



## 32MB to 4GB Flash Card

### FEATURES

- ATA compatibility
- Supports 3 variations of mode access
  - I/O Card Mode
  - Memory Card Mode
  - True- IDE Mode
- +5.5V / +3.0V single power supply.
- Internal Error Correction Logic
  - Data Interleave to 2 for each 256 Bytes.
  - Error Correction of 1 Byte random error per 128 Bytes of data.
  - Automatic on-the-fly, in-buffer error correction.
- Compatible with all PC Card Service and Socket Service.
- Integrated PC Card attribute memory of 256 Bytes(CIS).
- 4 PC Card function register support.
- Supports Host-side Write Protect.
- Automatic wake up from power-down on host reset or command write.
- Sector data transfers without microprocessor intervention.
- Operation Environment
  - Temperature — 0°C ~ 65°C
  - Humidity — 8% ~ 95%

### DESCRIPTION

The WED7PxxxATA80xxC25 series ATA card is an ATA interface flash memory card based on flash technology. The ATA card is constructed with a flash disk controller chip and NAND-type flash memory device. Operates from a single 5-Volt or 3.3-Volt power source. The card is available in ATA type-2 form factor from 32MB to 4GB unformatted capacity. Being able to emulate IDE hard disk drives, WEDC's ATA card is a perfect choice for solid-state mass-storage in industrial applications.

\* This product is subject to change without notice.

