



Austin Semiconductor, Inc.

PRELIMINARY

SOLID STATE DISK

AS3SSD4GB8PBG

AS3SSD8GB8PBG

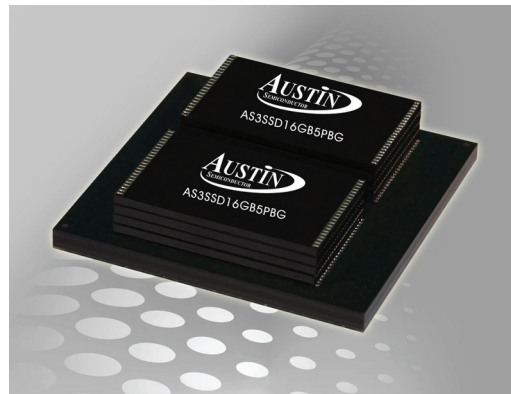
AS3SSD16GB5PBG

Solid State Disk On Chip (SSDoC)

FEATURES

- Capacities
 - 4 GB
 - 8 GB
 - 16 GB
- PATA Compatibility
 - ATA-5 compatible
 - UDMA4 supported
 - PIO Mode 4 supported
 - MWDMA Mode 2 supported
- Performance
 - Sustained Sequential Read Bandwidth: 16 MB/s
 - Sustained Sequential Write Bandwidth: 5 MB/s
- Form Factor
 - BGA Package
 - 31 mm (W) x 31 mm (L) x 4.2-7.8 mm (H)
 - Weighs approximately 11 grams (TYP)
- Each NAND component, either a 4, 8 or 16Gb device, based on the use of single and stacked silicon solutions
- ECC correction = 6 Bytes within a 512 Byte sector
- Automatic sleep mode
- Controller contained in base interposer
- SLC (Single-Level Cell) NAND Flash
- Reliability
 - Mean Time Between Failure (MTBF) >2,000,000 Hours (est.)
 - Program/Erase >1,000,000 Times (est.)
 - Temp Cycle 500/1000 cycles, JEDEC A104 Condition B -55°C to +125°C
- Power Supply Voltage: 5.0V or 3.3 V $\pm$ 10% (TYP)
- Power Consumption (Vcc = 5.0 V)
 - Idle: 10 mW (TYP)
 - Active: 255 mW (TYP)

- Operating Temperature
 - Commercial: 0C to 70C
 - Industrial: -45C to 85C
- Shock and Vibration
 - Shock: 1500G MIL-STD0810F
 - Vibration: 15 G RMS MIL-STD0810F
- Compliances
 - Lead free
 - RoHS
 - Sn/Pb Ball Option



OVERVIEW

The solid state disk is based on a proprietary package stacking technology to create an extremely space conscious, robust Solid State Disk. The SSD is capable of operating in harsh, vibration prone product platforms such as embedded computing applications, heavy transportation, ultra portables, handhelds, mobile computing, digital radio, high-speed networking & enterprise applications, as well as, military, aerospace and industrial applications.

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KEY FEATURES

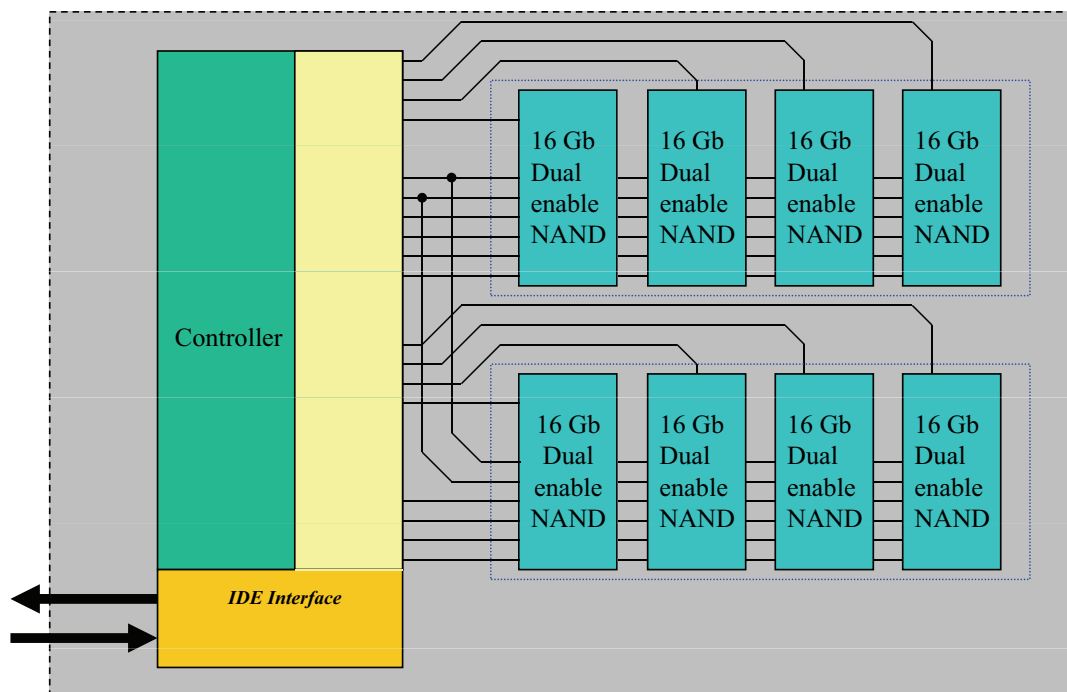
- NAND FLASH Controller
- (2) stacks, each containing (2 or 4) NAND components
- Each NAND component, either a 4,8 or 16Gb device, based on the use of single silicon and stacked silicon solutions
- Providing a total bit density of either 4,8 or 16GB
- Controller contained in base interposer
- Fast ATA host to buffer transfer rates supporting True IDE, PIO/4 mode support
- 512Byte Sector Buffers
- Flash Memory power-down logic
- ECC correction = 6 Bytes within a 512 Byte sector
- Automatic Sleep Mode
- Burst Transfer rate, 16.67MB per second
- Sustained Transfer rate: 6.7MB per second
- Sophisticated Wear Leveling

