Am29LV400B
Known Good Wafer

Data Sheet

July 2003

The following document specifies Spansion memory products that are now offered by both Advanced Micro Devices and Fujitsu. Although the document is marked with the name of the company that originally developed the specification, these products will be offered to customers of both AMD and Fujitsu.

Continuity of Specifications

There is no change to this datasheet as a result of offering the device as a Spansion product. Any changes that have been made are the result of normal datasheet improvement and are noted in the document revision summary, where supported. Future routine revisions will occur when appropriate, and changes will be noted in a revision summary.

Continuity of Ordering Part Numbers

AMD and Fujitsu continue to support existing part numbers beginning with "Am" and "MBM". To order these products, please use only the Ordering Part Numbers listed in this document.

For More Information

Please contact your local AMD or Fujitsu sales office for additional information about Spansion memory solutions.

Publication Number **26609** Revision **B** Amendment **+0** Issue Date **April 18, 2003**

SUPPLEMENT

Am29LV400B Known Good Wafer

4 Megabit (512 K x 8-Bit/256 K x 16-Bit)
CMOS 3.0 Volt-only, Boot Sector Flash Memory, Die Revision 1

Note: This supplement contains information on the Am29LV400B in Known Good Wafer form. Refer to the Am29LV400B standard datasheet (publication 21523) for full electrical specifications.

DISTINCTIVE CHARACTERISTICS

- **Top or bottom boot block configurations available**
- **Minimum 1,000,000 write cycle guarantee per sector**
- **20-year data retention at 125°C**
- **Tested to datasheet specifications at temperature**
- **Quality and reliability levels equivalent to standard packaged components**
- **Complies with JEDEC standards for wafer shipments**

GENERAL DESCRIPTION

The Am29LV400B in Known Good Wafer (KGW) form is an 4 Mbit, 3.0 volt-only Flash memory. AMD defines KGW as standard product in wafer form, tested for functionality and speed. AMD KGW products have the same reliability and quality as AMD products in packaged form.

Electrical Specifications

Refer to the Am29LV400B data sheet, publication number 21523, for full electrical specifications on the Am29LV400B in KGW form.

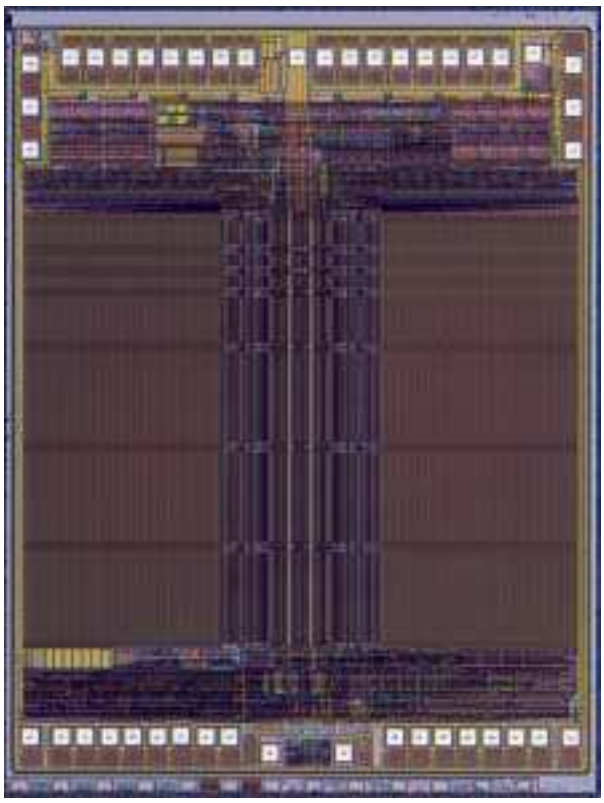
Publication# **26609** Rev: **B** Amendment/**0**
Issue Date: **April 18, 2003**