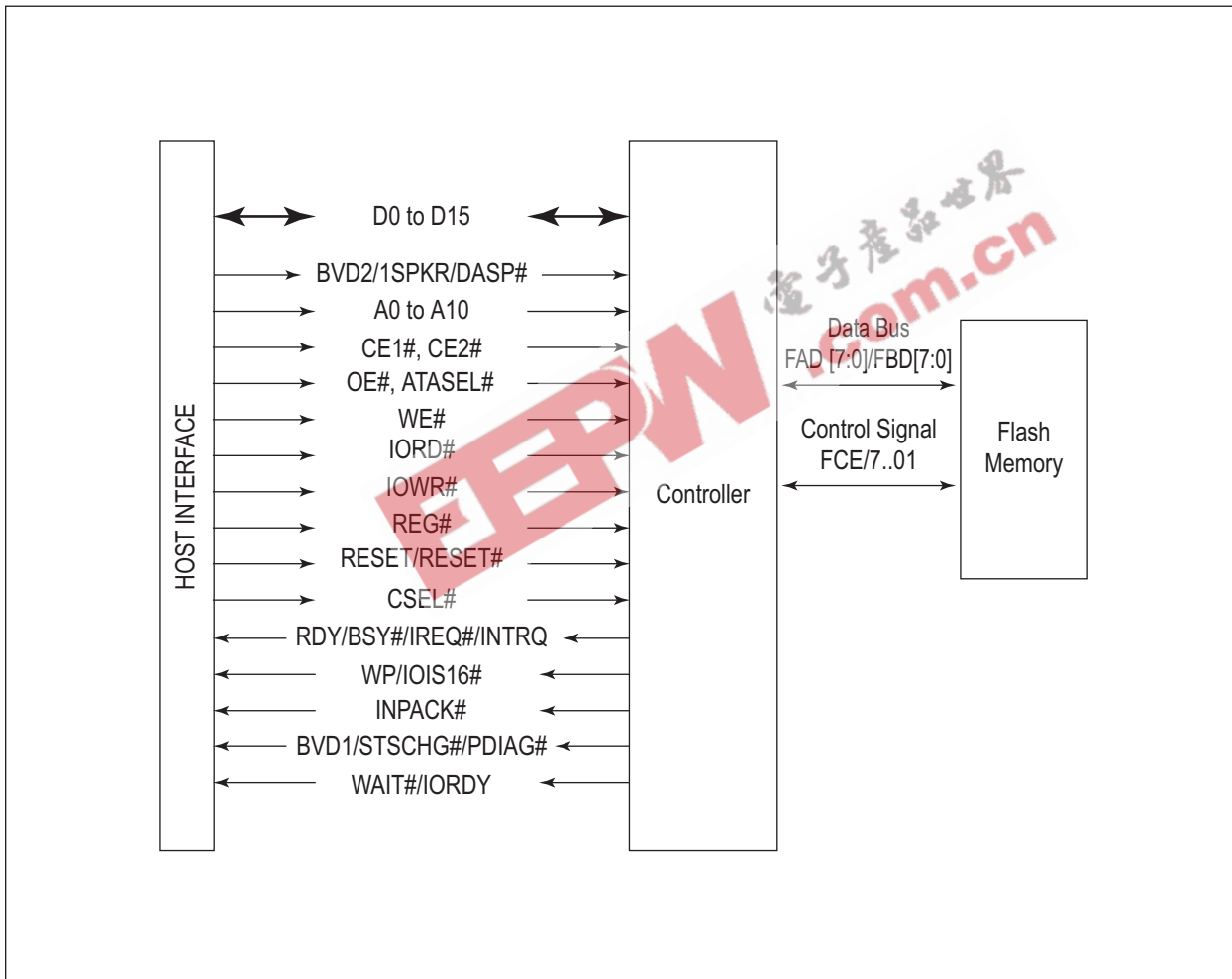
### PRODUCT TYPES

Card Density	Model No.
32MB	7P032ATA80xxC25
64MB	7P064ATA80xxC25
128MB	7P128ATA80xxC25
256MB	7P256ATA80xxC25
512MB	7P512ATA80xxC25
1024MB	7P1G0ATA80xxC25
2048MB	7P2G0ATA80xxC25
4096MB	7P4G0ATA80xxC25

xx = Housing  
03 = WEDC logo  
04 = No logo



**BLOCK DIAGRAM**





**PIN ASSIGNMENTS AND PIN TYPE**

Pin #	Memory card mode		I/O Card Mode		True IDE Mode	
	Signal Name	I/O	Signal Name	I/O	Signal Name	I/O
1	GND		GND		GND	
2	D3	I/O	D3	I/O	D3	I/O
3	D4	I/O	D4	I/O	D4	I/O
4	D5	I/O	D5	I/O	D5	I/O
5	D6	I/O	D6	I/O	D6	I/O
6	D7	I/O	D7	I/O	D7	I/O
7	CE1#	I	CE1#	I	CE1#	I
8	A10	I	A10	I	A10	I
9	OE#	I	OE#	I	ATASEL#	I
10	N.C.	-	N.C.	-	N.C.	-
11	A9	I	A9	I	A9	I
12	A8	I	A8	I	A8	I
13	N.C.	-	N.C.	-	N.C.	-
14	N.C.	-	N.C.	-	N.C.	-
15	WE#	I	WE#	I	WE#	I
16	RDY/BSY	O	IREQ#	O	INTRQ	O
17	Vcc		Vcc		Vcc	
18	N.C.	-	N.C.	-	N.C.	-
19	N.C.	-	N.C.	-	N.C.	-
20	N.C.	-	N.C.	-	N.C.	-
21	N.C.	-	N.C.	-	N.C.	-
22	A7	I	A7	I	A7	I
23	A6	I	A6	I	A6	I
24	A5	I	A5	I	A5	I
25	A4	I	A4	I	A4	I
26	A3	I	A3	I	A3	I
27	A2	I	A2	I	A2	I
28	A1	I	A1	I	A1	I
29	A0	I	A0	I	A0	I
30	D0	I/O	D0	I/O	D0	I/O
31	D1	I/O	D1	I/O	D1	I/O
32	D2	I/O	D2	I/O	D2	I/O
33	WP	O	IOIS16#	O	IOIS16#	O
34	GND	-	GND	-	GND	-

