

CompactFlash Card

AC60-XXXXR04XX



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1. Product Description

1.1 Product Overview

AC60-XXXX is **CompactFlash™** based on flash memory controller technology. This card complies with **CompactFlash™** specification; it is suitable for the usage of data storage memory for PC or other electric equipment and digital still camera. This card is equipped with NAND flash memory. By using this card it is possible to operate stability for the system that has **CompactFlash™** slots.

Fixed mode (045A)~AC60-XXXXRXXX2(4) disk use in system storage, some operating system can not accept boot-up from removable mode (848A)~AC60-XXXXRXXX1(3) disk like windows XP, when we boot-up from CFC with windows XP, the system detect the device will disable Removable device boot-up function, so the system can not finish the boot-up process. For this issue, we can setting the device mode to Fixed mode (045A) to solve this problem.

The CFC setting to Fixed or Removable mode will no any function different or issue.

● **Application Fields;**

- Industrial PC and Thin Client
- Entertainment/Consumer Electronic Device
- Game and Telecommunication Machine
- Ticketing, Examining, testing machine
- Army, Health and Production Equipment and Machine
- Other machines and Equipments with CompactFlash Card Interface

1.2 Product Features

- 32MB~8GB flash memory card.
- CompactFlash™ specification: PCMCIA ver.2.1 and PC Card ATA ver.2.01 compatible 50pin SMT connector and type I (3.3mm).
- 3.3V/5V single power supply operation.
- Internal self-diagnostic program operates at VCC power on.
- 3 variations of access mode: Memory Card Mode, I/O Card Mode, True-IDE Mode
- High reliability based on internal ECC (Error Correcting Code) Function.
- Data reliability is 1 error in 10^{14} bits read.
- Support PIO Mode4 and Ultra DMA mode2.
- Power Consumption (3.3V/5.0V)
- Write protect for read only function only for AC60-XXXXRXXX1 (2, 3, 4).
- High Read/Write Speed

Notice : The performance will depend on different platform with different test result.

1.3 System Requirement

- The Host system which is connected to Industrial CompactFlash Storage Card should meet system requirements at minimum;

1.3.1 Power Requirement

- Voltage: DC +3.3V \pm 5% or DC +5.0V \pm 10%

1.3.2 Operating System

- Windows 98SE/ME/2000/XP/Vista
- Linux
- DOS
- WinXP Embedded
- WinCE

1.3.3 Interface

- PCMCIA ver.2.1 and PC Card ATA ver.2.01 compatible 50pin SMT connector and type I (3.3mm).

2. Specification

2.1 Physical Specifications

2.1.1 Overlook

The overlook views of High Speed Industrial CompactFlash Storage Card are illustrated in Figure 1.