PRODUCT SELECTOR GUIDE

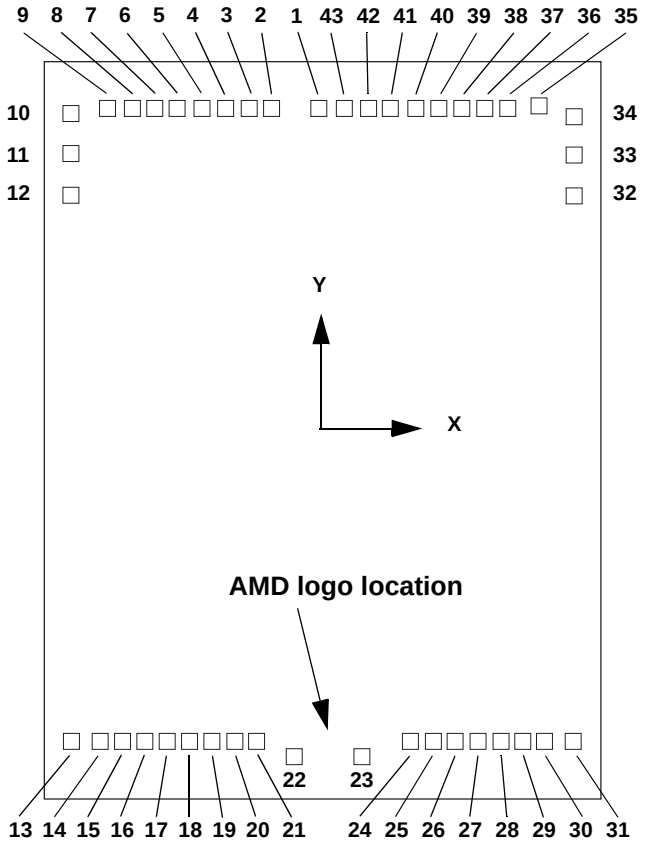
Family Part Number		Am29LV400B KGW				
Speed Option & Voltage Operating Range, V_{CC}	3.0 – 3.6 V	**-60R**				
	2.7 – 3.6 V		**-70**	**-80**	**-90**	**-120**
Max Access Time, t_{ACC} (ns)		60	70	80	90	120
Max CE# Access, t_{CE} (ns)		60	70	80	90	120
Max OE# Access, t_{OE} (ns)		30	30	30	35	50

Note: *Refer to "Test Conditions" for additional information related to speed options.*

DIE PHOTOGRAPH



DIE PAD LOCATIONS



PAD DESCRIPTION

Pad locations relative to die center.

Pad	Signal	Pad Center (mils)		Pad Center (millimeters)	
		X	Y	X	Y
1	V_{CC}	–0.90	80.50	–0.02	2.04
2	DQ4	–13.00	80.50	–0.33	2.04
3	DQ12	–18.90	80.50	–0.48	2.04
4	DQ5	–24.80	80.50	–0.63	2.04
5	DQ13	–30.70	80.50	–0.78	2.04
6	DQ6	–36.50	80.50	–0.93	2.04
7	DQ14	–42.40	80.50	–1.08	2.04
8	DQ7	–48.30	80.50	–1.23	2.04
9	DQ15/A–1	–54.20	80.50	–1.38	2.04
10	V_{SS}	–63.60	78.90	–1.62	2.00
11	BYTE#	–63.60	68.90	–1.62	1.75
12	A16	–63.60	–58.80	–1.62	–1.49
13	A15	–63.30	–79.00	–1.61	–2.01
14	A14	–55.90	–79.00	–1.42	–2.01
15	A13	–50.50	–79.00	–1.28	–2.01
16	A12	–44.70	–79.00	–1.14	–2.01
17	A11	–39.30	–79.00	–1.00	–2.01
18	A10	–33.40	–79.00	–0.85	–2.01
19	A9	–28.00	–78.70	–0.71	–2.00
20	A8	–22.10	–79.00	–0.56	–2.01
21	WE#	–16.60	–79.00	–0.42	–2.01
22	RESET#	–7.10	–82.80	–0.18	–2.10
23	RY/BY#	10.20	–82.80	0.26	–2.10
24	A17	22.20	–79.00	0.56	–2.01
25	A7	28.00	–79.00	0.71	–2.01
26	A6	33.40	–79.00	0.85	–2.01
27	A5	39.30	–79.00	1.00	–2.01
28	A4	44.70	–79.00	1.14	–2.01
29	A3	50.50	–79.00	1.28	–2.01
30	A2	55.90	–79.00	1.42	–2.01
31	A1	63.30	–79.00	1.61	–2.01
32	A0	63.60	58.60	1.62	1.49
33	CE#	63.60	68.70	1.62	1.75
34	V_{SS}	63.60	78.70	1.62	2.00
35	OE#	54.20	81.40	1.38	2.07
36	DQ0	46.60	80.50	1.18	2.04
37	DQ8	40.70	80.50	1.03	2.04
38	DQ1	34.90	80.50	0.89	2.04
39	DQ9	28.90	80.50	0.73	2.04
40	DQ2	23.10	80.50	0.59	2.04
41	DQ10	17.20	80.50	0.44	2.04
42	DQ3	11.40	80.50	0.29	2.04
43	DQ11	5.40	80.50	0.14	2.04