ARCHITECTURE

The PATA controller in the PATA Solid State Drive utilizes a 32-bit RISC architecture which provides for direct connection of one, two or four NAND flash memory devices (2 per channel). An on-chip error correction code (ECC) and cyclic redundancy check (CRC) unit generates the required code bytes facilitating error detection and correction of up to six bytes per 512 byte data sector. On the fly code byte generation for read and write operations minimizes ECC performance impacts.

The controller's flash memory interface allows the direct connection of up to 10 chips and support Samsung (NAND) type flash memory. ASI PATA Solid State Drives use single level cell (SLC) Samsung NAND Flash Memory devices.

BLOCK DIAGRAM



REGULATORY COMPLIANCE

Since the PATA SSD is a component (or a set of components depending on the configuration) on the motherboard, system certifications are the responsibility of the OEM or ODM.

DEVICE COMPLIANCE

Compliance	Description
PB Free	Components and materials are lead free.
RoHS	Restriction of Hazardous Substance Directive



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PRODUCT SPECIFICATIONS

Capacity and User Addressable Sectors

Unformatted	User Addressable Sector in LBA mode
4GB*	7,880,544
8GB*	15,761,088
16GB*	31,522,176

Note: Formatting and other functions will use some of the space, thus the listed capacity will not be available entirely for data storage.

Read and Write Performance

Operation	Access Type	MB/second
READ	Sustained Sequential Read Bandwidth	16 MB/second
WRITE	Sustained Sequential Write Bandwidth	5 MB/second

OPERATING CONDITIONS

Maximum Ratings

Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not guaranteed. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Absolute Maximum Ratings by Device

Parameter	Symbol	Max.	Min.	Unit
Vcc supply voltage	Vcc_P	-0.5	+5.5	V
Non-Operation Temperature	Ti	-40	+85	°C



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OPERATING CONDITIONS (continued)

Recommended Operating Conditions

Operating Temperature and Voltages

Parameter	Symbol	Max.	Typ	Min.	Unit
Industrial: 0°C to +70°C	T ₀	0	-	70	°C
Commercial: -40°C to +85°C	T ₀	0	-	70	°C
V _{cc} supply voltage	T _{cc} P	4.5	5	5.5	V
	T _{cc} P	3.0	3.3	3.6	V
Ground supply voltage	GndPLN	0	0	0	V

DC Characteristics (PATA controller configuration)

Symbol	Parameter	Min.	Max.	Units	Conditions
V _{IL}	Input LOW Voltage	-0.3	+0.8	V	
V _{IH}	Input HIGH Voltage	2.2	V _{cc} +0.3	V	
V _{OL}	Output LOW Voltage		0.45	V	I _{OL} =4mA
V _{OH}	Output HIGH Voltage	2.4		V	I _{OH} =-1mA
I _{cc}	Operating Current, V _{cc_R} =5.0V				
	Sleep Mode		0.2	mA	
	Operating, 20 MHz		30	mA	
	Operating, 40 MHz		50	mA	
I _{cc}	Operating Current, V _{cc_R} =3.3V				
	Sleep Mode		.02	m	
	Operating, 20 MHz		30	m	
	Operating, 40 MHz		50	m	
I _{LI}	Input Leakage Current		±10	μA	
I _{LO}	Output Leakage Current		±10	μA	
C _{I/O}	Input / Output Capacitance		10	pF	



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ELECTRICAL CHARACTERISTICS

Power Consumption

Setting	Value
Active Idle Current	1.85mA
Active Current	51mA
Active Power	255mW
Idle Power	9.25mW

ENVIRONMENTAL CONDITIONS

Temperature Specifications

	Mode	Max.	Min.	Unit
Ambient Temperature	Operate - Commercial	0	+70	°C
	Operate - Industrial	-40	+85	°C

Altitude

Since there are no moving parts, this device is not susceptible to a lack of air molecules and will operate correctly to 85,000 feet above sea level.

Shock and Vibration Characteristics

Condition	Value
Operating Shock	1500G MIL-STD-810F
Operating Vibration	15G RMS MIL-STD-810F



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ENVIRONMENTAL CONDITIONS (continued)

Acoustics

This drive has no moving or noise-emitting parts; therefore, it produces negligible sound (0dB) in all modes of operation.

Electrostatic Discharge (ESD)

The PATA SSD can withstand an electrostatic discharge of +/- of 2 KV. ESD testing is done to demonstrate that the units can withstand discharge encountered in normal handling or operations of the equipment.