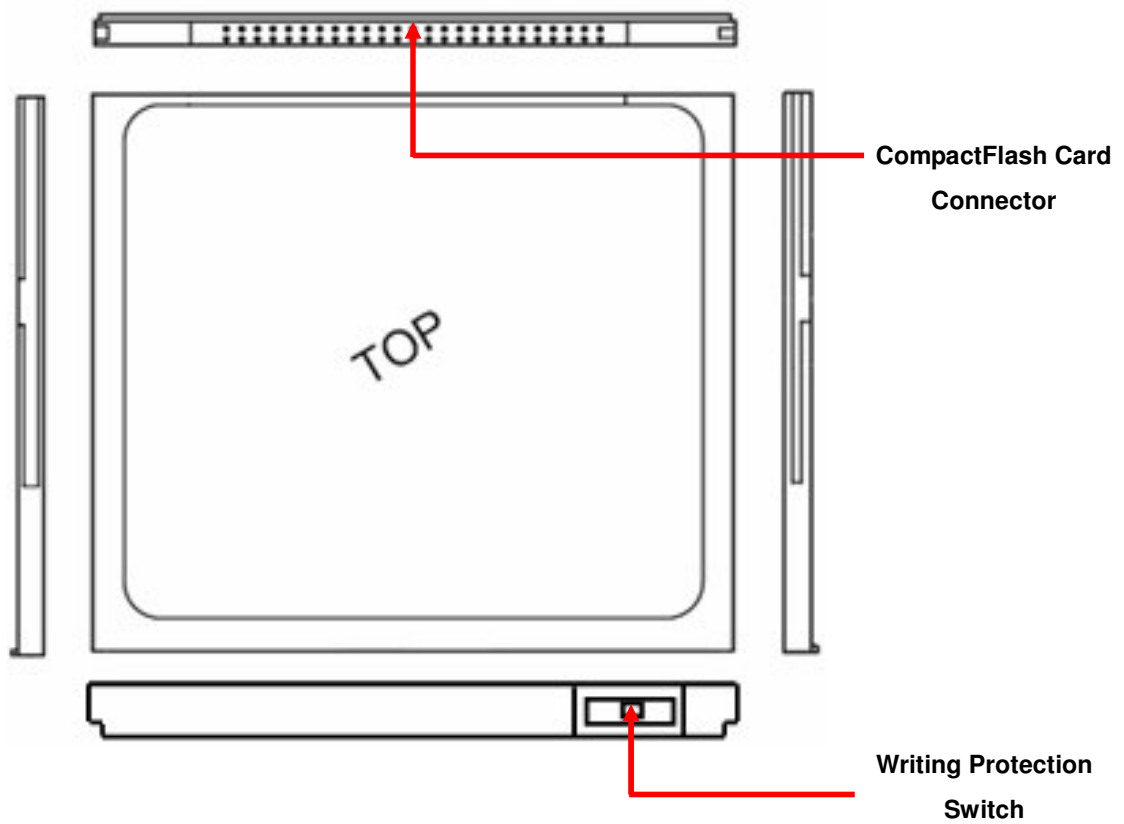


Figure 1: CompactFlash Storage Card Overlook Diagram

2.1.2 Dimension

The Dimensions of CompactFlash Storage Card are illustrated in Figure 2 and described in Table 1.