Note: *The coordinates above are relative to die center and can be used to operate wire bonding equipment.*

PAD DESCRIPTION

Pad locations relative to V_{CC}.

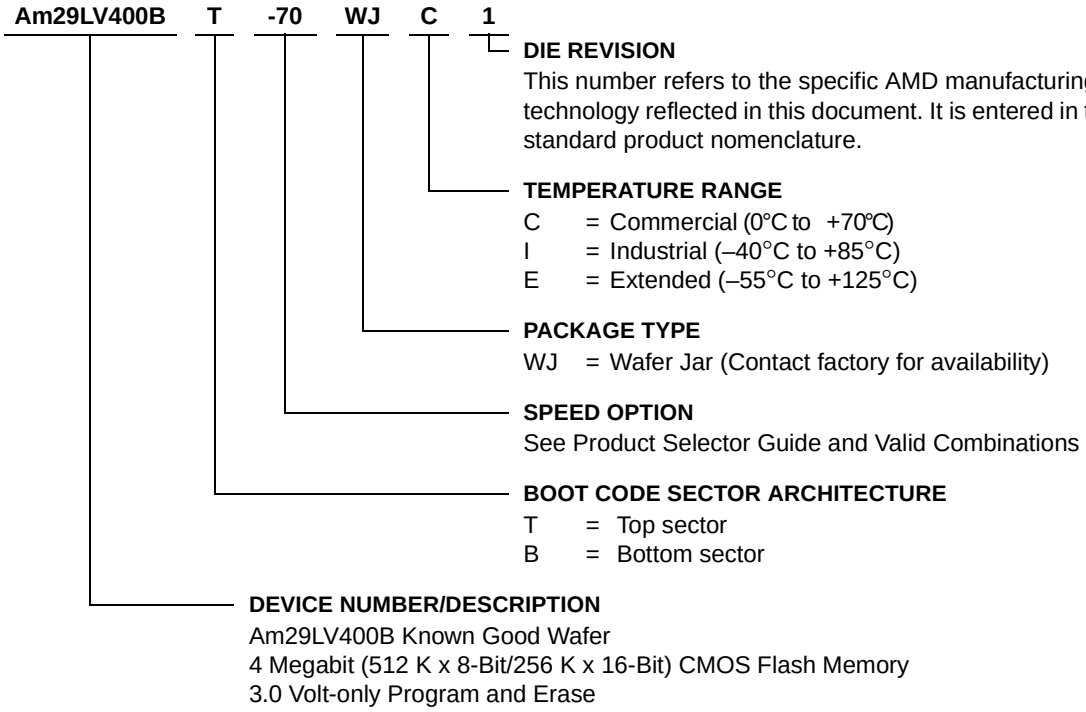
Pad	Signal	Pad Center (mils)		Pad Center (millimeters)	
		X	Y	X	Y
1	V_{CC}	0.00	0.00	0.00	0.00
2	DQ4	–12.10	0.00	–0.31	0.00
3	DQ12	–18.00	0.00	–0.46	0.00
4	DQ5	–23.90	0.00	–0.61	0.00
5	DQ13	–29.80	0.00	–0.76	0.00
6	DQ6	–35.60	0.00	–0.90	0.00
7	DQ14	–41.50	0.00	–1.05	0.00
8	DQ7	–47.40	0.00	–1.20	0.00
9	DQ15/A–1	–53.30	0.00	–1.35	0.00
10	V_{SS}	–62.70	–1.60	–1.59	–0.04
11	BYTE#	–62.70	–11.60	–1.59	–0.29
12	A16	–62.70	–21.70	–1.59	–0.55
13	A15	–62.40	–159.50	–1.58	–4.05
14	A14	–55.00	–159.50	–1.40	–4.05
15	A13	–49.60	–159.50	–1.26	–4.05
16	A12	–43.80	–159.50	–1.11	–4.05
17	A11	–38.40	–159.50	–0.98	–4.05
18	A10	–32.50	–159.50	–0.83	–4.05
19	A9	–27.10	–159.20	–0.69	–4.04
20	A8	–21.20	–159.50	–0.54	–4.05
21	WE#	–15.70	–159.50	–0.40	–4.05
22	RESET#	–6.20	–163.30	–0.16	–4.15
