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You can read the recommendations in the user guide, the technical guide or the installation guide for TRANSCEND TS8GSDHC10I. You'll find the answers to all your questions on the TRANSCEND TS8GSDHC10I in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

**User manual TRANSCEND TS8GSDHC10I**  
**User guide TRANSCEND TS8GSDHC10I**  
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**TS4G~8GSDHC10I**

4G~8G Industrial High Capacity Secure Digital Card

**Description**

Secure Digital Card is a compact, slim and high capacity storage media with copyright protection. Designed in advanced SD specification Ver.3.0, Transcend Industrial SDHC card now reaches a new performance milestone. Based on 0.16um process controller and high quality Industrial NAND Flash chip, Transcend Industrial SDHC card can provide high performance, low power consumption yet excellent reliability.

- Performance up to speed class 10
- Operating Temperature : -40 ~ 85°C

**Features**

- RoHS compliant product.
- Card Lid material: PC + ABS
- Operating Voltage: 2.7 ~ 3.6V
- Operating Temperature: -40 ~ 85°C
- Durability: 10,000 insertion/removal cycles
- Compatible with SD Specification Ver. 3.0
- Mechanical Write Protection Switch
- Supports Speed Class Specification up to Class 10
- Supports Copy Protection for Recorded Media (CPRM) for SD-Audio
- 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 <sup>3</sup>	Card Detect/Data Line [Bit3]	CS	I	Chip Select (neg true)
2	CMD	PP	Command/Response	DI	I	Data In
3	V <sub>SS1</sub>	S	Supply voltage ground	VSS	S	Supply voltage ground
4	V <sub>CC1</sub>	S	Supply voltage	VDD	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	V <sub>SS2</sub>	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:

Designed in advanced SD specification Ver.3.0, Transcend Industrial SDHC card now reaches a new performance milestone. Based on 0.16um process controller and high quality Industrial NAND Flash chip, Transcend Industrial SDHC card can provide high performance, low power consumption yet excellent reliability. -Performance up to speed class 10 -Operating Temperature : -40 ~ 85° C 4G~8G Industrial High Capacity Secure Digital Card Features · RoHS compliant product. · Card Lid material: PC + ABS · Operating Voltage: 2.7 ~ 3.6V · Operating Temperature: -40 ~ 85° C · Durability: 10,000 insertion/removal cycles · Compatible with SD Specification Ver. 3.

0 · Mechanical Write Protection Switch · Supports Speed Class Specification up to Class 10 · Supports Copy Protection for Recorded Media (CPRM) for SD-Audio · Form Factor: 24mm x 32mm x 2.1mm Placement Front Back Pin Definition Pin No. 1 2 3 4 5 6 7 Name Type SD Mode Description Name CS DI VSS VDD SCLK VSS2 DO 1 RSV RSV V1.0 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/PP3 Card Detect/Data Line [Bit3] CMD VSS1 VDD CLK VSS2 DAT0 PP S S I S Command/Response DAT2 I/O/PP Data Line [Bit2] TS4G~8GSDHC10I Architecture 4G~8G Industrial High Capacity Secure Digital Card Transcend Information Inc. 2 V1.0 TS4G~8GSDHC10I Bus Operating Conditions · General Parameter Peak voltage on all lines All Inputs Input Leakage Current All Outputs Output Leakage Current 4G~8G Industrial High Capacity Secure Digital Card Symbol Min. -0.3 -10 -10 Max. VDD+0. 3 10 10 Unit V  $\mu$ A  $\mu$ A 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=-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. · 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  $\Omega$  pF Remark To prevent bus floating 1 card CHOST+CBUS shall not exceed 30 pF Transcend Information Inc. 3 V1.0 TS4G~8GSDHC10I Single card capacitance Maximum signal line inductance Pull-up resistance inside card (pin1) RDAT3 CCARD 4G~8G Industrial High Capacity Secure Digital Card 10 16 10 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. @@@@ @@@@ @95° C 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 Moisture and corrosion Durability Bending Torque Drop test Visual inspection Shape and form WP Switch cycles 10.000 mating cycles 10N 0.15N.m or +/-2.5 deg 1.

