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You can read the recommendations in the user guide, the technical guide or the installation guide for TRANSCEND SDXC CLASS 10 CARD. You'll find the answers to all your questions on the TRANSCEND SDXC CLASS 10 CARD 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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Transcend

Rev. 1.0

SDXC Card series

64GB Extended Capacity Secure Digital Card

Description

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

Features

- ROHS compliant product.
- Card Lid material: PC + ABS
- Operating Voltage: 2.7 ~ 3.6V
- Operating Temperature: -25 ~ 85°C
- Durability: 10,000 insertion/removal cycles
- Compatible with SD Specification Ver. 3.0
- Mechanical Write Protection Switch
- Supports Speed Class 10 Specification
- Supports Copy Protection for Recorded Media (CPRM) for SD-Audio
- Support exFAT file system
- Form Factor: 24mm x 32mm x 2.1mm

Placement

Front Back

Pin Definition

Pin No.	SD Mode			SPI Mode		
	Name	Type	Description	Name	Type	Description
1	CD/DAT	I/O/PP	Card Detect/Data Line [Bit3]	CS	I	Chip Select (neg true)
2	CMD	PP	Command/Response	DI	I	Data In
3	V_{SS1}	S	Supply voltage ground	VSS	S	Supply voltage ground
4	V_{DD}	S	Supply voltage	VDD	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	V_{SS2}	S	Supply voltage ground	VSS2	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		
9	DAT2	I/O/PP	Data Line [Bit2]	RSV		

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Manual abstract:

1.0 SDXC Card series Description Transcend secured digital extended capacity Card series are specifically designed to meet the High Capacity, High Definition Audio and Full HD Video requirement for the latest Digital Cameras, DV Recorders, Mobile, etc,. The new defined Speed Class enables the host to support AV applications to perform real time recording to the SD memory card. 64GB Extended Capacity Secure Digital Card Features · · · · · · · · ROHS compliant product. Card Lid material: PC + ABS Operating Voltage: 2.7 ~ 3.6V Operating Temperature: -25 ~ 85° C Durability: 10,000 insertion/removal cycles Compatible with SD Specification Ver. 3.0 Mechanical Write Protection Switch Supports Speed Class 10 Specification Supports Copy Protection for Recorded Media (CPRM) for SD-Audio · · Support exFAT file system Form Factor: 24mm x 32mm x 2.1mm Placement · Front Back Pin Definition Pin No. 1 2 3 4 5 6 7 8 9 Name Type SD Mode Description Name CS DI VSS VDD SCLK VSS2 DO RSV RSV Type I I S S I S O/PP SPI Mode Description Chip Select (neg true) Data In Supply voltage ground Supply voltage Clock Supply voltage ground Data Out CD/DAT I/O/PP Card Detect/Data Line [Bit3] CMD VSS1 VDD CLK VSS2 DAT0 DAT1 DAT2 PP S S I S Command/Response Supply voltage ground Supply voltage Clock Supply voltage ground I/O/PP Data Line [Bit0] I/O/PP Data Line [Bit1] I/O/PP Data Line [Bit2] Transcend Information Inc. 1 Rev. 1.0 SDXC Card series 1.0 Architecture 64GB Extended Capacity Secure Digital Card Transcend Information Inc.

2 Rev. 1.0 SDXC Card series 2.0 Hardware Interface 2.1 General Parameter Peak voltage on all lines All Inputs Input Leakage Current All Outputs Output Leakage Current 64GB Extended Capacity Secure Digital Card Symbol Min.

-0.3 -10 -10 Max. VDD+0.3 10 10 Unit V µA µA Remark 2.0 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=-100uA@VDD Min. IOL=100uA@VDD Min. 0.625* VDD VDD+0.3 VSS-0.3 0.25* VDD 250 From 0v to VDD Min. Transcend Information Inc. 3 Rev. 1.*

0 SDXC Card series 3.0 Power Scheme 3.1 Power Up 64GB Extended Capacity Secure Digital Card Power-up Diagram Power up time is defined as voltage rising time from 0 volt to VDD(min.) and depends on application parameters such as the maximum number of SD Cards, the bus length and the characteristic of the power supply unit. Supply ramp up time provides the time that the power is built up to the operating level (the host supply voltage) and the time to wait until the SD card can accept the first command, The host shall supply power to the card so that the voltage is reached to VDD(min.