23	RY/BY#	11.10	–163.30	0.28	–4.15
24	A17	23.10	–159.50	0.59	–4.05
25	A7	28.90	–159.50	0.73	–4.05
26	A6	34.30	–159.50	0.87	–4.05
27	A5	40.20	–159.50	1.02	–4.05
28	A4	45.60	–159.50	1.16	–4.05
29	A3	51.40	–159.50	1.31	–4.05
30	A2	56.80	–159.50	1.44	–4.05
31	A1	64.20	–159.50	1.63	–4.05
32	A0	64.50	–21.90	1.64	–0.56
33	CE#	64.50	–11.80	1.64	–0.30
34	V_{SS}	64.50	–1.80	1.64	–0.05
35	OE#	55.10	0.90	1.40	0.02
36	DQ0	47.50	0.00	1.21	0.00
37	DQ8	41.60	0.00	1.06	0.00
38	DQ1	35.80	0.00	0.91	0.00
39	DQ9	29.80	0.00	0.76	0.00
40	DQ2	24.00	0.00	0.61	0.00
41	DQ10	18.10	0.00	0.46	0.00
42	DQ3	12.30	0.00	0.31	0.00
43	DQ11	6.30	0.00	0.16	0.00

Note: *The coordinates above are relative to the die center and can be used to operate wire bonding equipment.*

ORDERING INFORMATION

Standard Products

AMD standard products are available in several packages and operating ranges. The order number (Valid Combination) is formed by a combination of the following:

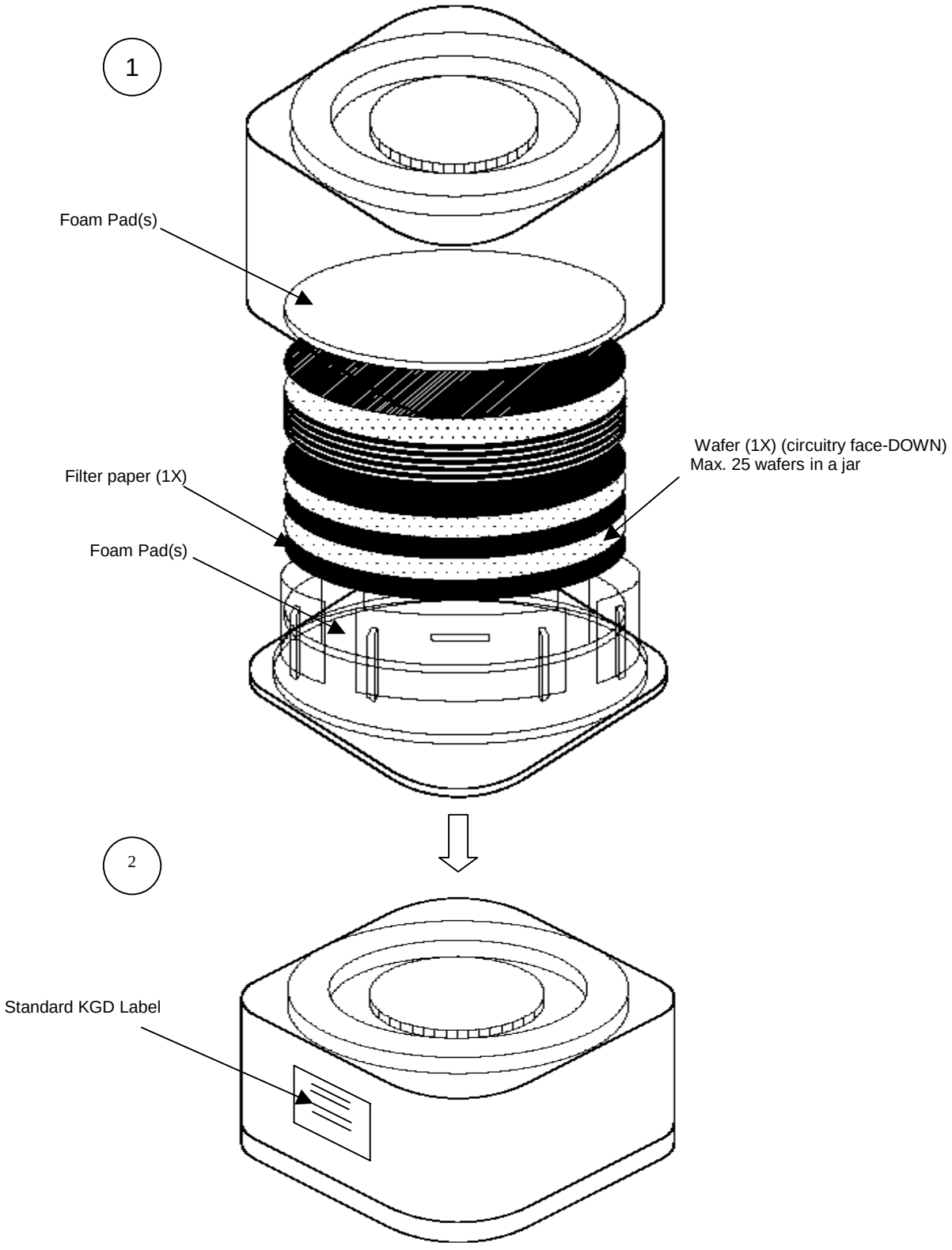


Valid Combinations		V_{CC} Range
AM29LV400BT-60R AM29LV400BB-60R	WJC 1, WJI 1	3.0–3.6 V
AM29LV400BT-70 AM29LV400BB-70		2.7–3.6 V
AM29LV400BT-80 AM29LV400BB-80	WJC 1, WJI 1, WJE 1	
AM29LV400BT-90 AM29LV400BB-90		
AM29LV400BT-120 AM29LV400BB-120		

Valid Combinations

Valid Combinations list configurations planned to be supported in volume for this device. Consult the local AMD sales office to confirm availability of specific valid combinations and to check on newly released combinations.

WAFER JAR DIAGRAM



PRODUCT TEST FLOW

Figure 1 provides an overview of AMD's Known Good Wafer test flow. For more detailed information, refer to the Am29LV400B product qualification database. AMD implements quality assurance procedures throughout the product test flow. These QA procedures also allow AMD to produce KGW products without requiring or implementing burn-in. In addition, an off-line qualification maintenance program (QMP) guarantees AMD quality standards are met on Known Good Wafer products.

