

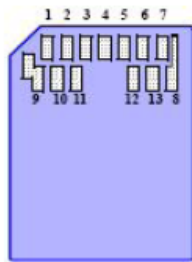
Description

TS128MMC4 ~ TS4GMMC4 is a 128MB ~ 4GB MMCplus memory card. It's a fastest, low-power, highly integration memory card. It is designed to provide an inexpensive, mechanically robust storage medium in card form for multimedia consumer applications and mobile devices (handheld PCs, digital cameras, MP3 players, etc.) to store, copy, and move data at high-speed transfer rate.

Placement



Front



Back

Features

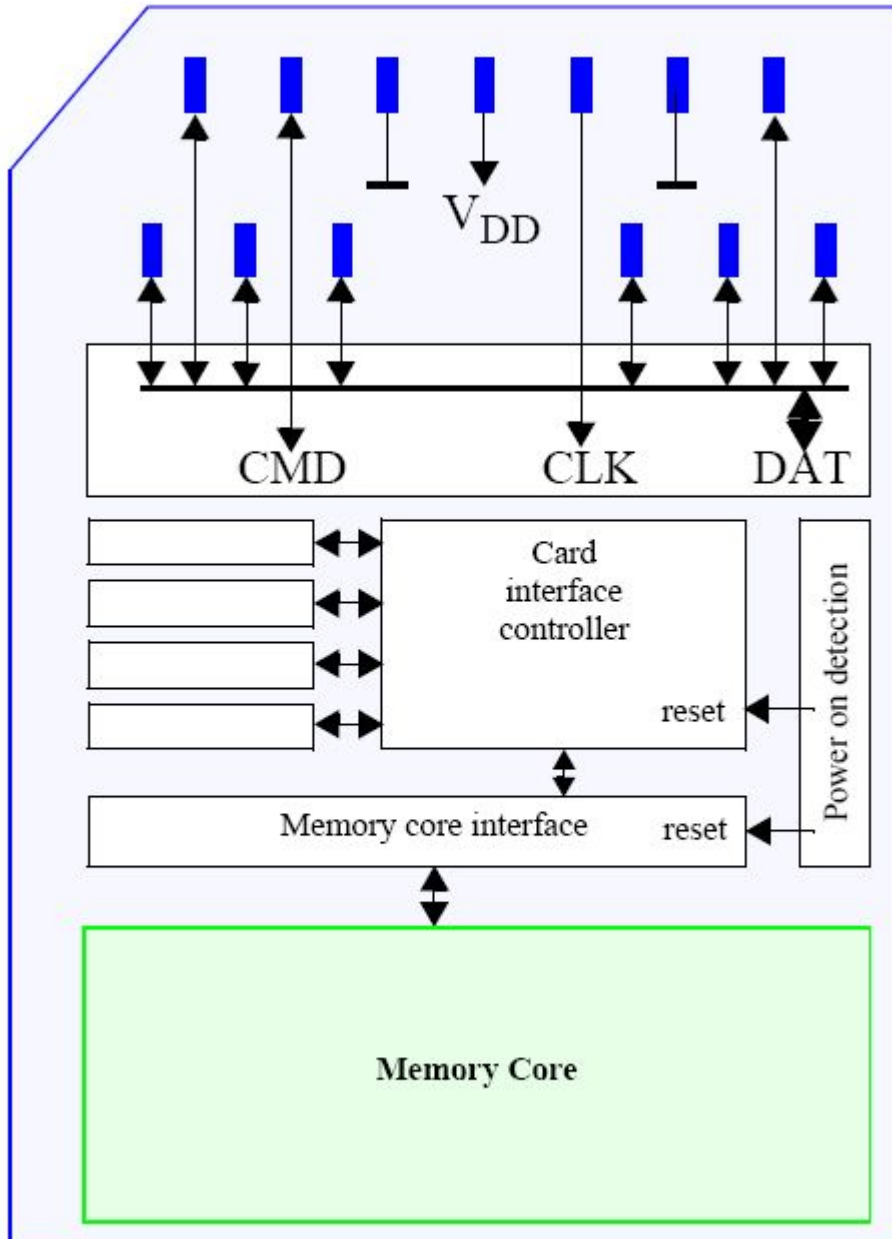
- ◆ Storage Capacity: 128MB ~ 4GB
- ◆ Operating Voltage: 2.7~3.6V
- ◆ Support clock frequencies: 0-20 MHz, 0-26 MHz, or 0-52 MHz
- ◆ Support different Bus width: x1, x4, x8
- ◆ Operating Temperature: -25°C ~ 85°C
- ◆ Compatible with Multimedia Card system specification version 4.2
- ◆ Form Factor: 32mm x 24mm x 1.4mm