) within 250ms and start to supply at least 74 SD clocks to the SD card with keeping CMD line to high. In case of SPI mode, CS shall be held to high during 74 clock cycles. Transcend Information Inc. 4 Rev. @@@@In case of SD host, CMD0 is not necessary.

@@@@The host that does not support CMD8 shall supply high voltage range. ACMD41 is a synchronization command used to negotiate the operation voltage range and to poll the cards until they are out of their power-up sequence. In case the host system connects multiple cards, the host shall check that all cards satisfy the supplied voltage. Otherwise, the host should select one of the cards and initialize 3.2 Power Up time Host needs to keep power line level less than 0.5V and more than 1ms before power ramp up. Transcend Information Inc. 5 Rev. 1.0 SDXC Card series 3.

3 Pow Pow Power On or Power Cycle 64GB Extended Capacity Secure Digital Card Followings are requirements for Power on and Power cycle to assure a reliable SD Card hard reset. (1) Voltage level shall be below 0.5V (2) Duration shall be at least 1ms. 3.4 Pow Sup Power Supply Ramp Up The power ramp up time is defined from 0.5 V threshold level up to the operating supply voltage which is stable between VDD(min.) and VDD(max.) and host can supply SDCLK. Followings are recommendation of Power ramp up: (1) Voltage of power ramp up should be monotonic as much as possible. (2) The minimum ramp up time should be 0.

1ms. (3) The maximum ramp up time should be 35ms for 2.7-3.6V power supply. 3.

5 Pow Dow Pow Cy Power Dow n and Power Cycle When the host shuts down the power, the card VDD shall be lowered to less than 0.5 Volt for a minimum period of 1ms. During power down, DAT, CMD, and CLK should be disconnected or driven to logical 0 by the host to avoid a situation that the operating current is drawn through the signal lines. If the host needs to change the operating voltage, a power cycle is required. Power cycle means the power is turned off and supplied again.

Power cycle is also needed for accessing cards that are already in Inactive State. To create a power cycle the host shall follow the power down description before power up the card (i.e. the card VDD shall be once lowered to less than 0.5 Volt for a minimum period of 1ms). 3.6 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. Transcend Information Inc. 6 Rev.

1.0 SDXC Card series 4.0 Bus Signal 4.1 Bus Signal Levels 64GB Extended Capacity Secure Digital 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. 7 Rev. 1.*

0 SDXC Card series 4.2 Bus Timing (Default speed mode) 64GB Extended Capacity Secure Digital Card Card Input Timing (Default Speed Mode) Card Output Timing (Default Speed Mode) Transcend Information Inc. 8 Rev. 1.0 SDXC Card series 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 Outputs CMD, DAT (referenced to CLK) Output Delay time during Data Transfer Mode tODLY tISU tIH 64GB Extended Capacity Secure Digital Card Symbol fPP fOD tWL tWH tTLH tTHL 5 5 0 14 Min 0 0(1)/100 10 10 Max.