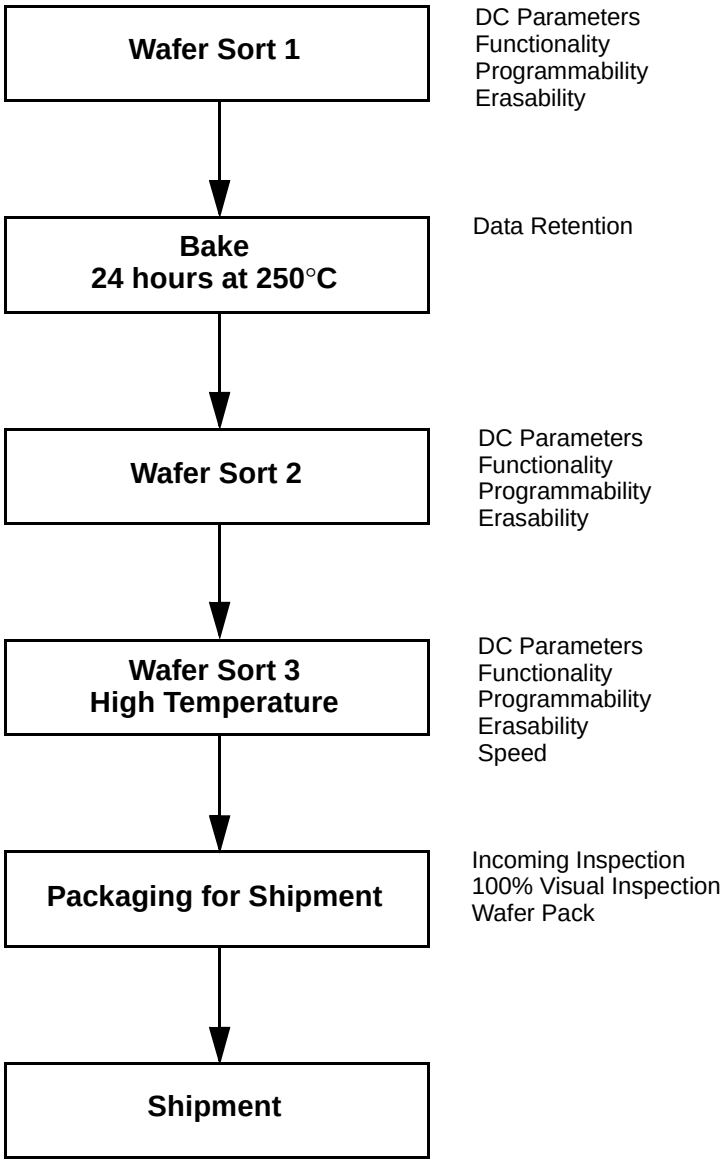


Figure 1. AMD KGW Product Test Flow

PHYSICAL SPECIFICATIONS

Wafer Size . . . . . 200 mm

Active Die dimensions . x = 3462.6 µm; y = 4470.6 µm

. . . . . x = 136.3 mils; y = 176 mils

Scribe width . . . . . .x = 87.4 µm; y = 229.4 µm

. . . . . x = 3.44 mils; y = 9.03 mils

Step dimensions . . . . . .x = 3.56 mm; y = 4.70 mm

. . . . . x = 140 mils; y = 185 mils

Wafer Thickness . . . . . .483 +/–51 µm

Bond Pad Size . . . . . 3.74 mils x 3.74 mils

. . . . . 95 µm x 95 µm

Minimum pad pitch. . . . . 137.8 µm

. . . . . 5.42 mils

Pad Area Free of Passivation . . . . . .13.99 mils^2

. . . . . 9,025 µm^2

Pads Per Die 43

Bond Pad Metalization . . . . . Al/Cu

. . . . . Minimum thickness: 10500 Angstroms

Die Backside . . . . . No metal, may be grounded with Back-grind type finish (optional)