Pin Definition

Pin No.	MMC Mode		
	Name	Type	Description
1	DAT3	I/O/PP	Data
2	CMD	I/O/PP/OD	Command/Response
3	VSS1	S	Ground
4	VDD	S	Power supply
5	CLK	I	Clock
6	VSS2	S	Ground
7	DAT0	I/O/PP	Data
8	DAT1	I/O/PP	Data
9	DAT2	I/O/PP	Data
10	DAT4	I/O/PP	Data
11	DAT5	I/O/PP	Data
12	DAT6	I/O/PP	Data
13	DAT7	I/O/PP	Data

S: Power Supply; I:Input; O:Output; PP:Push-Pull; OD:Open-Drain; NC:Not Connected

Multimedia Card Architecture



Electrical DC Characteristics

•General bus operating conditions

Parameter	Symbol	Min	Max	Unit
Peak voltage on all lines		-0.5	3.6	V
All Inputs				
Input Leakage Current (before initialization sequence and/or the internal pull up resistors connected)		-100	100	uA
Input Leakage Current (after initialization sequence and the internal pull up resistors disconnected)		-10	10	uA
All Outputs				
Output Leakage Current (before initialization sequence)		-100	100	uA
Output Leakage Current (after initialization sequence)		-10	10	uA

•MMC high-voltage power supply voltage

Parameter	Symbol	Min	Max	Unit
Supply voltage	VDD	2.7	3.6	V
Supply voltage differentials (VSS1, VSS2)		-0.5	0.5	V

• Bus Signal Line Load

The total capacitance C_L of each line of the MultiMedia Card bus is the sum of the bus master capacitance C_{HOST} , the bus capacitance C_{BUS} itself and the capacitance C_{CARD} of the card connected to this line:

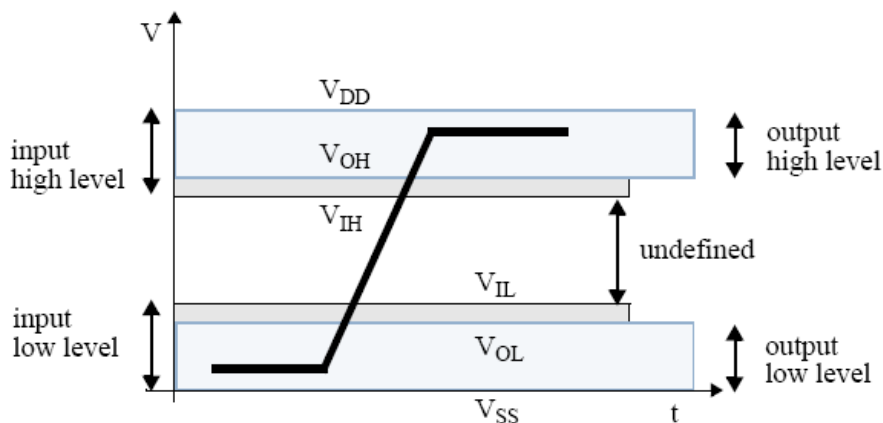
$$C_L = C_{HOST} + C_{BUS} + C_{CARD}$$

Parameter	Symbol	Min	Max	Unit	Remark
Pull-up resistance for CMD	R_{CMD}	4.7	100	KOhm	to prevent bus floating
Pull-up resistance for DAT0-7	R_{DAT}	50	100	KOhm	to prevent bus floating
Internal pull up resistance DAT1-DAT7	R_{int}	50	150	kOhm	to prevent unconnected lines floating
Bus signal line capacitance	C_L		30	pF	Single card
Single card capacitance	C_{CARD}		7	pF	
Maximum signal line inductance			16	nH	$f_{PP} \leq 52 \text{ MHz}$

• Open-drain mode bus signal level

($T_a = -25^{\circ}\text{C}$ to 85°C , $V_{DDH} = 2.7\text{V}$ to 3.6V)