Pin #	Memory card mode		I/O Card Mode		True IDE Mode	
	Signal Name	I/O	Signal Name	I/O	Signal Name	I/O
35	GND	-	GND	-	GND	-
36	CD1#	O	CD1#	O	CD1#	O
37	D11	I/O	D11	I/O	D11	I/O
38	D12	I/O	D12	I/O	D12	I/O
39	D13	I/O	D13	I/O	D13	I/O
40	D14	I/O	D14	I/O	D14	I/O
41	D15	I	D15	I	D15	I
42	CE2#	I	CE2#	I	CE2#	I
43	VS1	O	VS1	O	VS1	O
44	IORD#	I	IORD#	I	IORD#	I
45	IOWR#	I	IOWR#	I	IOWR#	I
46	NC	-	NC	-	NC	-
47	NC	-	NC	-	NC	-
48	NC	-	NC	-	NC	-
49	NC	-	NC	-	NC	-
50	NC	-	NC	-	NC	-
51	Vcc	-	Vcc	-	Vcc	-
52	NC	-	NC	-	NC	-
53	NC	-	NC	-	NC	-
54	NC	-	NC	-	NC	-
55	NC	-	NC	-	NC	-
56	CSEL#	I	CSEL#	I	CSEL#	I
57	VS2	O	VS2	O	VS2	O
58	RESET	I	RESET	I	RESET#	I
59	Wait#	O	Wait#	O	IORDY	O
60	INPACK#	O	INPACK#	O	INPACK#	O
61	REG#	I	REG#	I	REG#	I
62	BVD2	I/O	SPKR#	I/O	DASP	I/O
63	BVD1	I/O	STSCHG#	I/O	PDIAG#	I/O
64	D8	I/O	D8	I/O	D8	I/O
65	D9	I/O	D9	I/O	D9	I/O
66	D10	O	D10	O	D10	O
67	CD2#	O	CD2#	O	CD2#	O
68	GND	-	GND	-	GND	-



**ELECTRICAL SPECIFICATIONS**

**ABSOLUTE MAXIMUM RATING**

Symbol	Parameter	Rating	Units
V <sub>CC</sub>	Power supply	-0.3 to 6.0	V
V <sub>IN</sub>	Input voltage	-0.3 to V <sub>CC</sub> +0.3	V
V <sub>OUT</sub>	Output voltage	-0.3 to V <sub>CC</sub> +0.3	V
T <sub>STG</sub>	Storage temperature	-40 to 125	°C

**DC CHARACTERISTICS:**

**I) Recommended Operating Conditions:**

Symbol	Parameter	Min.	Max.	Units
V <sub>CC</sub>	Power supply	3.0	5.5	V
V <sub>IN</sub>	Input voltage	0	V <sub>CC</sub>	V
T <sub>OPR</sub>	Operating temperature	-20	65	°C

**II) General DC Characteristics:**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
I <sub>IL</sub>	Input low current	no pull up/down	-1		1	μA
I <sub>IH</sub>	Input high current	no pull up/down	-1		1	μA
I <sub>OZ</sub>	Tri-state leakage current		-10		10	μA
C <sub>IN</sub>	Input capacitance		4			pF
C <sub>OUT</sub>	Output capacitance		4			pF
C <sub>BID</sub>	Bi-direction capacitance		4			pF

**III) DC Electrical Characteristics:**

Symbol	Parameter	Min	Typ	Max	Units
V <sub>IL</sub>	Input low voltage			0.3V <sub>CC</sub>	V
V <sub>IH</sub>	Input high voltage	0.7V <sub>CC</sub>			V
V <sub>IL</sub>	Schmitt input low voltage		1.22		V
V <sub>IH</sub>	Schmitt input high voltage		2.08		V
V <sub>OL</sub>	Output low voltage			0.4	V
V <sub>OH</sub>	Output high voltage	2.3		1	V
R <sub>I</sub>	Input pull up/down resistance		75		kΩ



**AC CHARACTERISTICS:**

**Attribute Memory Read Timing Specification**

Attribute Memory access time is defined as 300ns. Detailed timing specs are shown in Table below.