Humidity Specifications

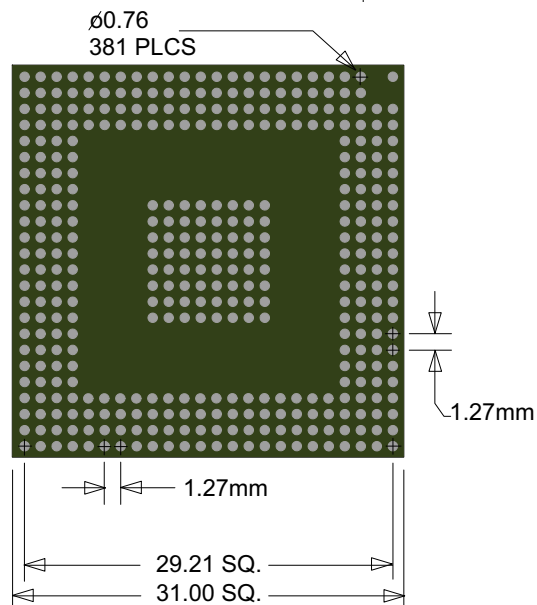
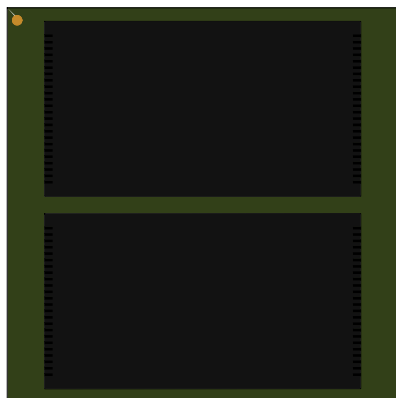
Condition	Value	Unit
Operate non-condensing	5-95	%

Reliability Specifications

Parameter	Value
Mean Time Between Failure (MTBF)	>2,000,000 Hours (est.)
Program / Erase	>1,000,000 Time (est.)
Warranty	2 Years

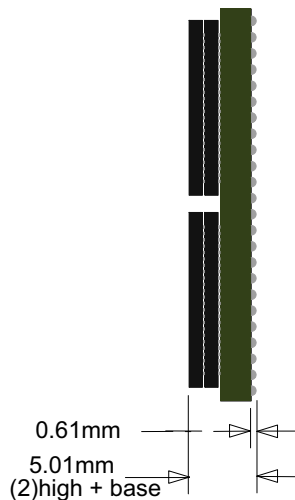
MECHANICAL INFORMATION

PATA SSD (Top, Side and Bottom Views)

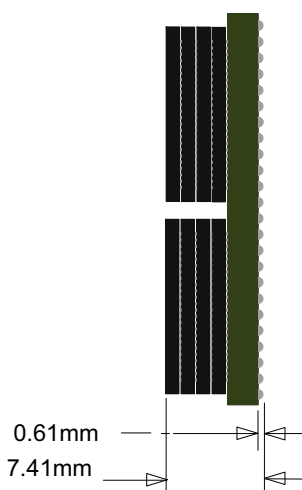


Stacks, each containing (2 or 4) NAND Components

4GB



8GB & 16GB





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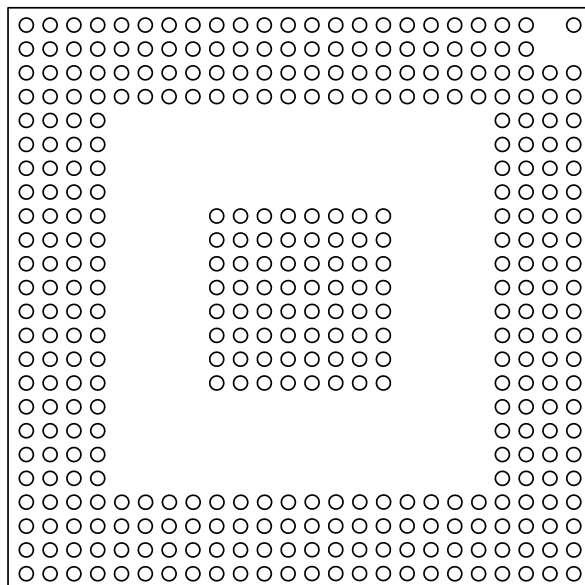
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PIN ASSIGNMENTS