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*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) CCARD 10 pF, (1 card) CL 40 pF, (1 card) Clock CLK (All values are referred to min (VIH) and max (VIL) 10 10 ns ns ns ns ns CL 40 pF, (1 card) Output Delay time during Identification Mode tODLY 0 50 ns * 0 Hz means to stop the clock. The given minimum frequency range is for cases were continues clock is required Transcend Information Inc. 9 Rev. 1.0 SDXC Card series 4.3 Bus Timing (High Speed Mode) 64GB Extended Capacity Secure Digital Card Card Input Timing (High Speed Mode) Card Output Timing (High Speed Mode) Transcend Information Inc. 10 Rev. 1.0 SDXC Card series Parameter Clock frequency Data Transfer 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 Outputs CMD, DAT (referenced to CLK) Output Delay time during Data Transfer Mode Output Hold time 1 64GB Extended Capacity Secure Digital Card Symbol fPP tWL tWH tTLH tTHL tISU tIH tODLY tOH 2.5 40 6 2 14 Min 0 7 7 Max.*

*50 Unit MHz 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) CL 40 pF, (1 card) CL 40 pF, (1 card) (1 card) Clock CLK (All values are referred to min (VIH) and max (VIL) 3 3 ns ns ns ns ns ns pF Total System capacitance for each line CL * In order to satisfy severe timing, host shall drive only one card. * TS64GSDXC10 does not support UHS-I mode. 4.4 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 Single card capacitance Maximum signal line inductance Pull-up resistance inside card (pin1) CCARD RDAT3 10 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 Transcend Information Inc. 11 Rev. 1.0 SDXC Card series connected separately to the SD Memory Card host.*

64GB Extended Capacity Secure Digital Card 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). 4.5 Timeout Condition Access time Read Access time Write Access time Erase Access time Timeout Condition 100ms (Maximum for Single/Multiple Read) 500ms (Maximum for Single/Multiple Write) 250ms (Maximum for Erase) Transcend Information Inc.

12 Rev. 1.0 SDXC Card series 5.0 Register Information 64GB Extended Capacity Secure Digital Card Within the card interface six registers are defined: OCR, CID, CSD, RCA, DSR and SCR. These can be accessed only by corresponding commands.

The OCR, CID, CSD and SCR registers carry the card/content specific information, while the RCA and DSR registers are configuration registers storing actual configuration parameters. 5.1 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, 0 indicates that the card is SDSC. 1 indicates that the card is SDHC or SDXC. The Card Capacity Status bit is valid after the card power up procedure is completed and the card power up status The OCR register shall be implemented by the cards. Transcend Information Inc. 13 Rev. 1.0 SDXC Card series 64GB Extended Capacity Secure Digital Card OCR Register Definition 1) This bit is valid only when the card power up status bit is set. @@3) Only UHS-I card supports this bit.

*A voltage range is not supported 75:70] [69:48] [47:47] [46:46] [45:39] [38:32] [31:31] [30:29] [28:26] [25:22] [21:21] [20:16] [15:15] [14:14] [13:13] [12:12] [11:10] 32h, 5Ah, 0Bh or 2Bh R 01x110110101b 9 0 0 0 x 00 0000b xxxxxxh 0 1 7Fh 0000000b 0 00b 010b 9 0 00000b 0 x x x 00b R R R R R R R R R R R R R R R R R R R R/W(1) R/W(1) R/W R partial blocks for read allowed (READ_BL_PARTIAL) write block misalignment read block misalignment DSR implemented reserved device size reserved erase single block enable erase sector size write protect group size write protect group enable reserved write speed factor max. @@@@

· 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.
5.4 5.4 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 value0x0000 is reserved to set all cards into the Stand-by State with CMD7. 5. DSR Register (Optional) 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 default value of the DSR register is 0x404.