Speed Version			300 ns	
Item	Symbol	IEEE Symbol	Min ns.	Max ns.
Read Cycle Time	tc(R)	tAVAV	300	
Address Access Time	ta(A)	tAVQV		300
Card Enable Access Time	ta(CE)	tELQV		300
Output Enable Access Time	ta(OE)	tGLQV		150
Output Disable Time from CE	tdis(CE)	tEHQZ		100
Output Disable Time from OE	tdis(OE)	tGHQZ		100
Address Setup Time	tsu(A)	tAVGL	30	
Output Enable Time from CE	ten(CE)	tELQNZ	5	
Output Enable Time from OE	ten(OE)	tGLQNZ	5	
Data Valid from Address Change	tv(A)	tAXQX	0	

Note: All times are in nanoseconds. The CE# signal or both the OE# signal and the WE# signal must be de-asserted between consecutive cycle operations.

**Configuration Register (Attribute Memory) Write Timing Specification**

The Card Configuration write access time is defined as 250ns. Detailed timing specifications are shown in Table below.

Speed Version			250 ns	
Item	Symbol	IEEE Symbol	Min ns	Max ns
Write Cycle Time	tc(W)	tAVAV	250	
Write Pulse Width	tw(WE)	tWLWH	150	
Address Setup Time	tsu(A)	tAVWL	30	
Write Recovery Time	trec(WE)	tWMAX	30	
Data Setup Time for WE	tsu(D-WEH)	tDVWH	80	
Data Hold Time	th(D)	tWMDX	30	

Note: All times are in nanoseconds.

**Common Memory Read Timing Specification**

Item	Symbol	IEEE Symbol	Min ns.	Max ns.
Output Enable Access Time	ta(OE)	tGLQV		125
Output Disable Time from OE	tdis(OE)	tGHQZ		100
Address Setup Time	tsu(A)	tAVGL	30	
Address Hold Time	th(A)	tGHAX	20	
CE Setup before OE	tsu(CE)	tELGL	0	
CE Hold following OE	th(CE)	tGHEH	20	
Wait Delay Falling from OE	tv(WT-OE)	tGLWTV		35
Data Setup for Wait Release	tv(WT)	tQVWTH		0
Wait Width Time	tw(WT)	tWTLWTH		350 (3000 for CF+)

Note: The maximum load on -WAIT# is 1 LSTTL with 50pF total load. All times are in nanoseconds. The WAIT# signal may be ignored if the OE# cycle to cycle time is greater than the Wait Width time. The Max Wait Width time can be determined from the Card Information Structure. The Wait Width time meets the PCMCIA specification of 12ps but is intentionally less in this specification.



**AC CHARACTERISTICS (cont'd):**

**I/O Input (Read) Timing Specification**

Item	Symbol	IEEE Symbol	Min ns.	Max ns.
Data Delay after IORD	td(IORD)	t <sub>IGLQV</sub>		100
Data Hold following IORD	th(IORD)	t <sub>IGHQX</sub>	0	
IORD Width Time	tw(IORD)	t <sub>IGLIGH</sub>	165	
Address Setup before IORD	tsuA(IORD)	t <sub>AVIGL</sub>	70	
Address Hold following IORD	thA(IORD)	t <sub>IGHAX</sub>	20	
CE Setup before IORD	tsuCE(IORD)	t <sub>ELIGL</sub>	5	
CE Hold following IORD	thCE(IORD)	t <sub>IGHEH</sub>	20	
REG Setup before IORD	tsuREG(IORD)	t <sub>RGLIGL</sub>	5	
REG Hold following IORD	thREG(IORD)	t <sub>IGHRGH</sub>	0	
INPACK Delay Falling from IORD	tdfINPACK(IORD)	t <sub>IGLIAL</sub>	0	45
INPACK Delay Rising from IORD	tdrINPACK(IORD)	t <sub>IGHIAH</sub>		45
IOIS16 Delay Falling from Address	tdfIOIS16(ADR)	t <sub>AVISL</sub>		35
IOIS16 Delay Rising from Address	tdrIOIS16(ADR)	t <sub>AVISH</sub>		35
Wait Delay Falling from IORD	tdWT(IORD)	t <sub>IGLWTL</sub>		35
Data Delay from Wait Rising	td(WT)	t <sub>WTHQV</sub>		0
Wait Width Time	tw(WT)	t <sub>WTLWTH</sub>		350 (3000 for CF+)

Note: Maximum load on WAIT#, INPACK# and IOIS16# is 1 LSTTL with 50pF total load. All times are in nanoseconds. Minimum time from WAIT# high to IORD# high is Onsec, but minimum IORD# width must still be met. Wait Width time meets PCMCIA specification of 12ps but is intentionally less in this spec.