24 22 20 18 16 14 12 10 8 6 4 2
23 21 19 17 15 13 11 9 7 5 3 1



A	A1 GndPLN	B1 BLANK	C1 GndPLN	D1 IDE_A1
B	A2 BLANK	B2 BLANK	C2 GndPLN	D2 IDE_A1
C	A3 IDE_DMARQ	B3 IDE_DMARQ	C3 IDE_DMARQ	D3 IDE_A1
D	A4 IDE_A2	B4 IDE_A2	C4 IDE_A2	D4 IDE_DMARQ
E	A5 FC_WAIT	B5 FC_WAIT	C5 FC_WAIT	D5 IDE_A2
F	A6 FC_PRESET	B6 FC_PRESET	C6 FC_PRESET	D6 FC_WAIT
G	A7 FC_IDEEN	B7 FC_IDEEN	C7 FC_IDEEN	D7 FC_PRESET
H	A8 Vcc_P	B8 Vcc_P	C8 Vcc_P	D8 IDE_IDEEN
J	A9 GndPLN	B9 GndPLN	C9 GndPLN	D9 Vcc_P
K	A10 Vcc_P	B10 Vcc_P	C10 Vcc_P	D10 NC
L	A11 IDE_INTRQ	B11 IDE_INTRQ	C11 IDE_INTRQ	D11 NC
M	A12 FC_MODE	B12 FC_MODE	C12 FC_MODE	D12 IDE_INTRQ
N	A13 Vcc_C	B13 Vcc_C	C13 Vcc_C	D13 FC_MODE
P	A14 Gnd_PLN	B14 Gnd_PLN	C14 Gnd_PLN	D14 Vcc_C
R	A15 Vcc_C	B15 Vcc_C	C15 Vcc_C	D15 IDE_IDWR\
T	A16 IDE_IDWR\	B16 IDE_IDWR\	C16 IDE_IDWR\	D16 IDE_IDRD\
U	A17 IDE_IDRD\	B17 IDE_IDRD\	C17 IDE_IDRD\	D17 IDE_CS1\
V	A18 IDE_CS1\	B18 IDE_CS1\	C18 IDE_CS1\	D18 IDE_CS0\
W	A19 IDE_CS0\	B19 IDE_CS0\	C19 IDE_CS0\	D19 IDE_D15
Y	A20 IDE_D15	B20 IDE_D15	C20 IDE_D15	D20 IDE_D7
AA	A21 IDE_D7	B21 IDE_D7	C21 IDE_D7	D21 IDE_D14
AB	A22 IDE_D14	B22 IDE_D14	C22 IDE_D14	D22 IDE_D6
AC	A23 GndPLN	B23 GndPLN	C23 GndPLN	D23 IDE_D6
AD	A24 GndPLN	B24 GndPLN	C24 GndPLN	D24 IDE_D6

E1 IDE_DMARQ\	F1 IDE_A0	G1 FC_LED\	H1 IDE_D0	J1 IDE_PDIG	K1 IDE_D1	L1 Vcc_P	M1 GndPLN
E2 IDE_DMARQ\	F2 IDE_A0	G2 FC_LED\	H2 IDE_D0	J2 IDE_PDIG	K2 IDE_D1	L2 Vcc_P	M2 GndPLN
E3 IDE_DMARQ\	F3 IDE_A0	G3 FC_LED\	H3 IDE_D0	J3 IDE_PDIG	K3 IDE_D1	L3 Vcc_P	M3 GndPLN
E4 IDE_A1	F4 IDE_DMARQ\	G4 IDE_A0	H4 FC_LED\	J4 IDE_D0	K4 IDE_PDIG	L4 IDE_D1	M4 Vcc_P
E5 BLANK	F5 BLANK	G5 BLANK	H5 BLANK	J5 BLANK	K5 BLANK	L5 BLANK	M5 BLANK
E6 BLANK	F6 BLANK	G6 BLANK	H6 BLANK	J6 BLANK	K6 BLANK	L6 BLANK	M6 BLANK
E7 BLANK	F7 BLANK	G7 BLANK	H7 BLANK	J7 BLANK	K7 BLANK	L7 BLANK	M7 BLANK
E8 BLANK	F8 BLANK	G8 BLANK	H8 BLANK	J8 BLANK	K8 BLANK	L8 BLANK	M8 BLANK
E9 BLANK	F9 BLANK	G9 BLANK	H9 BLANK	J9 VccPLN_IN	K9 VccNAND_INL9	VccNAND_INM9	VccNAND_IN
E10 BLANK	F10 BLANK	G10 BLANK	H10 BLANK	J10 VccPLN_IN	K10 VccPLN_IN	L10 VccPLN_IN	M10 VccNAND_IN
E11 BLANK	F11 BLANK	G11 BLANK	H11 BLANK	J11 VccPLN_IN	K11 VccPLN_IN	L11 VccPLN_IN	M11 VccNAND_IN
E12 BLANK	F12 BLANK	G12 BLANK	H12 BLANK	J12 VccPLN_IN	K12 VccPLN_IN	L12 VccPLN_IN	M12 FC_WP_EN1
E13 BLANK	F13 BLANK	G13 BLANK	H13 BLANK	J13 VccPLN_IN	K13 VccPLN_IN	L13 VccPLN_IN	M13 FC_WP_EN1
E14 BLANK	F14 BLANK	G14 BLANK	H14 BLANK	J14 VccPLN_IN	K14 VccPLN_IN	L14 VccPLN_IN	M14 VccNAND_IN
E15 BLANK	F15 BLANK	G15 BLANK	H15 BLANK	J15 VccPLN_IN	K15 VccPLN_IN	L15 VccNAND_IN	M15 VccNAND_IN
E16 BLANK	F16 BLANK	G16 BLANK	H16 BLANK	J16 VccPLN_IN	K16 VccNAND_INL16	VccNAND_INM16	VccNAND_IN
E17 BLANK	F17 BLANK	G17 BLANK	H17 BLANK	J17 BLANK	K17 BLANK	L17 BLANK	M17 BLANK
E18 BLANK	F18 BLANK	G18 BLANK	H18 BLANK	J18 BLANK	K18 BLANK	L18 BLANK	M18 BLANK
E19 BLANK	F19 BLANK	G19 BLANK	H19 BLANK	J19 BLANK	K19 BLANK	L19 BLANK	M19 BLANK
E20 BLANK	F20 BLANK	G20 BLANK	H20 BLANK	J20 BLANK	K20 BLANK	L20 BLANK	M20 BLANK
E21 IDE_D6	F21 IDE_D13	G21 IDE_D5	H21 Vcc_P	J21 IDE_D12	K21 IDE_D4	L21 IDE_D11	M21 NC
E22 IDE_D13	F22 IDE_D5	G22 Vcc_P	H22 IDE_D12	J22 IDE_D4	K22 IDE_D11	L22 NC	M22 IDE_D3
E23 IDE_D13	F23 IDE_D5	G23 Vcc_P	H23 IDE_D12	J23 IDE_D4	K23 IDE_D11	L23 NC	M23 IDE_D3
E24 IDE_D13	F24 IDE_D5	G24 Vcc_P	H24 IDE_D12	J24 IDE_D4	K24 IDE_D11	L24 NC	M24 IDE_D3