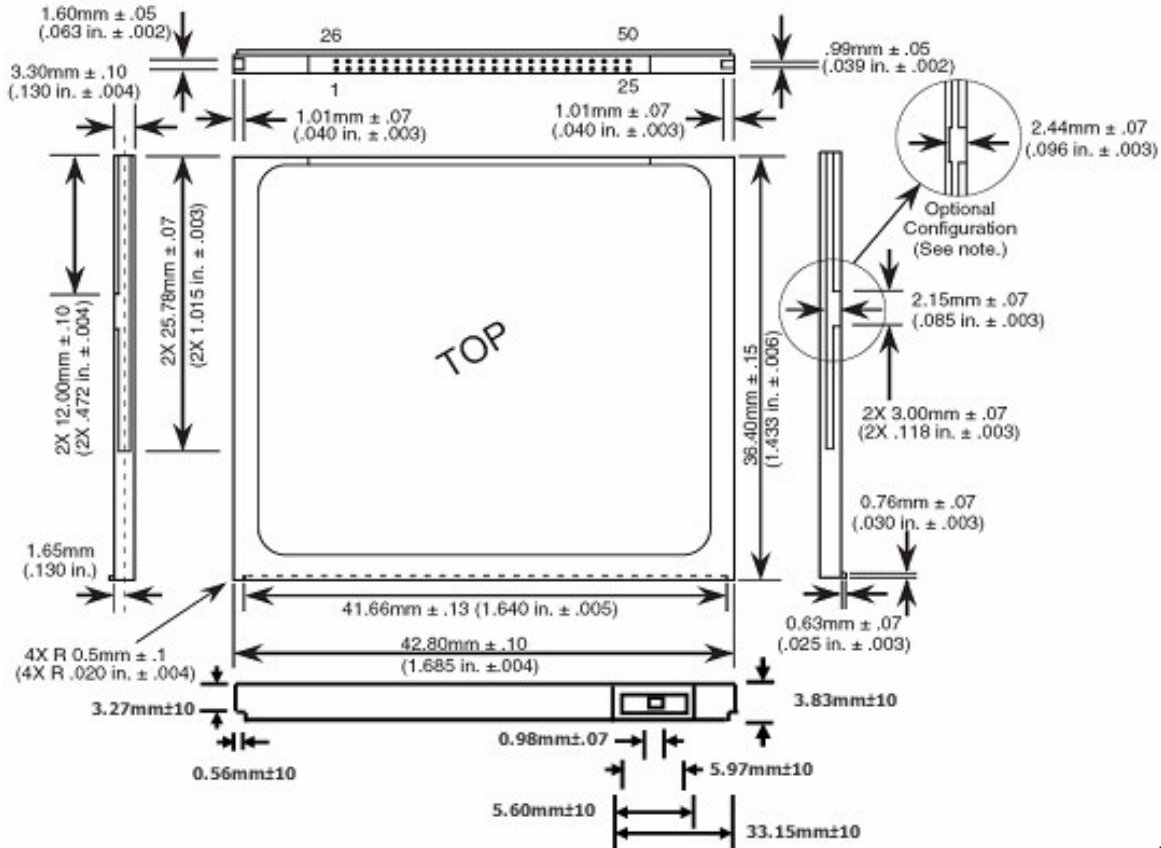


Figure 2: CompactFlash Storage Card Dimensions

Notice : The optional notched configuration was shown in the CFA specification Rev. 1.0 in specification Rev. 1.2, the notch was removed for ease of tooling. This optional configuration can be used but is not recommended.

Table 1: CompactFlash Storage Card Physical Dimension

Length	36.4 ±0.15 mm (1.433 ±0.006in.)
Width	42.8 ±0.10 mm (1.685 ±0.004in.)
Thickness (Including Label Area)	3.3 ±0.10mm (0.13 ±0.004in)

2.1.3 Weight

- Weight: 11.5g

2.2 Electronic Specifications

2.2.1 Product Definition

The CompactFlash Storage Card contains a single chip controller and flash memory module(s) in a matchbook-size package with a 50-pin connector consisting of two rows of 25 female contacts each on 50 mil (1.27mm) centers. The controller interfaces with a host system allowing data to be written to and read from the flash memory modules(s).

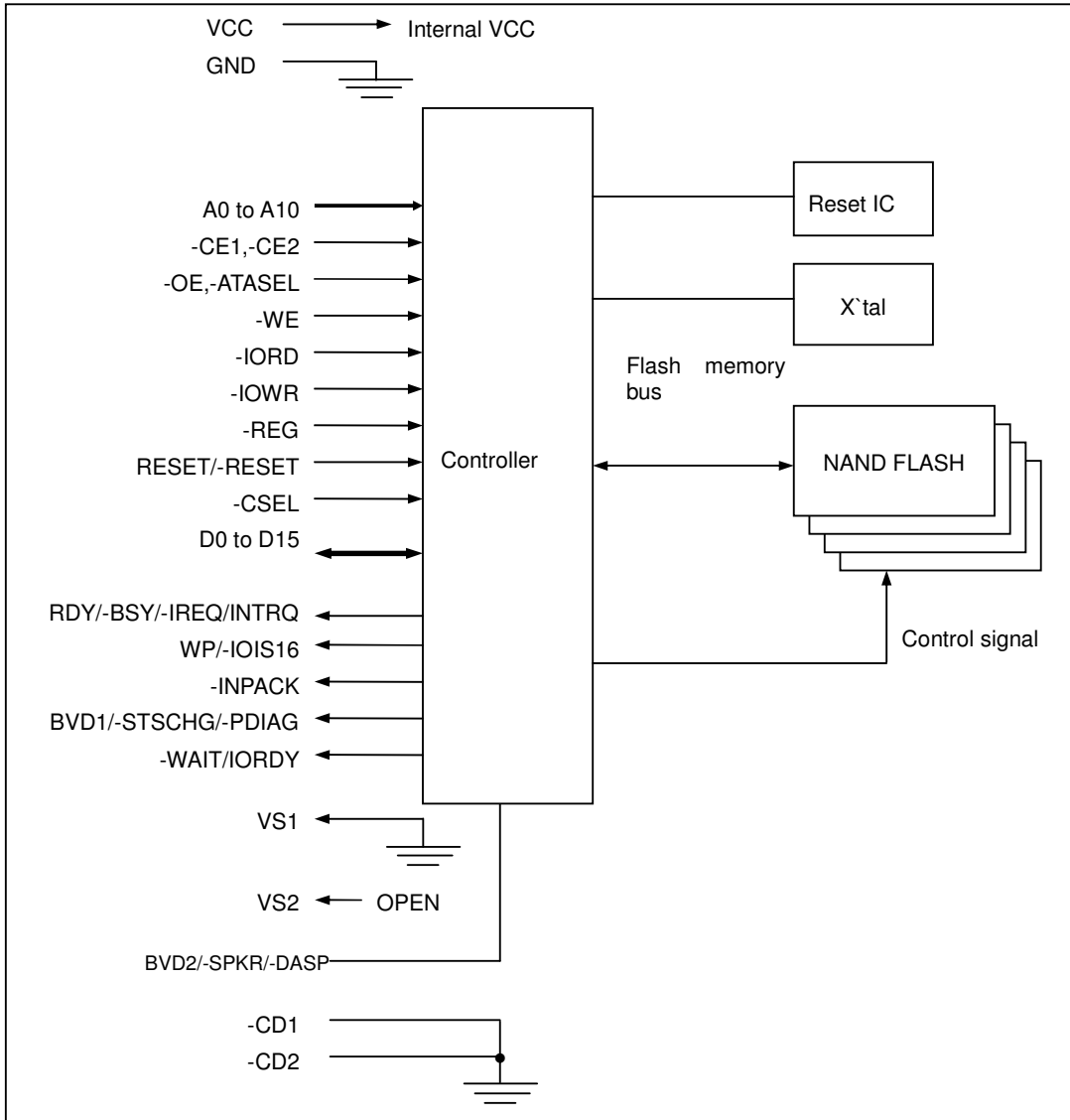
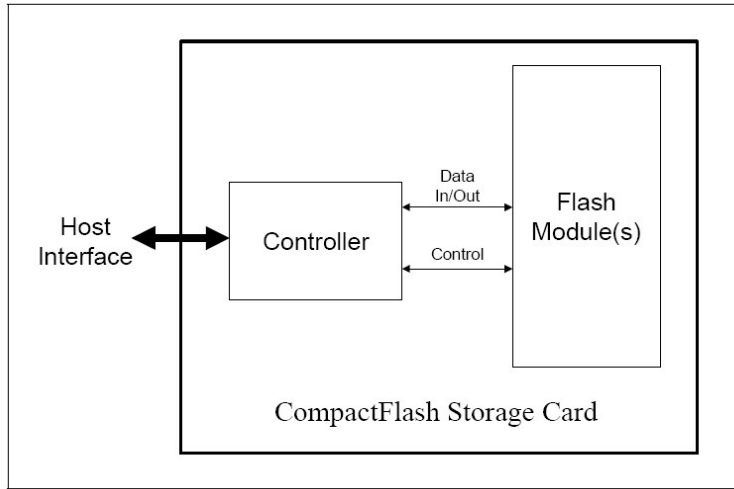