**I/O Output (Write) Timing Specification**

Item	Symbol	IEEE Symbol	Min ns.	Max ns.
Data Setup before IOWR	tsu(IOWR)	t <sub>DVIWH</sub>	60	
Data Hold following IOWR	th(IOWR)	t <sub>IWHDX</sub>	30	
IOWR Width Time	tw(IOWR)	t <sub>WLWWH</sub>	165	
Address Setup before IOWR	tsuA(IOWR)	t <sub>AVIWL</sub>	70	
Address Hold following IOWR	thA(IOWR)	t <sub>IWHAX</sub>	20	
CE Setup before IOWR	tsuCE(IOWR)	t <sub>ELIWL</sub>	5	
CE Hold following IOWR	thCE(IOWR)	t <sub>IWHEH</sub>	20	
REG Setup before IOWR	tsuREG(IOWR)	t <sub>RGLIWL</sub>	5	
REG Hold following IOWR	thREG(IOWR)	t <sub>IWHRGH</sub>	0	
IOIS16 Delay Falling from Address	tdfIOIS16(ADR)	t <sub>AVISL</sub>		35
IOIS16 Delay Rising from Address	tdrIOIS16(ADR)	t <sub>AVISH</sub>		35
Wait Delay Falling from IOWR	tdWT(IOWR)	t <sub>IWLWTL</sub>		35
IOWR high from Wait high	tdrIOWR(WT)	t <sub>WTJIWH</sub>	0	
Wait Width Time	tw(WT)	t <sub>WTLWTH</sub>		350 (3000for CF+)

Note: The maximum load on WAIT#, INPACK#, and IOIS16# is 1 LSTTL with 50pF total load. All times are in nanoseconds. Minimum time from WAIT# high to IOWR# high is Onsec, but minimum IOWR# width must still be met. The Wait Width time meets the PCMCIA specification of 12ps but is intentionally less in this specification.



**AC CHARACTERISTICS (cont'd):**

**True IDE Mode I/O Input (Read) Timing Specification**

Item	Symbol	IEEE Symbol	Min ns.	Max ns.
Data Delay after IORD	td(IORD)	t <sub>IGLQV</sub>		100
Data Hold following IORD	th(IORD)	t <sub>IGHQX</sub>	0	
IORD Width Time	tw(IORD)	t <sub>IGLIGH</sub>	165	
Address Setup before IORD	tsuA(IORD)	t <sub>AVIGL</sub>	70	
Address Hold following IORD	thA(IORD)	t <sub>IGHAX</sub>	20	
CE Setup before IORD	tsuCE(IORD)	t <sub>ELIGL</sub>	5	
CE Hold following IORD	thCE(IORD)	t <sub>IGHHEH</sub>	20	
I/OIS16 Delay Falling from Address	tdfI/OIS16(ADR)	t <sub>AVISL</sub>		35
I/OIS16 Delay Rising from Address	tdrI/OIS16(ADR)	t <sub>AVISH</sub>		35

Note: The maximum load on I/OIS16# is 1 LSTTL with 50pF total load. All times are in nanoseconds. Minimum time from WAIT# high to IORD# high is 0 nsec, but minimum IORD# width must still be met.