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PIN ASSIGNMENTS (continued)

N1	Vcc_P	P1	IDE_D8	R1	IDE_D2	T1	IDE_D9	U1	IDE_PIOIS16\	V1	IDE_D10	W1	FC_WP_EN	Y1	Vcc_F
N2	Vcc_P	P2	IDE_D8	R2	IDE_D2	T2	IDE_D9	U2	IDE_PIOIS16\	V2	IDE_D10	W2	FC_WP_EN	Y2	Vcc_F
N3	Vcc_P	P3	IDE_D8	R3	IDE_D2	T3	IDE_D9	U3	IDE_PIOIS16\	V3	IDE_D10	W3	FC_WP_EN	Y3	Vcc_F
N4	IDE_D8	P4	IDE_D2	R4	IDE_D9	T4	IDE_PIOIS16\	U4	IDE_D10	V4	FC_WP_EN	W4	NC	Y4	Vcc_F
N5	BLANK	P5	BLANK	R5	BLANK	T5	BLANK	U5	BLANK	V5	BLANK	W5	BLANK	Y5	BLANK
N6	BLANK	P6	BLANK	R6	BLANK	T6	BLANK	U6	BLANK	V6	BLANK	W6	BLANK	Y6	BLANK
N7	BLANK	P7	BLANK	R7	BLANK	T7	BLANK	U7	BLANK	V7	BLANK	W7	BLANK	Y7	BLANK
N8	BLANK	P8	BLANK	R8	BLANK	T8	BLANK	U8	BLANK	V8	BLANK	W8	BLANK	Y8	BLANK
N9	VccNAND_IN	P9	VccNAND_IN	R9	VccNAND_IN	T9	GndPLN	U9	BLANK	V9	BLANK	W9	BLANK	Y9	BLANK
N10	VccNAND_IN	P10	VccNAND_IN	R10	GndPLN	T10	GndPLN	U10	BLANK	V10	BLANK	W10	BLANK	Y10	BLANK
N11	VccNAND_IN	P11	GndPLN	R11	GndPLN	T11	GndPLN	U11	BLANK	V11	BLANK	W11	BLANK	Y11	BLANK
N12	FC_WP_EN1	P12	GndPLN	R12	GndPLN	T12	GndPLN	U12	BLANK	V12	BLANK	W12	BLANK	Y12	BLANK
N13	FC_WP_EN1	P13	GndPLN	R13	GndPLN	T13	GndPLN	U13	BLANK	V13	BLANK	W13	BLANK	Y13	BLANK
N14	VccNAND_IN	P14	GndPLN	R14	GndPLN	T14	GndPLN	U14	BLANK	V14	BLANK	W14	BLANK	Y14	BLANK
N15	VccNAND_IN	P15	VccNAND_IN	R15	GndPLN	T15	GndPLN	U15	BLANK	V15	BLANK	W15	BLANK	Y15	BLANK
N16	VccNAND_IN	P16	VccNAND_IN	R16	VccNAND_IN	T16	GndPLN	U16	BLANK	V16	BLANK	W16	BLANK	Y16	BLANK
N17	BLANK	P17	BLANK	R17	BLANK	T17	BLANK	U17	BLANK	V17	BLANK	W17	BLANK	Y17	BLANK
N18	BLANK	P18	BLANK	R18	BLANK	T18	BLANK	U18	BLANK	V18	BLANK	W18	BLANK	Y18	BLANK
N19	BLANK	P19	BLANK	R19	BLANK	T19	BLANK	U19	BLANK	V19	BLANK	W19	BLANK	Y19	BLANK
N20	BLANK	P20	BLANK	R20	BLANK	T20	BLANK	U20	BLANK	V20	BLANK	W20	BLANK	Y20	BLANK
N21	IDE_D3	P21	FADJ	R21	NC	T21	NC	U21	Vcc_R	V21	CADJ	W21	COUT	Y21	Vcc_F
N22	FOUT	P22	FOUT	R22	FADJ	T22	Vcc_R	U22	GndPLN	V22	Vcc_R	W22	CADJ	Y22	COUT
N23	FOUT	P23	FOUT	R23	FADJ	T23	Vcc_R	U23	GndPLN	V23	Vcc_R	W23	CADJ	Y23	COUT
N24	FOUT	P24	FOUT	R24	FADJ	T24	Vcc_R	U24	GndPLN	V24	Vcc_R	W24	CADJ	Y24	COUT