Figure 3: CompactFlash Storage Card Block Diagram

2.2.2 Operating Voltage

- Voltage DC +3.3V ± 5% or DC +5.0V ± 10%

2.2.3 Capacity and Block Size information

- Capacity: 32MB ~ 8GB
- Sector Size: 512B

2.2.4 Power Consumption (3.3V/5.0V)

- Current Information

Test Item	3.3V	5.0V
Write Current	32.4mA	36.3mA
Read Current	30.6mA	34.1mA
Sleep / Stand by Current	9.3mA	10.1mA

2.3 Performance Specifications

2.3.1 Modes

- Memory Card Mode
- I/O Card Mode
- True-IDE Mode
- PIO Mode 4 and Ultra DMA Mode 2

2.3.2 Data Transfer Time

- Sequential Read: 12.0 MB/sec
- Sequential Write: 10.0 MB/sec

※ Test Platform: Average Value based on Serial ATA 1.0 Mode

MB 1: Giga BX2000/Chipset: Intel 440BX+8671/CPU: P2-450MHz SDI33 256MB

MB 2: MSI 6566E / Chipset: Intel 845E_ICH4/ CPU: P4-1.8GHz DDR266 256MB

Testing Software: HD Bench 3.4 & Qbench

Notice

The value is various bases on the testing platform.

2.3.3 Data Retention

- 10years without requiring power support

Notice

The Value of Data Retention is various bases on the type and manufacturer of Flash Memory

2.3.4 Wear-leveling

- Dynamic Wear-Leveling for same level of Write/Erase Cycle

2.3.5 Bad Block Management

- The Bad Blocks of Flash Memory will be replaced into new ones by controller.