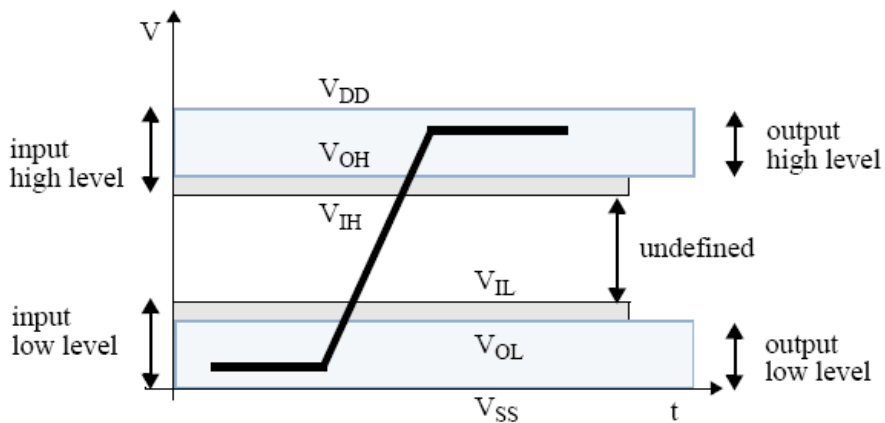
Parameter	Symbol	Min.	Max.	Unit	Condition
Output HIGH voltage	V_{OH}	$V_{DD} - 0.2\text{V}$		V	$I_{OH} = -100\ \mu\text{A}$
Output LOW voltage	V_{OL}		0.3	V	$I_{OL} = 2\ \text{mA}$



• Push-pull mode bus signal level—high-voltage MultiMedia Card

($T_a = -25^{\circ}\text{C}$ to 85°C , $V_{DDH} = 2.7\text{V}$ to 3.6V)

Parameter	Symbol	Min.	Max.	Unit	Condition
Output HIGH voltage	V_{OH}	$0.75 * V_{DD}$		V	$I_{OH} = -100\ \mu\text{A}$ @ V_{DD} min
Output LOW voltage	V_{OL}		$0.125 * V_{DD}$	V	$I_{OL} = 100\ \mu\text{A}$ @ 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	



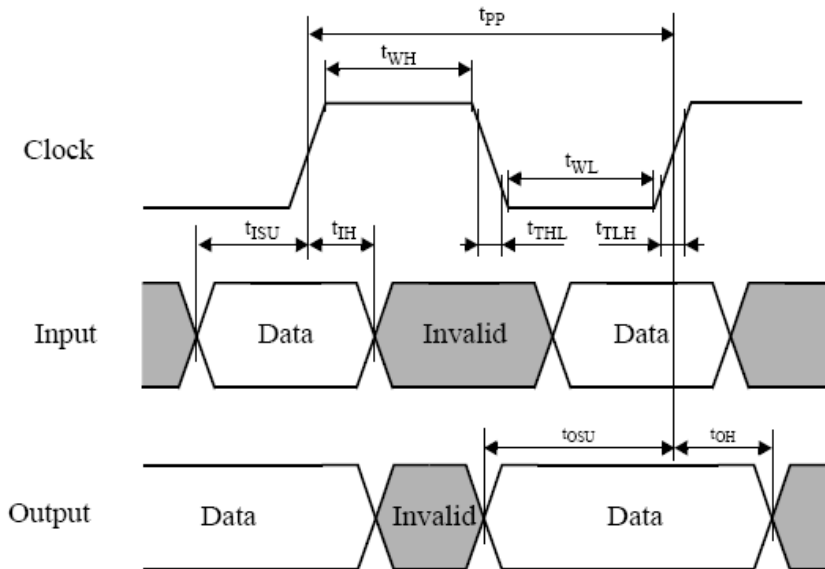
Electrical AC Characteristics

- Card interface timings

(Ta=-25°C to 85°C, V_{DDH}=2.7V to 3.6V)

Parameter	Symbol	Min.	Max.	Unit	Notes
Clock Frequency (Data Transfer Mode)	f _{pp}	0	26/52	MHz	C _L ≤ 30 pF Tolerance: +100KHz
Clock Frequency (Identification Mode)	f _{OD}	0	400	KHz	Tolerance: +20KHz
Clock Low Time	t _{WL}	6.5		ns	C _L ≤ 30 pF
Clock Rise Time	t _{TLH}		3	ns	C _L ≤ 30 pF
Clock Fall Time	t _{THL}		3	ns	C _L ≤ 30 pF
Inputs CMD, DAT (referenced to CLK)					
Input Set-up Time	t _{ISU}	3		ns	C _L ≤ 30pF
Input Hold Time	t _{IH}	3		ns	C _L ≤ 30pF
Outputs CMD, DAT (referenced to CLK)					
Input Set-up Time	t _{OSU}	5		ns	C _L ≤ 30pF
Input Hold Time	t _{OH}	5		ns	C _L ≤ 30pF
Signal Rise Time	t _{rise}		3	ns	C _L ≤ 30pF
Signal Fall Time	t _{fall}		3	ns	C _L ≤ 30pF

NOTE 1. All timing values are measured relative to 50% of voltage level
 NOTE 2. A Multimedia Card shall support the full frequency range from 0-26Mhz, or 0-52MHz
 NOTE 3. Rise and fall times are measured from 10%-90% of voltage level
 NOTE 4. Rise and fall times are measured from 10%-90% of voltage level



Note: Data must always be sampled on the rising edge of the clock.