AA1	Vcc_F	AB1	GndPLN	AC1	GndPLN	AD1	GndPLN
AA2	Vcc_F	AB2	GndPLN	AC2	GndPLN	AD2	GndPLN
AA3	Vcc_F	AB3	NC	AC3	NC	AD3	NC
AA4	NC	AB4	VccPLN_IN	AC4	VccPLN_IN	AD4	VccPLN_IN
AA5	VccPLN_IN	AB5	VccPLN_IN	AC5	VccPLN_IN	AD5	VccPLN_IN
AA6	NC	AB6	VccPLN_IN	AC6	VccPLN_IN	AD6	VccPLN_IN
AA7	FOUT	AB7	FOUT	AC7	FOUT	AD7	FOUT
AA8	FOUT	AB8	FOUT	AC8	FOUT	AD8	FOUT
AA9	NC	AB9	XTALI	AC9	XTALI	AD9	XTALI
AA10	XTALI	AB10	XTALC	AC10	XTALC	AD10	XTALC
AA11	XTALC	AB11	XTALR	AC11	XTALR	AD11	XTALR
AA12	XTALR	AB12	Vcc_C	AC12	Vcc_C	AD12	Vcc_C
AA13	Vcc_C	AB13	GndPLN	AC13	GndPLN	AD13	GndPLN
AA14	NC	AB14	Vcc_C	AC14	Vcc_C	AD14	Vcc_C
AA15	NC	AB15	Vcc_F	AC15	Vcc_F	AD15	Vcc_F
AA16	Vcc_F	AB16	GndPLN	AC16	GndPLN	AD16	GndPLN
AA17	NC	AB17	Vcc_F	AC17	Vcc_F	AD17	Vcc_F
AA18	NC	AB18	VccPLN_IN	AC18	VccPLN_IN	AD18	VccPLN_IN
AA19	VccPLN_IN	AB19	VccPLN_IN	AC19	VccPLN_IN	AD19	VccPLN_IN
AA20	FC_RESET	AB20	VccPLN_IN	AC20	VccPLN_IN	AD20	VccPLN_IN
AA21	NC	AB21	FC_RESET	AC21	FC_RESET	AD21	FC_RESET
AA22	Vcc_F	AB22	NC	AC22	NC	AD22	NC
AA23	Vcc_F	AB23	GndPLN	AC23	GndPLN	AD23	GndPLN
AA24	Vcc_F	AB24	GndPLN	AC24	GndPLN	AD24	GndPLN



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SIGNAL DESCRIPTIONS

Symbol	Type	Description
IDE_A0	Output	Address bus
IDE_A1	Output	
IDE_A2	Output	
IDE_D0	Input/Output	Data bus. The signals D15..D0 represent the bidirectional data bus; active high signals a "one".
IDE_D1	Input/Output	
IDE_D2	Input/Output	
IDE_D3	Input/Output	
IDE_D4	Input/Output	
IDE_D5	Input/Output	
IDE_D6	Input/Output	
IDE_D7	Input/Output	
IDE_D8	Input/Output	
IDE_D9	Input/Output	
IDE_D10	Input/Output	
IDE_D11	Input/Output	
IDE_D12	Input/Output	
IDE_D13	Input/Output	
IDE_D14	Input/Output	
IDE_D15	Input/Output	
IDE_INTRQ	Output	Drive interrupt request.
IDE_IOWR\	Input	I/O Data Write Enable is the strobe signal asserted by the host to write device registers or the data port. DIOW shall be negated by the host prior to the initiation of an Ultra DMA burst. STOP shall be negated by the host before the data is transferred in an Ultra DMA burst. The assertion of STOP by the host during an Ultra DMA burst signals the termination of the Ultra DMA burst.
IDE_IORD\	Input	I/O Data Read Enable is the strobe signal asserted by the host to read device registers or the data port.
IDE_CS0\	Input	Drive chip select 0 is used by host to select Command Block registers.
IDE_CS1\	Input	Drive chip select 1 is used by host to select Command Block registers.
IDE_PIOIS16\	Output	16-bit I/O transfer.
IDE_PDIG	Input/Output	Passed diagnostics.
IDE_DMARQ IDE_DMARQ\	Output	DMA request. This signal, used for DMA data transfers between host and device, shall be asserted by the device when it is ready to transfer data to or from the host. For multi word DMA transfers, the direction of data transfer is Controller by IDE_IORD\ and IDE_IOWR\. When a DMS operation is enabled, CS0\ and CS1\ shall not be asserted and transfers shall be 16 bits wide. This signal shall be release when the device is not selected.
FC_WAIT	Output	Ready signal to IDE_IORDY