2.4 Environmental Specifications

2.4.1 Temperature

- Industrial Type: 0°C to +70°C (Operating Temperature), -40°C to +85°C (Non Operating Temperature)
- Wide Temperature: -40°C to +85°C (Operating Temperature), -55°C to +95°C (Non Operating Temperature)

2.4.2 Humidity

- Operating Humidity (30°C Max. Wet Bulb Temp): 8% to 95%
- Non-Operating Humidity (30°C Max. Wet Bulb Temp): 8% to 95% (with no condensation relative humidity)

2.4.3 Bare Drop Testing

- Testing Conditions: 75cm height
- Testing Orientation: (Free fell) Front/Rear/Right/Left/Top/Bottom side
- Testing Result: Pass

2.4.4 Vibration

- Random Vibration (Operation) : Testing Specification

Frequency (Hz)	PSD (G ² /Hz)	Acceleration (Grms)	Dwell Time (Min)
10	0.01	6Grms	30min per axis (X · Y · Z)
100	0.08		
500	0.08		

- Random Vibration (Non-Operating): Testing Specification

Frequency (Hz)	PSD (G ² /Hz)	Acceleration (Grms)	Dwell Time (Min)
10	0.1	6Grms	30min per axis (X · Y · Z)
100	0.04		
500	0.04		
2000	0.004		

- Frequency Range: 3 ~ 2000Hz
- Testing Result: Pass

2.4.5 Shock and Altitude
T. B. D.

2.5 Reliability Specifications

2.5.1 ECC/EDC (Error Correction Code/Error Detection Code)

- 1bytes data by 128bytes will be corrected.

2.5.2 Read and Write/Erase Cycle

- Read: No Limitation
- Write/Erase: 5,000,000 times
(Estimated on reference to Doc No.SM070001)

2.5.3 MTBF (Mean Time Between Failure)

- 2,000,000 hours
(Estimated on reference to Doc No.SM070002)

2.5.4 Power Cycle

- TBD

2.6 Compliance Specifications

- CE
- FCC

※ Note: Please contact your closest PQI's office for other certificate information.

3. Function

3.1 Switch Setting

- On case which the switch place “Lock” side, then the data will be read only and can’t be written.
- On case of placing in “Unlock” side, the data will be read and written together.

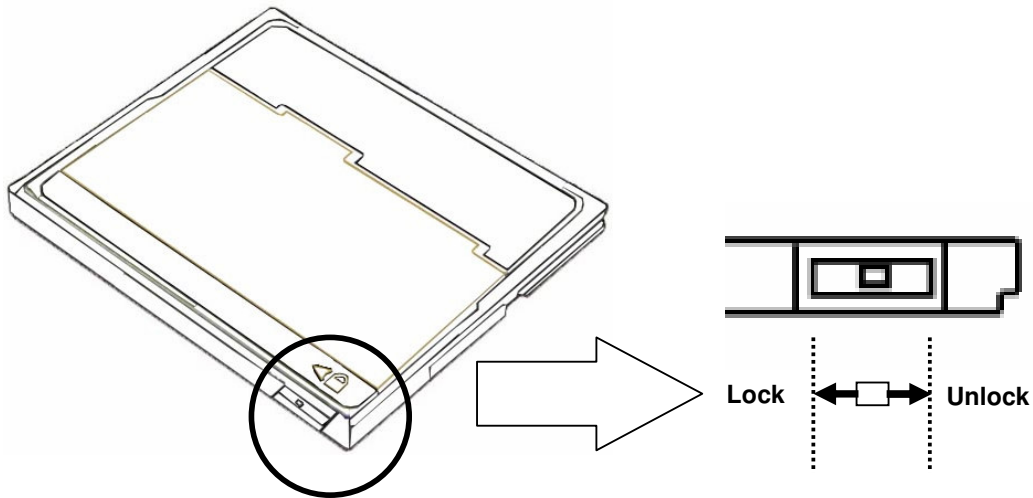


Figure 4: Write Protection Switch

3.2 Pin Signal Assignment

- The signals assigned for CF Card applications are described in Figure 5 and Table 2;