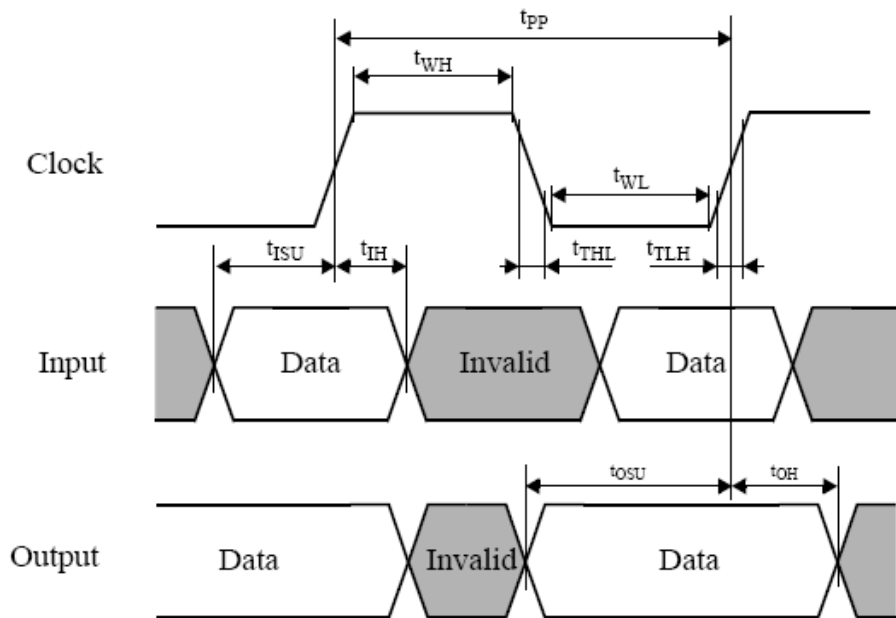
• Backward-compatible card interface timing

($T_a = -25^{\circ}\text{C}$ to 85°C , $V_{DDH} = 2.7\text{V}$ to 3.6V)

Parameter	Symbol	Min.	Max.	Unit	Notes
Clock Frequency (Data Transfer Mode)	f_{pp}	0	20	MHz	$C_L \leq 30\text{ pF}$
Clock Frequency (Identification Mode)	f_{OD}	0	400	KHz	
Clock Low Time	t_{WL}	6.5		ns	$C_L \leq 30\text{ pF}$
Clock Rise Time	t_{TLH}		3	ns	$C_L \leq 30\text{ pF}$
Clock Fall Time	t_{THL}		3	ns	$C_L \leq 30\text{ pF}$
Inputs CMD, DAT (referenced to CLK)					
Input Set-up Time	t_{ISU}	3		ns	$C_L \leq 30\text{ pF}$
Input Hold Time	t_{IH}	3		ns	$C_L \leq 30\text{ pF}$
Outputs CMD, DAT (referenced to CLK)					
Output Set-up Time	t_{OSU}	5		ns	$C_L \leq 30\text{ pF}$
Output Hold Time	t_{OH}	5		ns	$C_L \leq 30\text{ pF}$
Signal Rise Time	t_{rise}		3	ns	$C_L \leq 30\text{ pF}$
Signal Fall Time	t_{fall}		3	ns	$C_L \leq 30\text{ pF}$

NOTE 1. All timing values are measured relative to 50% of voltage level

NOTE 2. Clock rise and fall times are measured from V_{IL} to V_{IH} of voltage level



Reliability and Durability

Temperature	Operation: -25°C / 85°C Storage: -40°C (168h) / 85°C (500h) Junction temperature: max. 95°C
Moisture and corrosion	Operation: 25°C / 95% rel. humidity Stress: 40°C / 93% rel. hum./500h Salt Water Spray: 3% NaCl/35C; 24h acc. MIL STD Method 1009
ESD protection	Contact Pads: +/-4kV, Human body model according to ANSI EOS/ESD-S5.1-1998 Non Contact Pads area: +/-8kV(coupling plane discharge) +/-15kV(air discharge) Human body model according to IEC61000-4-2
UV light exposure	UV: 200nm, 15Ws/cm ² according to ISO 7816-1
Visual inspection Shape and form	No warp page; no mold skin; complete form; no cavities surface smoothness sigma -0.1 mm/cm ² within contour; no cracks; no pollution (fat, oil dust, etc.)

Above technical information is based on MMC4.2 standard specification and tested to be reliable, but SPI mode would not be supported. Transcend makes no warranty, either expressed or implied, as to its accuracy and assumes no liability in connection with the use of this product. Transcend reserves the right to make changes in specifications at any time without prior notice