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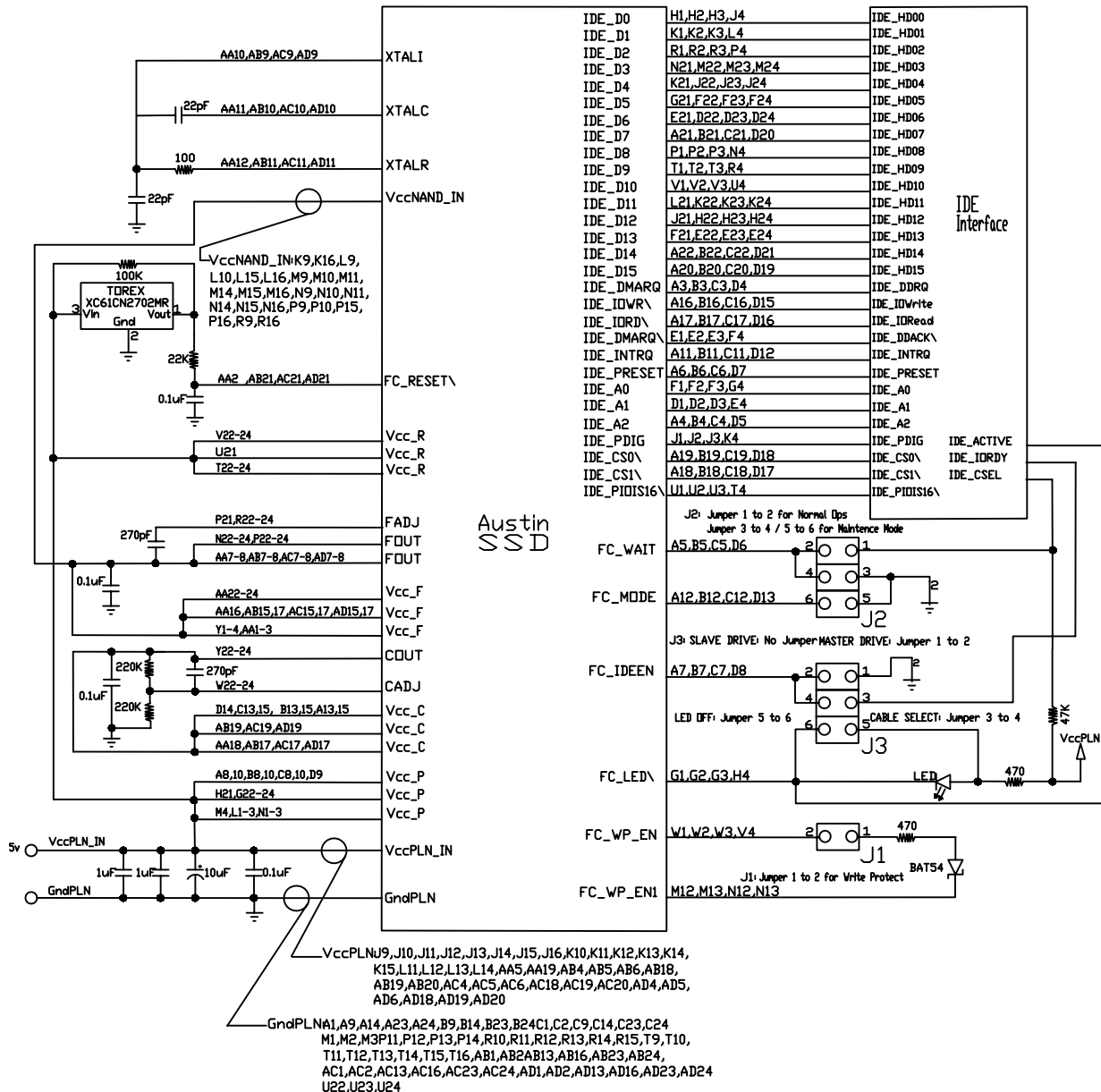
AS3SSD4GB8PBG

AS3SSD8GB8PBG

AS3SSD16GB5PBG

IDE_PRESET	Input	Reset
FC_WP_EN FC_WP_EN1	Input	Write protect signal
FC_RESET	Input	Reset processor. RESET# low resets the processor to the initial state and halts all activity. RESET# must be low for at least one cycle. On a transition from low to high, a Reset exception occurs and the processor starts execution at the Reset entry determined by the INT4 state. The transition may occur asynchronously to the clock. We recommend connecting this pin to a voltage monitoring circuit with open-drain output (e.g. Torex XC61A) supplying a reset signal for supply voltages less than 2.6 or 2.7V, connected to a R/C combination of 100 kΩ and 100 nF giving an additional reset delay in the order of 10 ms.
FC_LED\	Output	Operation LED signal
FC_MODE		
FC_IDEEN	Output	Master/Slave select and connect to IDE_CSEL for Cable select option
XTALR	Output	R/C Clock Oscillator Resistor Output. The resistor connected between this pin and XTALI determines the operating clock frequency. Use a 470Ω resistor to obtain a frequency of about 20 MHz
XTALC	Output	R/C Clock Oscillator Capacitor Output. Connect a 22pF capacitor between this pin and XTALI.
XTALI	Input	R/C Clock Oscillator Input. This input connects to the other side of the resistors and the capacitor connected to XTALR1, XTALR2 and XTALC. Connect a 22pF capacitor from this pin to ground.
NC		Not connected
Vcc_C	Supply	Power Supply Voltage, Core
Vcc_R	Supply	Power Supply Voltage, Regulator
Vcc_F	Supply	Power Supply Voltage, Flash Memory
Vcc_P	Supply	Power Supply Voltage, controller
FADJ	Input	3.3V Flash Memory Power Supply Adjustment. Connect a 270pF capacitor from this pin to FOUT.
FOUT	Output	3.3V Flash Memory Power Supply. This output provides a regulated 3.3V supply if the power supply voltage is above 3.3V. This supply voltage must also be connected to the VCC_F pins.
CADJ	Input	2.5V Core Power Supply Adjustment. Connect a 220kΩ resistor from this pin to GND, a 220kΩ resistor from this pin to COUT, and a 270pF capacitor from this pin to COUT.
COUT	Output	2.5V Core Power Supply. This output provides a regulated 2.5V supply if the power supply voltage is above 3.3V. This supply voltage must be connected to the VCC_C pins.
VccNAND_IN	Supply	3.3V Flash Memory Power Supply
VccPLN_IN	Supply	Supply to the controller
GndPLN	Supply	Supply ground

