

TS256~512MUSD80

80x microSD Memory Card

Description

Transcend microSD Card is non-volatile, which means no external power is required to retain the information stored on it. Besides, it is also a solid-state device that without moving parts to skip or break down. Based on original SLC(Single Level Cell) NAND flash chip, Transcend microSD card can offer an incredible combination of fast data transfer, great flexibility, excellent security and incredibly small size.

Features

- ROHS compliant product
- Operating Voltage: 2.7 ~ 3.6V
- Operating Temperature: -25 ~ 85°C
- Durability: 10,000 insertion/removal cycles
- Fully compatible with SD card spec. v1.1
- Comply with SD Association File System Specification
- Mechanical Write Protection Switch with microSD adapter
- SD Host allows MultiMediaCard upward compatibility
- Form Factor: 11mm x 15mm x 1mm

Placement



Front



Back

Pin Definition

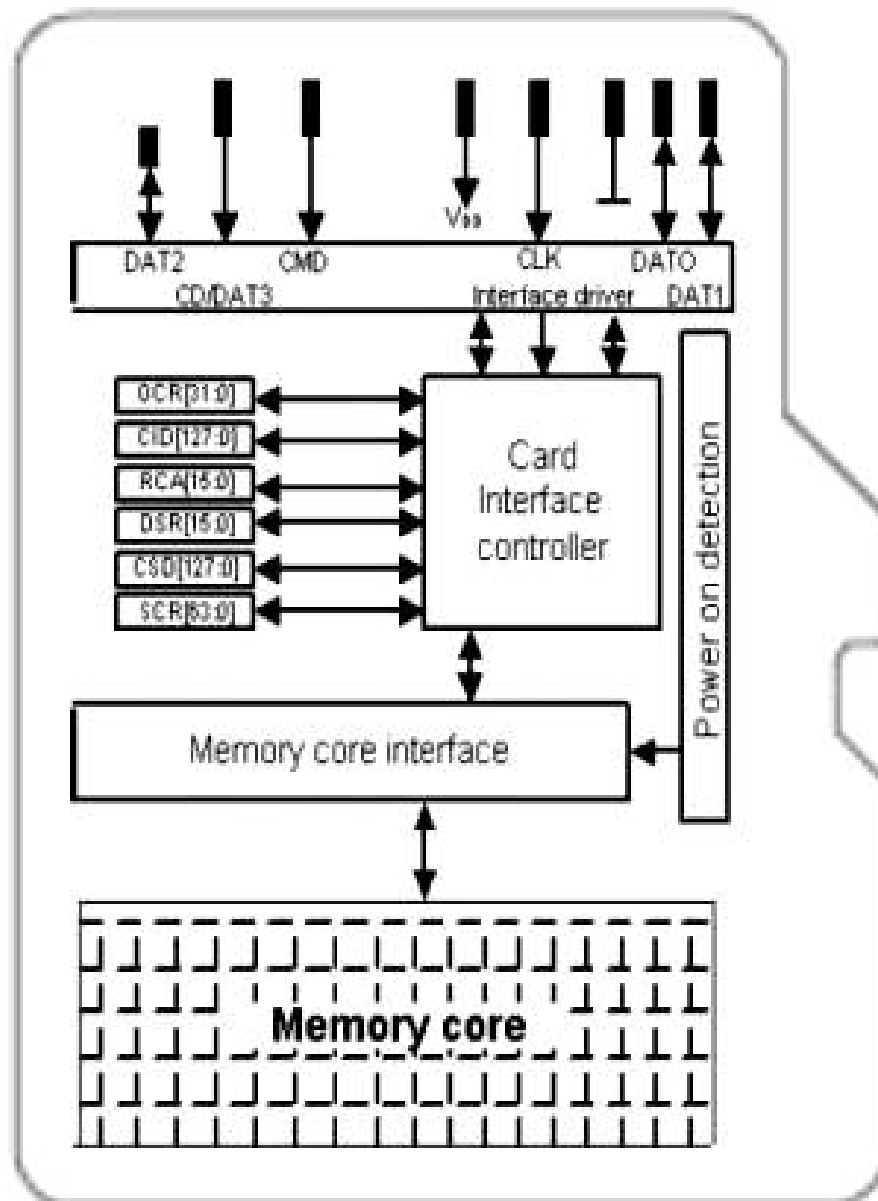
| Pin No. | SD Mode | | | SPI Mode | | |
|---------|-----------------|--------|--------------------------------|-----------------|------|-----------------------|
| | Name | Type | Description | Name | Type | Description |
| 1 | DAT2 | I/O/PP | Data Line [Bit2] | RSV | | Reserved |
| 2 | CD/DAT3 | I/O/PP | Card Detect / Data Line [Bit3] | 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 [Bit0] | DO | O/PP | Data out |
| 8 | DAT1 | I/O/PP | Data Line [Bit1] | RSV | | Reserved |

