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You can read the recommendations in the user guide, the technical guide or the installation guide for TRANSCEND TS16GUSDHC2. You'll find the answers to all your questions on the TRANSCEND TS16GUSDHC2 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

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microSDHC2 Card series

4-32GB High Capacity microSD Card

Description

Transcend High Capacity microSD Card series are specifically designed to meet the High Capacity, High Definition Audio and Video requirement for the latest Digital Cameras, DV Recorders, Mobile Phones, etc. The new defined Speed Class enables the host to support AV applications to perform real time recording to the microSD memory card.

Features

- RoHS compliant product.
- Operating Voltage: 2.7 ~ 3.6V
- Operating Temperature: -25 ~ 85°C
- Durability: 10,000 insertion/removal cycles
- Compatible with SD Specification Ver. 2.0
- Comply with SD File System Specification Ver. 2.0
- Supports Speed Class Specification Class 2
- Supports Copy Protection for Recorded Media (CPRM) for SD-Audio
- 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 [Bk2]	RSV		Reserved
2	CD/DAT3	I/O,PP	Card Detect / Data Line [Bk3]	CS	I	Chip Select
3	CMD	PP	Command / Response	DI	I	Data In
4	Vcc	S	Supply voltage	Vcc	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	Vss	S	Supply voltage ground	Vss	S	Supply voltage ground
7	DAT0	I/O,PP	Data Line [Bk0]	DO	O/PP	Data out
8	DAT1	I/O,PP	Data Line [Bk1]	RSV		Reserved

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

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Manual abstract:

The new defined Speed Class enables the host to support AV applications to perform real time recording to the microSD memory card. 4~32GB High Capacity microSD Card Features RoHS compliant product. Operating Voltage: 2.7 ~ 3.6V Operating Temperature: -25 ~ 85° C Durability: 10,000 insertion/removal cycles Compatible with SD Specification Ver. 2.0 Comply with SD File System Specification Ver. 2.0 Supports Speed Class Specification Class 2 Supports Copy Protection for Recorded Media (CPRM) Placement 12345678 for SD-Audio Form Factor: 11mm x 15mm x 1mm Front Pin Definition Back SD Mode Pin No. Name 1 2 3 4 5 6 7 DAT2 CD/DAT3 CMD VDD CLK VSS DAT0 DAT1 Type I/O/PP I/O/PP PP S I S I/O/PP I/O/PP Description Data Line [Bit2] Card Detect / Data Line [Bit3] Command / Response Supply voltage Clock Supply voltage ground Data Line [Bit0] Data Line [Bit1] Name RSV CS DI VDD SPI Mode Type Reserved I I S I S O/PP Chip Select Data In Supply voltage Description SCLK VSS Clock Supply voltage ground DO RSV Data out Reserved 8 S: Power Supply; I:Input; O:Output; PP:Push-Pull Transcend Information Inc.

1 microSDHC2 Card series Architecture 4~32GB High Capacity microSD Card Transcend Information Inc. 2 microSDHC2 Card series Bus Operating Conditions · General Parameter Peak voltage on all lines All Inputs Input Leakage Current All Outputs Output Leakage Current -10 -10 4~32GB High Capacity microSD Card Symbol Min. -0.3 Max. VDD+0.

3 10 10 Unit V μA μA Remark · Power Supply Voltage Parameter Supply voltage Output High Voltage Output Low Voltage Input High Voltage Input Low Voltage Power up time Symbol VDD VOH VOL VIH VIL Min. 2.7 0.75* VDD Max. 3.

6 0.125* VDD Unit V V V V V ms Remark IOH=-100μA@VDD Min. IOL=100μA@VDD Min. 0.625* VDD VDD+0.3 VSS-0.3 0.25* VDD 250 From 0v to VDD Min. · Current Consumption The current consumption is measured by averaging over 1 second. · Before first command: Maximum 15 mA · During initialization: Maximum 100 mA · Operation in Default Mode: Maximum 100 mA · Operation in High Speed Mode: Maximum 200 mA · Operation with other functions: Maximum 500 mA.