5m free fall No warp page; no mold skin; complete form; no cavities surface smoothness  $\leq -0.1$  mm/cm<sup>2</sup> 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. 10 V1.0 TS4G~8GSDHC10I Register Information 4G~8G Industrial High 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. 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. OCR Register Definition Transcend Information Inc. 11 V1.

0 TS4G~8GSDHC10I 4G~8G Industrial High Capacity Secure Digital Card 1) This bit is valid only when the card power up status bit is set. 2) This bit is set to LOW if the card has not finished the power up routine. 3) Only UHS-I card supports this bit. 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. CID Register The Card Identification (CID) register is 128 bits wide. It contains the card identification information used during the card identification phase. Every individual flash card shall have a unique identification number. The structure of the CID register is defined in the following paragraphs: Name Manufacturer ID OEM/Application ID Product name Product revision Product serial number reserved Manufacturing date CRC7 checksum not used, always 1 Field MID OID PNM PRV PSN -MDT CRC Width 8 16 40 8 32 4 12 7 1 CID-slice [127:120] [119:104] [103:64] [63:56] [55:24] [23:20] [19:8] [7:1] [0:0] The CID Fields · MID An 8-bit binary number that identifies the card manufacturer.



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The MID number is controlled, defined, and allocated to a SD Memory Card manufacturer by the SD-3C, LLC. The "m" field [11:8] is the month code. 1 = January. The "y" field [19:12] is the year code. 0 = 2000.

CSD Register 4G~8G Industrial High Capacity Secure Digital Card The CSD Register shows Definition of the CF=8.0 reserved 6:3 7 Maximum Data Transfer Rate Definition Transcend Information Inc. 16 V1.0 TS4G~8GSDHC10I 4G~8G Industrial High Capacity Secure Digital Card Note that for current SD Memory Cards that field must be always 0\_0110\_010b (032h) which is equal to 25MHz - the mandatory maximum operating frequency of SD Memory Card. CCC bit 0 1 .....

The Minimum user area size of SDXC Card is 67,108,864 sectors (32GB). This value is not related to erase operation. However, the host should not use this factor and should use 250 ms for write timeout. WRITE\_BL\_LEN This field is fixed to 9h, which indicates WRITE\_BL\_LEN=512 Byte. WRITE\_BL\_PARTIAL This field is fixed to 0, which indicates partial block read is inhibited and only unit of block access is allowed. FILE\_FORMAT\_GRP This field is set to 0. Host should not use this field. COPY Defines whether the contents is original (=0) or has been copied (=1). Setting this bit to 1 indicates that the card content is a copy. The COPY bit is a one time programmable bit except ROM card. 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 'x' entry indicates that the CSD field affects the commands of the related command class. Transcend Information Inc. 19 V1.0 TS4G~8GSDHC10I 4G~8G Industrial High Capacity Secure Digital Card Transcend Information Inc. 20 V1.0 TS4G~8GSDHC10I 4.

RCA Register 4G~8G Industrial High Capacity Secure Digital Card 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) 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. 6. SCR Register 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. All conditions shall be satisfied for each version. The other combination of conditions is not allowed. It is important to keep compatibility for future version. DATA\_STAT\_AFTER\_ERASE 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 Transcend Information Inc. 23 V1.0 TS4G~8GSDHC10I 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). 4G~8G Industrial High Capacity Secure Digital Card 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. SD\_BUS\_WIDTHS Describes all the DAT bus widths that are supported by this card.

SD\_BUS\_WIDTHS Bit 0 Bit 1 Bit 2 Bit 3 Supported Bus Widths 1 bit (DAT0) reserved 4 bit (DAT0-3) reserved SD Memory Card Supported Bus Widths 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. 24 V1.0 TS4G~8GSDHC10I Mechanical Dimension 4G~8G Industrial High Capacity Secure Digital Card Transcend Information Inc. 25 V1.

0 TS4G~8GSDHC10I 4G~8G Industrial High Capacity Secure Digital Card Transcend Information Inc. 26 V1.0 TS4G~8GSDHC10I 4G~8G Industrial High Capacity Secure Digital Card Transcend Information Inc. 27 V1.0.



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