Figure 5: CF Card Signal Connector

Table 2 –CF Card Pin Assignment

Pin No.	Memory card mode		I/O card mode		True IDE mode			
	Signal name	I/O	Signal name	I/O	PIO mode		Ultra DMA mode	
					Signal name	I/O	Signal name	I/O
1	GND	—	GND	—	GND	—	GND	—
2	D3	I/O	D3	I/O	D3	I/O	D3	I/O
3	D4	I/O	D4	I/O	D4	I/O	D4	I/O
4	D5	I/O	D5	I/O	D5	I/O	D5	I/O
5	D6	I/O	D6	I/O	D6	I/O	D6	I/O
6	D7	I/O	D7	I/O	D7	I/O	D7	I/O
7	-CE1		-CE1		-CS0		-CS0	
8	A10		A10		A10		A10	
9	-OE		-OE		-ATASEL		-ATASEL	
10	A9		A9		A9		A9	
11	A8		A8		A8		A8	
12	A7		A7		A7		A7	
13	VCC	—	VCC	—	VCC	—	VCC	—
14	A6		A6		A6		A6	
15	A5		A5		A5		A5	
16	A4		A4		A4		A4	
17	A3		A3		A3		A3	
18	A2		A2		A2		A2	
19	A1		A1		A1		A1	
20	A0		A0		A0		A0	
21	D0	I/O	D0	I/O	D0	I/O	D0	I/O

22	D1	I/O	D1	I/O	D1	I/O	D1	I/O
23	D2	I/O	D2	I/O	D2	I/O	D2	I/O
24	WP	O	-IOIS16	O	-IOIS16	O	-IOIS16	O
25	-CD2	O	-CD2	O	-CD2	O	-CD2	O
26	-CD1	O	-CD1	O	-CD1	O	-CD1	O
27	D11	I/O	D11	I/O	D11	I/O	D11	I/O
28	D12	I/O	D12	I/O	D12	I/O	D12	I/O
29	D13	I/O	D13	I/O	D13	I/O	D13	I/O
30	D14	I/O	D14	I/O	D14	I/O	D14	I/O
31	D15	I/O	D15	I/O	D15	I/O	D15	I/O
32	-CE2		-CE2		-CS1		-CS1	
33	-VS1	O	-VS1	O	-VS1	O	-VS1	O
34	-IORD		-IORD		-IORD		HSTROBE/-HDMARDY	
35	-IOWR		-IOWR		-IOWR		STOP	
36	-WE		-WE		-WE		-WE	
37	RDY/-BSY	O	-IREQ	O	INTRQ	O	INTRQ	O
38	VCC	—	VCC	—	VCC	—	VCC	—
39	-CSEL		-CSEL		-CSEL		-CSEL	
40	-VS2	O	-VS2	O	-VS2	O	-VS2	O
41	RESET		RESET		-RESET		-RESET	
42	-WAIT	O	-WAIT	O	IORDY	O	DSTROBE /-DDMARDY	O
43	-INPACK	O	-INPACK	O	RFU	O	DMARQ	O
44	-REG		-REG		RFU		-DMACK	
45	BVD2	I/O	-SPKR	I/O	-DASP	I/O	-DASP	I/O
46	BVD1	I/O	-STSCHG	I/O	-PDIAG	I/O	-PDIAG	I/O
47	D8	I/O	D8	I/O	D8	I/O	D8	I/O
48	D9	I/O	D9	I/O	D9	I/O	D9	I/O
49	D10	I/O	D10	I/O	D10	I/O	D10	I/O
50	GND	—	GND	—	GND	—	GND	—

3.3 Card Capacity and Cylinder, Head, Sector

The table show various capacities available for AC60 series, if your platform does not support auto-detection function or AC60 series is not identified, we advice can following below Cylinders, Heads, Sectors number to setting your platform.

Unformatted Disk Capacity	No. of Cylinders	No. of Heads	No. of Sectors	Disk Total Sector
32MB	62	16	63	62496
64MB	123	16	63	123984
128MN	251	16	63	253008
256MB	503	16	63	507024
512MB	1007	16	63	1015056
1GB	2015	16	63	2031120
2GB	4030	16	63	4062240
4GB	8061	16	63	8125488
8GB	16123	16	63	16251984

4. Electrical specification

4.1 Absolute Ratings

Symbol	Parameter	Ratings	Units
VDD	Supply voltage	- 0.3 to +6.0	V
VIN	Input voltage	-0.3 to VDD +0.3	V
IIN	DC input current	7	mA
TSTG	Storage temperature	Industrial	°C

5. Ordering Information

Table 3: CompactFlash Card Ordering Information

P/N	Capacity (Max)
AC60-0320-1R04XX	8GB

- 1 : 0320 : 032MB,
- 0640 : 064MB
- 1280 : 128MB
- 2560 : 256MB
- 5120 : 512MB
- 1030 : 1GB
- 2030 : 2GB
- 4030 : 4GB
- 8030 : 8GB