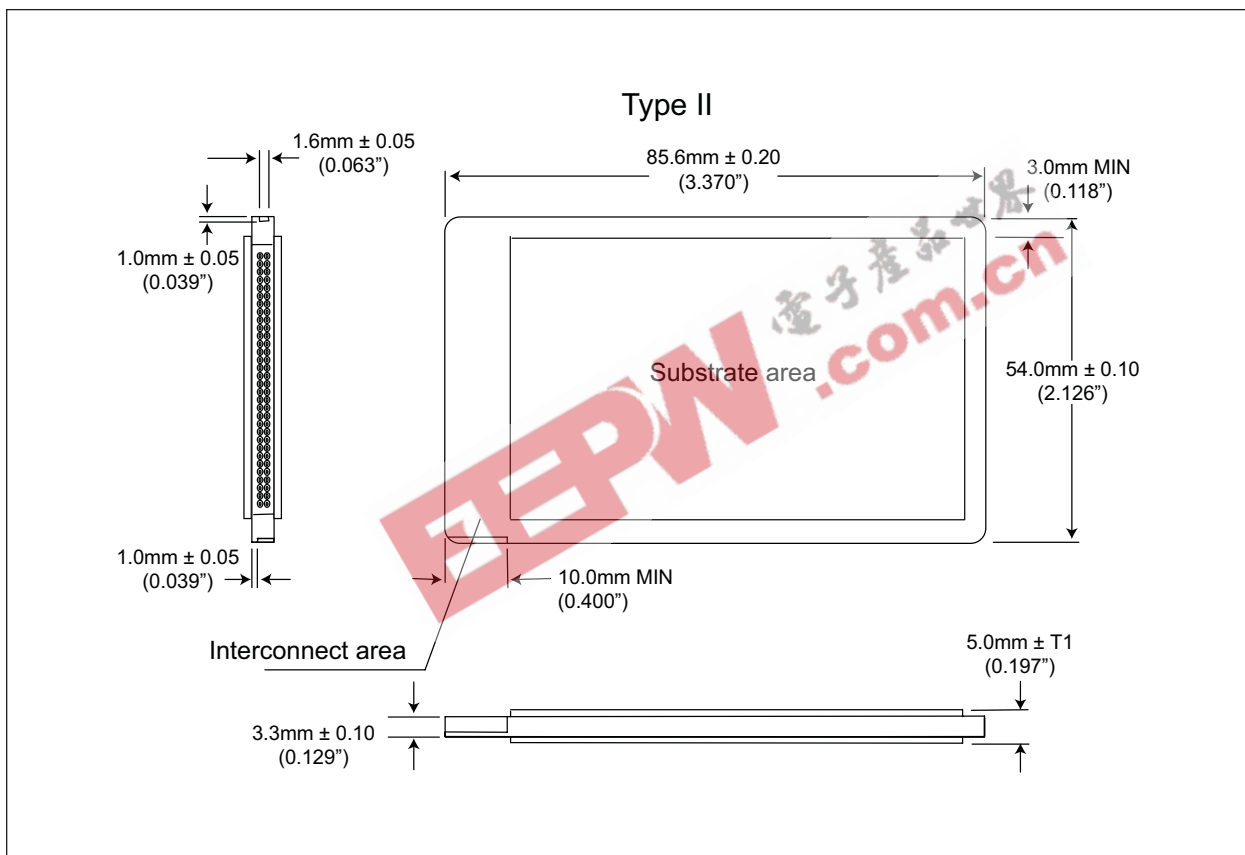
**True IDE Mode I/O Output (Write) Timing Specification**

Item	Symbol	IEEE Symbol	Min ns.	Max ns.
Data Setup before IOWR	tsu(IOWR)	t <sub>DVIWH</sub>	60	
Data Hold following IOWR	th(IOWR)	t <sub>IWHDX</sub>	30	
IOWR Width Time	tw(IOWR)	t <sub>IWLWH</sub>	165	
Address Setup before IOWR	tsuA(IOWR)	t <sub>AVIWL</sub>	70	
Address Hold following IOWR	thA(IOWR)	t <sub>IWHAX</sub>	20	
CE Setup before IOWR	tsuCE(IOWR)	t <sub>ELIWL</sub>	5	
CE Hold following IOWR	thCE(IOWR)	t <sub>IWHHEH</sub>	20	
I/OIS16 Delay Falling from Address	tdfI/OIS16(ADR)	t <sub>AVISL</sub>		35
I/OIS16 Delay Rising from Address	tdrI/OIS16(ADR)	t <sub>AVISH</sub>		35

Note: The maximum load on I/OIS16# is 1 LSTTL with 50pF total load. All times are in nanoseconds. Minimum time from WAIT# high to IOWR# high is 0 nsec, but minimum IOWR# width must still be met.



