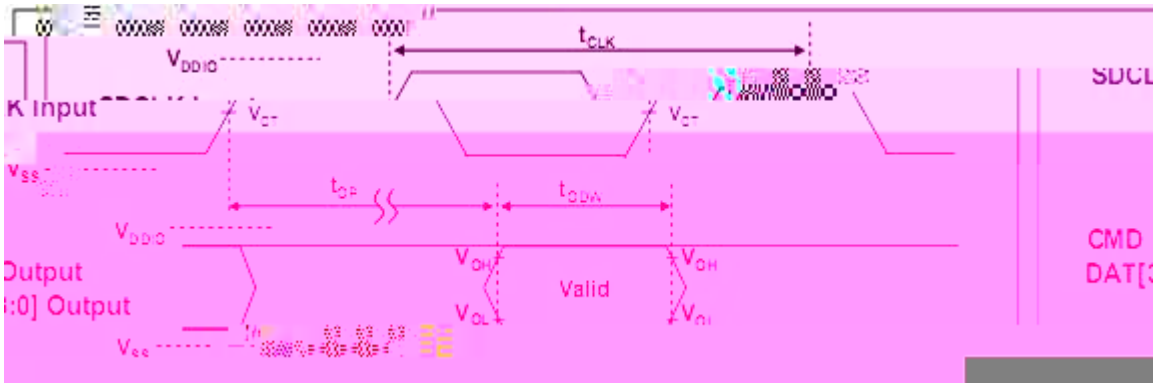




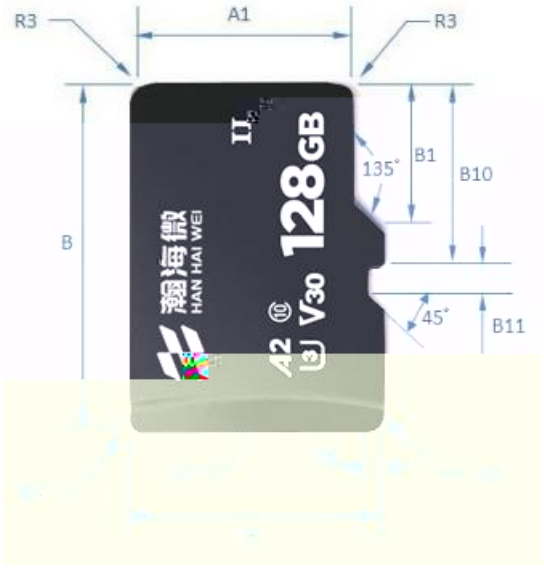
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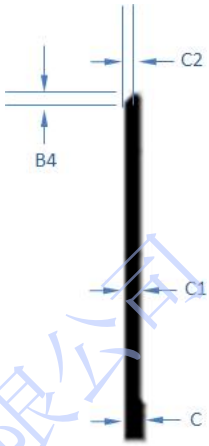
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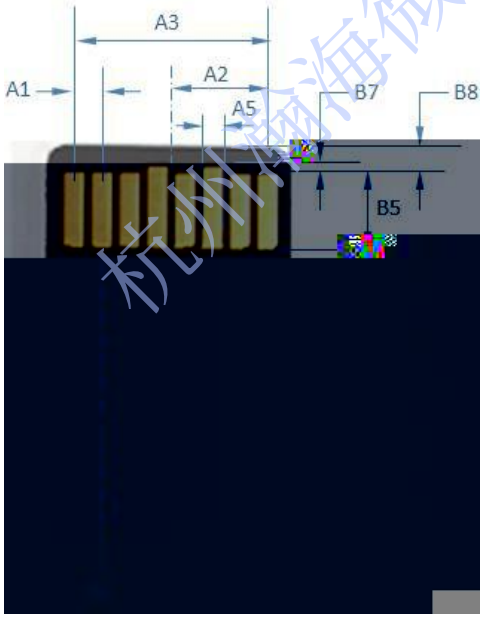
Clock frequency data transfer	fpp	0	50	MHz	C_{CARD} ≤ 10pF (1 card)
Clock low time	t_{WL}	7		ns	C_{CARD} ≤ 10pF (1 card)
Clock high time	t_{WH}	7		ns	C_{CARD} ≤ 10pF (1 card)
Clock rise time					

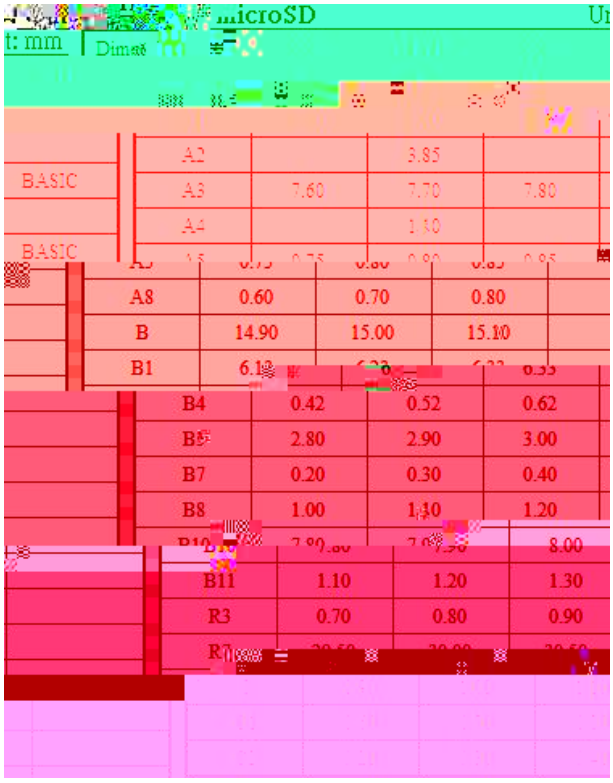

t_{CLK}
V_{DDIO}
V_{CT}
V_{CT}
t_{OP}
t_{ODW}
V_{DDIO}
V_{OH}
V_{OH}
Valid
V_{OL}
V_{OL}
V_{ss}
V_{ss}
K Input
SDCL
Output
:0] Output
CMD
DAT[

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.









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	Wide-temperature	Wide-temperature

	Normal-Temperature	Extended-Temperature	Wide-temperature