Transcend Information Inc. 22 Rev. 1.0 SDXC Card series 6. SCR Register 64GB Extended Capacity Secure Digital Card In addition to the CSD register there is another configuration register that named - SD CARD Configuration Register (SCR). SCR provides information on SD Memory Card's special features that were configured into the given card. The size of SCR register is 64 bit. This register shall be set in the factory by the SD Memory Card manufacturer. The following table describes the SCR register content. Description SCR Structure SD Memory Card - Spec.
Version data_status_after erases CPRM Security Support DAT Bus widths supported Spec. Version 3.00 or higher Extended Security Support Reserved Command Support bits reserved for manufacturer usage Field SCR_STRUCTURE SD_SPEC DATA_STAT_AFTER_ERASE SD_SECURITY SD_BUS_WIDTHS SD_SPEC3 EX_ SECURITY Width 4 4 1 3 4 1 4 9 Cell Type R R R R R R R R R R SCR Slic e [63:60] [59:56] [55:55] [54:52] [51:48] [47] [46:43] [42:34] [33:32] [31:0] CMD_SUPPORT - 14 32 The SCR Fields · SCR_STRUCTURE Version number of the related SCR structure in the SD Memory Card Physical Layer Specification. SCR_STRUCTURE SCR structure version 0 1-15 SCR version 1.0 reserved SD Physical Layer Specification Version Version 1.
01-3.00 SCR Register Structure Version Transcend Information Inc. 23 Rev. 1.0 SDXC Card series · SD_SPEC 64GB Extended Capacity Secure Digital Card 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 or Version 3.00 (Refer to SD_SPEC3) reserved Physical Layer Specification Version · SD_SPEC3 SD_SPEC 2 2 SD_SPEC3 0 1 Physical Layer Specification Version Number Version 2.00 Version 3.00 The card manufacturer determines SD_SPEC value by conditions indicated below. All conditions shall be satisfied for each version. The other combination of conditions is not allowed.

Essential conditions to indicate Version 3.00 Card (SD_SPEC=2 and SD_SPEC3=1) (1) The card shall support CMD6 (2) The card shall support CMD8 (3) The card shall support CMD42 (4) User area capacity shall be up to 2GB (SDSC) or 32GB (SDHC) User area capacity shall be more than or equal to 32GB and up to 2TB (SDXC) (5) Speed Class shall be supported (SDHC or SDXC) Application Notes: When checking SD_SPEC version in SCR, the host shall not forget that higher SD_SPEC version may be specified in future. It is important to keep compatibility for future version. Transcend Information Inc. 24 Rev. 1.0 SDXC Card series · DATA_STAT_AFTER_ERASE 64GB Extended Capacity Secure Digital Card Defines the data status after erase, whether it is '0' or '1' (the status is card vendor dependent). · SD_SECURITY This field indicates CPRM Security Specification Version for each capacity card. The definition of Protected Area is different in each capacity card. SD_SECURITY 0 1 2 3 4 5-7 CPRM Security Version No Security Not Used SDSC Card (Security Version 1. 01) SDHC Card (Security Version 2.00) SDXC Card (Security Version 3.xx) Reserved CPRM Security Version The basic rule of setting this field: SDSC Card sets this field to 2 (Version 1.01) SDHC Card sets this field to 3 (Version 2.00).
SDXC Card sets this field to 4 (Version 3.xx). Note that it is mandatory for a regular writable SD Memory Card to support Security Protocol.
@@@@@@@@95° C Moisture and corrosion Operation: 25° / 95% rel. humidity C Storage: 40° / 93% rel.
hum./500h C Salt Water Spray: 3% NaCl/35C; 24h acc. MIL STD Method 1009 Durability Bending Torque Drop test Visual inspection Shape and form WP Switch cycles 10.000 mating cycles; test procedure: tbd. 10N 0.15N.m or +/-2.5 deg 1.5m free fall No warp page; no mold skin; complete form; no cavities surface smoothness <= -0.1 mm/cm² within contour; no cracks; no pollution (fat, oil dust, etc.

) minimum 1000 Cycles(@Slide force 0.4N to 5N) Minimum moving force of WP witch 40gf (Ensures that the WP switch will not slide while it is inserted to the connector.) Transcend Information Inc. 27 Rev. 1.0 SDXC Card series 7.0 Mechanical Dimension 64GB Extended Capacity Secure Digital Card Transcend Information Inc. 28 Rev. 1.0 SDXC Card series 64GB Extended Capacity Secure Digital Card Transcend Information Inc.
29 Rev. 1.0 SDXC Card series 64GB Extended Capacity Secure Digital Card Transcend Information Inc. 30 .

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