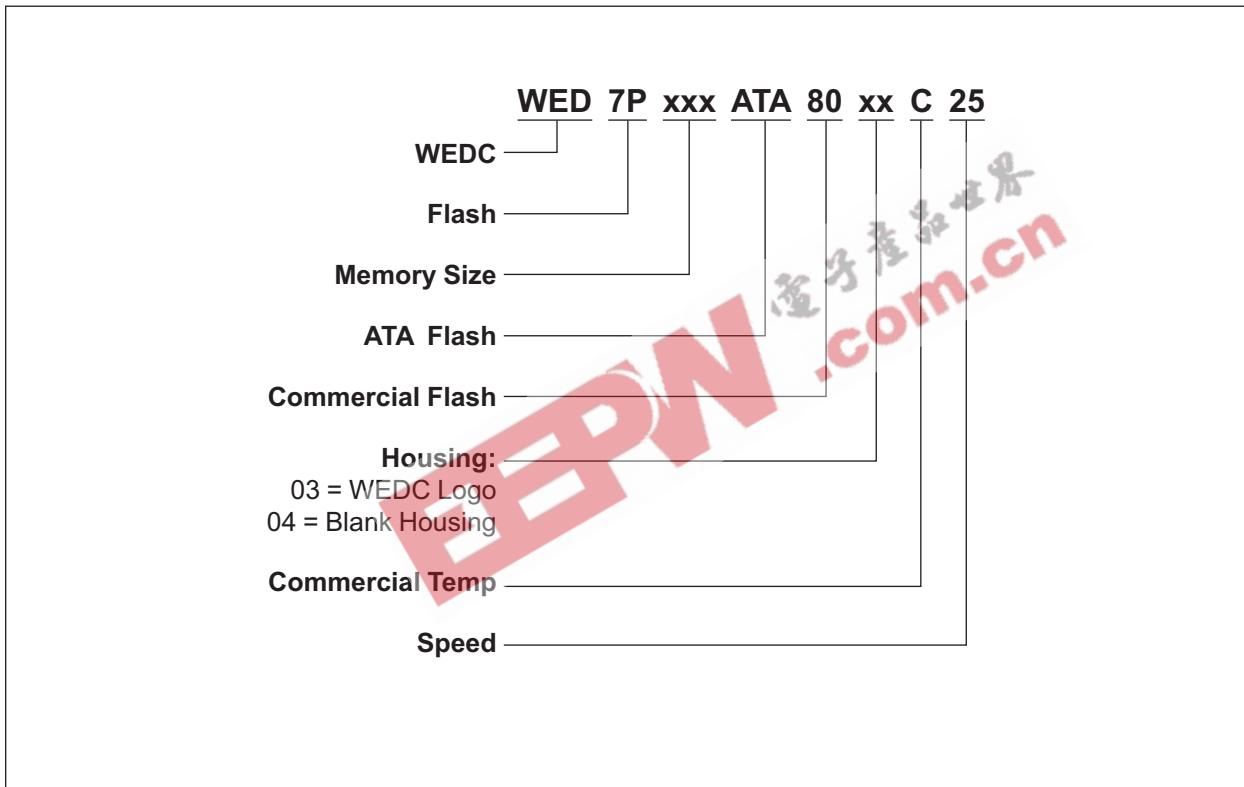
PACKAGE DIMENSIONS







**PART NUMBERING GUIDE**





**Document Title**

32MB to 4GB Flash Card

**Revision History**

<b>Rev #</b>	<b>History</b>	<b>Release Date</b>	<b>Status</b>
Rev 0	Initial Release	March 2005	Final
Rev 1	1.1 Added "ED" to part marking	July 2005	Final