· Bus Signal Line Load The total capacitance CL the CLK line of the SD Memory Card bus is the sum of the bus master capacitance CHOST, the bus capacitance CBUS itself and the capacitance CCARD of each card connected to this line: $CL = CHOST + CBUS + *CCARD$ Where N is the number of connected cards. Parameter Pull-up resistance Bus signal line capacitance Symbol RCMD RDAT CL Min. 10 Max. 100 40 Unit k pF Remark To prevent bus floating 1 card CHOST+CBUS shall not exceed 30 pF Transcend Information Inc. 3 microSDHC2 Card series Single card capacitance Maximum signal line inductance Pull-up resistance inside card (pin1) RDAT3 10 CCARD 4~32GB High Capacity microSD Card 10 16 90 pF nH k fPP 20 MHz May be used for card detection Note that the total capacitance of CMD and DAT lines will be consist of CHOST, CBUS and one CCARD only because they are connected separately to the SD Memory Card host. Host should consider total bus capacitance for each signal as the sum of CHOST, CBUS, and CCARD, these parameters are defined by per signal. The host can determine CHOST and CBUS so that total bus capacitance is less than the card estimated capacitance load (CL=40 pF). The SD Memory Card guarantees its bus timing when total bus capacitance is less than maximum value of CL (40 pF). Transcend Information Inc. 4 microSDHC2 Card series · Bus Signal Levels 4~32GB High Capacity microSD Card 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 and JESD8-7, the card input and output voltages shall be within the following specified ranges for any VDD of the allowed voltage range: Parameter Output HIGH voltage Output LOW voltage Input HIGH voltage Input LOW voltage Symbol VOH VOL VIH VIL Min. 0.75* VDD Max. 0.125* VDD Unit V V V V Remark IOH = -100 μA @VDD min IOL = -100 μA @VDD min 0.625* VDD VSS 0.3 VDD + 0.3 0.25* VDD Transcend Information Inc. 5 microSDHC2 Card series · Bus Timing 4~32GB High Capacity microSD Card Parameter Clock frequency Data Transfer Mode Clock frequency Identification Mode Clock low time Clock high time Clock rise time Clock fall time Inputs CMD, DAT (referenced to CLK) Input set-up time Input hold time Symbol fPP fOD tWL tWH tTLH tTHL tISU tIH 6 Min 0 0(1)/100 10 10 Max. 25 400 Unit MHz KHz ns ns Remark CCARD 10 pF, (1 card) CCARD 10 pF, (1 card) CCARD 10 pF, (1 card) CCARD 10 pF, (1 card) CCARD 10 pF, (1 card) CCARD 10 pF, (1 card) CCARD 10 pF, (1 card) Clock CLK (All values are referred to min (VIH) and max (VIL)) 10 10 5 5 ns ns ns ns Transcend Information Inc. microSDHC2 Card series Outputs CMD, DAT (referenced to CLK) Output Delay time during Data Transfer Mode tODLY 0 4~32GB High Capacity microSD Card 14 ns CL 40 pF, (1 card) CL 40 pF, (1 card) Output Delay time during Identification Mode tODLY 0 50 ns (1) 0 Hz means to stop the clock. @@humidity C Storage: 40° / 93% rel. hum./500h C Salt Water Spray: 3% NaCl/35C; 24h acc. MIL STD Method 1009 10.000 mating cycles; test procedure: tbd. @@@@These can be accessed only by corresponding commands. @@OCR register The 32-bit operation conditions register stores the VDD voltage profile of the card. Additionally, this register includes status information bits.

One status bit is set if the card power up procedure has been finished. This register includes another status bit indicating the card capacity status after set power up status bit. The OCR register shall be implemented by the cards. The 32-bit operation conditions register stores the VDD voltage profile of the card.

Bit 7 of OCR is newly defined for Dual Voltage Card and set to 0 in default. If a Dual Voltage Card does not receive CMD8, OCR bit 7 in the response indicates 0, and the Dual Voltage Card which received CMD8, sets this bit to 1. Additionally, this register includes 2 more status information bits. Bit 31 - Card power up status bit, this status bit is set if the card power up procedure has been finished. Bit 30 - Card capacity status bit, this status bit is set to 1 if card is High Capacity SD Memory Card. 0 indicates that the card is Standard Capacity SD Memory Card.