TYPICAL APPLICATION DESIGN





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PRELIMINARY

SOLID STATE DISK

AS3SSD4GB8PBG

AS3SSD8GB8PBG

AS3SSD16GB5PBG

COMMAND SETS

The PATA SSD device supports all the mandatory ATA commands as defined in the ATA/ATAPI-5 specification.

ATA General Feature Command Set

The PATA SSD device supports the ATA General Feature command set.

Common Name	Code
EXECUTE DEVICE DIAGNOSTIC	90h
IDENTIFY DEVICE	ECh
IDENTIFY DEVICE DMA	EEh
INITIALIZE DRIVE PARAMETERS	91h
NOP	00h
READ BUFFER	E4h
READ DMA	C8h, C9h
READ LONG	22h, 23h
READ MULTIPLE	C4h
READ NATIVE MAX ADDRESS	F8h
READ SECTOR(S)	20h, 21h
READ VERIFY SECTOR(S)	40h, 41h
RECALIBRATE	1Xh
SEEK	7Xh
SET FEATURES	EFh
SET MULTIPLE MODE	C6h
SMART	B0h
TRANSLATE SECTOR	87h
WRITE BUFFER	E8h
WRITE DMA	CAh, CBh
WRITE LONG	32h, 31h
WRITE MULTIPLE	C5h
WRITE MULTIPLE without ERASE	CDh
WRITE SECTOR(S)	30h, 31h
WRITE SECTOR(S) without ERASE	38h
WRITE VERIFY	3Ch



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REFERENCE

This document also references standards and specifications defined by a variety of organizations. Please use the following information to identify the location of an organization's standards information.

Date or Revision Number	Title	Location
February 2000	ATA-5	http://www.t13.org/Documents/UploadedDocuments/project/d1321r3-ATAATAPI-5.pdf
December 2004	JEDEC Standard JESD22-C101C: Field-Induced Charged-Device Model Test Method for Electrostatic- Discharge-Withstand Thresholds of Microelectronic Components	http://www.jedec.org/download/search/default2.cfm
March 2006	Hyperston F2-16x, 32-Bit Flash Memory Controller Specification	http://www.hyperstone.com/fmc_f2_en,15593.html
January 2007	JEDEC Standard: Electrostatic Discharge (ESD) Sensitivity Testing Human Body Model (HBM)	http://www.jedec.org/download/search/default2.cfm

GLOSSARY

This document incorporates many industry and device specific words. Use the following list to define a variety of terms and acronyms.

Term	Definition
ATA	Advanced Technology Attachment
CFA	CompactFlash Association
CPRM	Content Protection for Recordable Media
CRC	Cyclic Redundancy Check
DMA	Direct Memory Access
ECC	Error Correction Code
ESD	Electrostatic Discharge
HDD	Hard Disk Drive
HPA	Host Protected Area
IDE	Integrated Device Electronics
LBA	Logical Block Addressing
MTBF	Mean Time Between Failure
MWDMA	Multi-word DMA
ODM	Original Design Manufacturer
OEM	Original Equipment Manufacturer
PATA	Parallel ATA
PCMCIA	Personal Computer Memory Card International Association
PIO	Programmable Input / Output
SATA	Serial ATA
SSD	Solid state drive
UMDA	Ultra DMA, also know Ultra ATA



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ORDER CHART

Part Number	Storage Density	Sustained Transfer Rate
AS3SSD4GB8PBGR/IT	4GB	7.7MB/sec
AS3SSD8GB8PBGR/IT	8GB	7.7MB/sec
AS3SSD16GB5PBGR/IT	16GB	5.0MB/sec
AS3SSD4GB8PBGR/CT	4GB	7.7MB/sec
AS3SSD8GB8PBGR/CT	8GB	7.7MB/sec
AS3SSD16GB5PBGR/CT	16GB	5.0MB/sec

Available Processes

CT = Commercial Temperature Range

0°C to +70°C

IT = Industrial Temperature Range

-40°C to +85°C

R = RoHS Compliant / Lead Free

Blank = Sn / Pb Finish Option



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SOLID STATE DISK

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DOCUMENT TITLE

4GB, 8GB, 16GB Solid State Disk on Chip

REVISION HISTORY

<u>Rev #</u>	<u>History</u>	<u>Release Date</u>	<u>Status</u>
1.0	Initial Release	December 2008	Preliminary
1.1	Updated Mechanical Information	January 2009	Preliminary
1.2	Updated Order Chart	March 2009	Preliminary
1.3	Updated 4GB & 8GB Drawing	July 2009	Preliminary