S: Power Supply; I:Input; O:Output; PP:Push-Pull

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Architecture



Bus Operating Conditions

• General

| Parameter | Symbol | Min. | Max. | Unit | Remark |
|---------------------------|--------|------|---------|------|--------|
| Peak voltage on all lines | | -0.3 | VDD+0.3 | V | |
| All Inputs | | | | | |
| Input Leakage Current | | -10 | 10 | μA | |
| All Outputs | | | | | |
| Output Leakage Current | | -10 | 10 | μA | |

• Power Supply Voltage

| Parameter | Symbol | Min. | Max. | Unit | Remark |
|---|-----------------|------|------|------|-------------------------------------|
| Supply voltage | V _{DD} | 2.0 | 3.6 | V | CMD0, 15,55,ACMD41 commands |
| Supply voltage specified in OCR register | | | | | Except CMD0, 15,55, ACMD41 commands |
| Supply voltage differentials (V _{SS1} , V _{SS2}) | | -0.3 | 0.3 | V | |
| Power up time | | | 250 | ms | From 0v to V _{DD} Min. |

Note. The current consumption of any card during the power-up procedure must not exceed 10 mA.

• Bus Signal Line Load

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

$$C_L = C_{HOST} + C_{BUS} + N \cdot C_{CARD}$$

Where N is the number of connected cards. Requiring the sum of the host and bus capacitances not to exceed 30 pF for up to 10 cards, and 40 pF for up to 30 cards, the following values must not be exceeded:

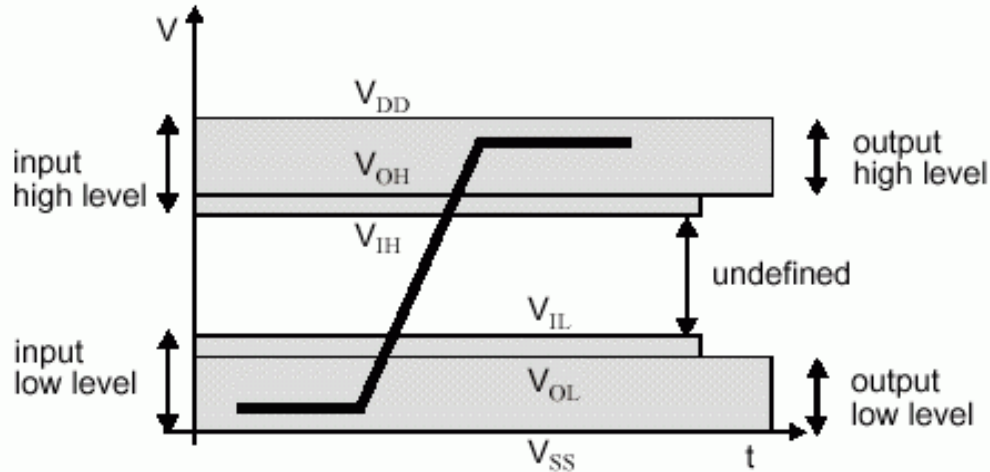
| Parameter | Symbol | Min. | Max. | Unit | Remark |
|---------------------------------------|-------------------|------|------|------|-----------------------------------|
| Bus signal line capacitance | C _L | | 100 | pF | f _{PP} ≤ 20 MHz, 7 cards |
| Single card capacitance | C _{CARD} | | 10 | pF | |
| Maximum signal line inductance | | | 16 | nH | f _{PP} ≤ 20 MHz |
| Pull-up resistance inside card (pin1) | R _{DAT3} | 10 | 90 | KΩ | May be used for card detection |

Note that the total capacitance of CMD and DAT lines will be consist of C_{HOST}, C_{BUS} and one C_{CARD} only since they are connected separately to the SD Memory Card host.

| Parameter | Symbol | Min. | Max. | Unit | Remark |
|-----------------------------|-------------------------------------|------|------|------|-----------------------------------|
| Pull-up resistance | R _{CMD} , R _{DAT} | 10 | 100 | KΩ | To prevent bus floating |
| Bus signal line capacitance | C _L | | 250 | pF | f _{PP} ≤ 5 MHz, 21 cards |