The Card Capacity status bit is valid after the card power up procedure is completed and the card power up status bit is set to 1. The Host shall read this status bit to identify a Standard or High Capacity SD Memory Card. The OCR register shall be implemented by the cards. OCR Register Definition 1) This bit is valid only when the card power up status bit is set.



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2) This bit is set to LOW if the card has not finished the power up routine.

Transcend Information Inc. 11 microSDHC2 Card series 4~32GB High Capacity microSD Card A voltage range is not supported if the corresponding bit value is set to LOW. As long as the card is busy, the corresponding bit (31) is set to LOW. 2. @@@@The "m" field [11:8] is the month code.

1 = January. The "y" field [19:12] is the year code. 0 = 2000. @@@@CSD Version 2.0 is applied to only the High Capacity SD Memory Card.

@@@The Cell Type field is coded as follows: R = readable, W(1) = writable once, W = multiple writable. Transcend Informe and R2W_FACTOR. @@@@The COPY bit is an one time programmable bit. · PERM_WRITE_PROTECT Permanently protects the whole card content against overwriting or erasing (all write and erase commands for this card are permanently disabled). The default value is '0', i.

e. not permanently write protected. · TMP_WRITE_PROTECT Temporarily protects the whole card content from being overwritten or erased (all write and erase commands for this card are temporarily disabled). This bit can be set and reset. The default value is '0', i.e. not write protected. · FILE_FORMAT This field is set to 0. Host should not use this field. · CRC The CRC field carries the check sum for the CSD contents.

The checksum has to be recalculated by the host for any CSD modification. The default corresponds to the initial CSD contents. The following table lists the correspondence between the CSD entries and the command classes. A '+' entry indicates that the CSD field affects the commands of the related command class. Transcend Information Inc.

18 microSDHC2 Card series 4~32GB High Capacity microSD Card 4. RCA Register The writable 16-bit relative card address register carries the card address that is published by the card during the card identification. This address is used for the addressed host-card communication after the card identification procedure. The default value of the RCA register is 0x0000. The value 0x0000 is reserved to set all cards into the Stand-by State with CMD7. 5. DSR Register (Optional) The 16-bit driver stage register is described in detail in Chapter 6.5. It can be optionally used to improve the bus performance for extended operating conditions (depending on parameters like bus length, transfer rate or number of cards). The CSD register carries the information about the DSR register usage. @@@@The size of SCR register is 64 bit. @@The following table describes the SCR register content. · SCR_STRUCTURE Version number of the related SCR structure in the SD Memory Card Physical Layer Specification. SCR Register Structure Version · SD_SPEC Describes the SD Memory Card Physical Layer Specification version supported by this card. SD_SPEC 0 1 2 3-15 Physical Layer Specification Version Number Version 1.

0-1.01 Version 1.10 Version 2.00 reserved Physical Layer Specification Version · DATA_STAT_AFTER_ERASE Transcend Information Inc. 20 microSDHC2 Card series 4~32GB High Capacity microSD Card Defines the data status after erase, whether it is '0' or '1' (the status is card vendor dependent). · SD_SECURITY Describes the security algorithm supported by the card. SD Supported Security Algorithm Note that it is mandatory for a regular writable SD Memory Card to support Security Protocol. For ROM (Read Only) and OTP (One Time Programmable) types of the SD Memory Card, the security feature is optional. In the case of Standard Capacity SD Memory Card, this field shall be set to 2 (Version 1.01).

In the case of High Capacity SD Memory Card, this field shall be set to 3 (Version 2.00). · SD_BUS_WIDTHS Describes all the DAT bus widths that are supported by this card. Since SD Memory Card shall support at least the two bus modes 1bit or 4bit width then any SD Card shall set at least bits 0 and 2 (SD_BUS_WIDTH="0101"). Transcend Information Inc.

21 microSDHC2 Card series Mechanical Dimension 4~32GB High Capacity microSD Card Mechanical Description: Top View Transcend Information Inc.

22 microSDHC2 Card series 4~32GB High Capacity microSD Card Mechanical Description: Bottom View Transcend Information Inc. 23 microSDHC2

Card series 4~32GB High Capacity microSD Card Mechanical Description: Keep Out Area Transcend Information Inc. 24 microSDHC2 Card series

4~32GB High Capacity microSD Card microSD package: Dimensions Transcend Information Inc. 25 .



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