• Bus Signal Levels

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



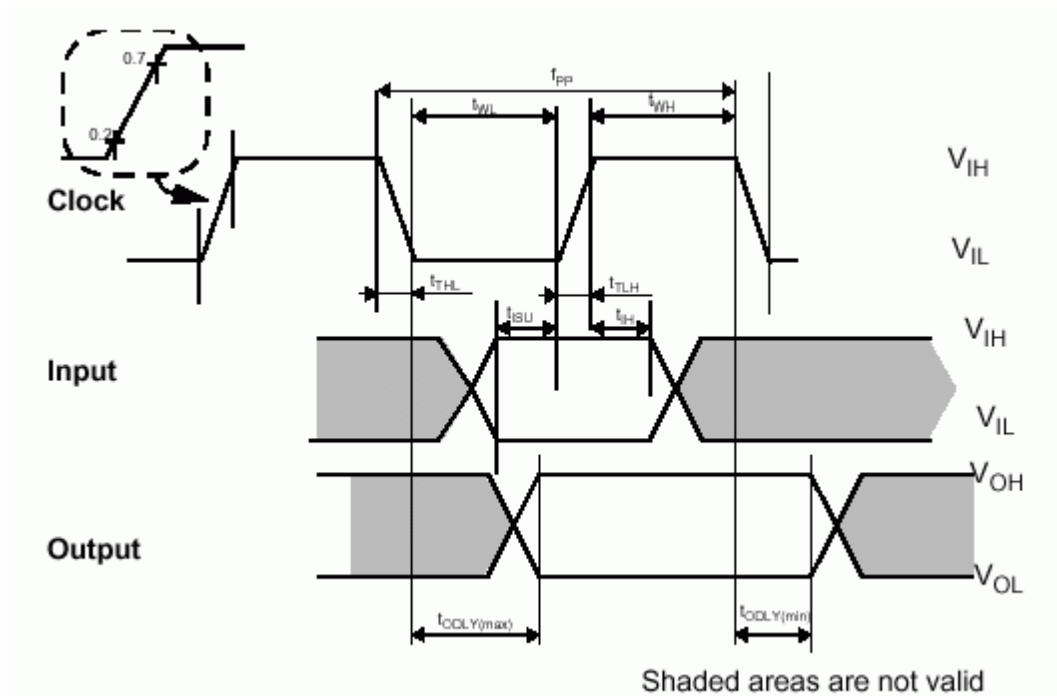
To meet the requirements of the JEDEC specification JESD8-1A, the card input and output voltages shall be within the following specified ranges for any V_{DD} of the allowed voltage range:

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

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• Bus Timing



| Parameter | Symbol | Min | Max. | Unit | Remark |
|--|------------|-----|------|------|-------------------------------|
| Clock CLK (All values are referred to min (V_{IH}) and max (V_{IL})) | | | | | |
| Clock frequency Data Transfer Mode | f_{PP} | 0 | 25 | MHz | $C_L \leq 100$ pF, (7 cards) |
| Clock frequency Identification Mode (The low freq. is required for MultiMediaCard compatibility.) | f_{OD} | 0 | 400 | KHz | $C_L \leq 250$ pF, (21 cards) |
| Clock low time | t_{WL} | 10 | | ns | $C_L \leq 100$ pF, (7 cards) |
| | | 50 | | ns | $C_L \leq 250$ pF, (21 cards) |
| Clock high time | t_{WH} | 10 | | ns | $C_L \leq 100$ pF, (7 cards) |
| | | 50 | | ns | $C_L \leq 250$ pF, (21 cards) |
| Clock rise time | t_{TLH} | | 10 | ns | $C_L \leq 100$ pF, (7 cards) |
| | | | 50 | ns | $C_L \leq 250$ pF, (21 cards) |
| Clock fall time | t_{THL} | | 10 | ns | $C_L \leq 100$ pF, (7 cards) |
| | | | 50 | ns | $C_L \leq 250$ pF, (21 cards) |
| Inputs CMD, DAT (referenced to CLK) | | | | | |
| Input set-up time | t_{ISU} | 5 | | ns | $C_L \leq 25$ pF, (1 cards) |
| Input hold time | t_{IH} | 5 | | ns | $C_L \leq 25$ pF, (1 cards) |
| Outputs CMD, DAT (referenced to CLK) | | | | | |
| Output Delay time | t_{ODLY} | 0 | 14 | ns | $C_L \leq 25$ pF, (1 cards) |

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Reliability and Durability

| | |
|------------------------|--|
| Temperature | Operation: -25°C / 85°C (Target spec) Storage: -40°C (168h) / 85°C (500h) Junction temperature: max. 95°C |
| Moisture and corrosion | Operation: 25°C / 95% rel. humidity Storage: 40°C / 93% rel. hum./500h Salt Water Spray: 3% NaCl/35C; 24h acc. MIL STD Method 1009 |
| Durability | 10000 mating cycles |
| Bending | 10N |
| Torque | 0.10N*m , +/- 2.5deg max |
| Drop test | 1.5m free fall |
| UV light exposure | UV: 254nm, 15Ws/cm ² according to ISO 7816-1 |
| Visual inspection | No warppage; no mold skin; complete form; no cavities surface smoothness <= -0.1 |
| Shape and form | mm/cm ² within contour; no cracks; no pollution (fat, oil dust, etc.) |

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