Passivation. . . . . Nitride/SOG/Nitride

. . . . . Minimum thickness: 14700 Angstroms

Ink dot height . . . . . .0.8 mils max

. . . . . 20.3 µm max

Ink dot diameter . . . . . .15 mils min

. . . . . 381 µm min

Edge die Inked . . . . . .Yes

DC OPERATING CONDITIONS

V_{CC} (Supply Voltage) . . . . . .2.7 V to 3.6 V

Operating Temperature

Commercial . . . . . 0°C to +70°C

Industrial . . . . . –40°C to +85°C

Extended . . . . . –55°C to +125°C

MANUFACTURING INFORMATION

Manufacturing . . . . . .FASL

Test . . . . . Penang, Malaysia

Manufacturing ID (Top Boot) 98F03AK

(Bottom Boot) 98F03ABK

Preparation for Shipment . . . . . Penang, Malaysia

Fabrication Process CS39S

Die Revision 1

SPECIAL HANDLING INSTRUCTIONS

Processing

Do not expose KGW products to ultraviolet light or process them at temperatures greater than 250°C. Failure to adhere to these handling instructions will result in irreparable damage to the devices. For best yield, AMD recommends assembly in a Class 10K clean room with 30% to 60% relative humidity.

Storage

Store at a maximum temperature of 30°C in a nitrogen-purged cabinet or vacuum-sealed bag. Observe all standard ESD handling procedures.

TERMS AND CONDITIONS OF SALE FOR AMD NON-VOLATILE MEMORY DIE

All transactions relating to unpackaged die or unpackaged wafer(s) under this agreement shall be subject to AMD's standard terms and conditions of sale, or any revisions thereof, which revisions AMD reserves the right to make at any time and from time to time. In the event of conflict between the provisions of AMD's standard terms and conditions of sale and this agreement, the terms of this agreement shall be controlling.

AMD warrants its manufactured unpackaged die whether shipped to customer in individual dice or wafer form ("Known Good Die," "KGD", "Die," "Known Good Wafer", "KGW", or Wafer(s)) will meet AMD's published specifications and against defective materials or workmanship for a period of one (1) year from date of shipment.

This limited warranty does not extend beyond the first purchaser of said Die or Wafer(s).

Buyer assumes full responsibility to ensure compliance with the appropriate handling, assembly and processing of KGD or KGW (including but not limited to proper Die preparation, Die attach, backgrinding, singulation, wire bonding and related assembly and test activities), and compliance with all guidelines set forth in AMD's specifications for KGD or KGW, and AMD assumes no responsibility for environmental effects on KGD or KGW or for any activity of Buyer or a third party that damages the Die or Wafer(s) due to improper use, abuse, negligence, improper installation, improper backgrinding, improper singulation, accident, loss, damage in transit, or unauthorized repair or alteration by a person or entity other than AMD ("Limited Warranty Exclusions")

The liability of AMD under this limited warranty is limited, at AMD's option, solely to repair the Die or Wafer(s), to send replacement Die or Wafer(s), or to make an appropriate credit adjustment or refund in an amount not to exceed the original purchase price actually paid for the Die or Wafer(s) returned to AMD, provided that: (a) AMD is promptly notified by Buyer in writing during the applicable warranty period of any defect or nonconformity in the Die or Wafer(s); (b) Buyer obtains authorization from AMD to return the defective Die or Wafer(s); (c) the defective Die or Wafer(s) is returned to AMD by Buyer in accordance with AMD's shipping instructions set forth below; and (d) Buyer shows to AMD's satisfaction that such alleged defect or nonconformity actually exists and was not caused by any of the above-referenced Warranty Exclusions. Buyer shall ship such defective Die or Wafer(s) to AMD via AMD's carrier, collect. Risk of loss will transfer to AMD when the defective Die or Wafer(s) is provided to AMD's carrier. If Buyer fails to adhere to these warranty returns guidelines, Buyer shall assume all risk of loss and shall pay for all freight to AMD's specified location. The aforementioned provisions do not extend the original limited warranty period of any Die or Wafer(s) that has either been replaced by AMD.

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REVISION SUMMARY

Revision A (June 19, 2002)

Initial release.

Revision B (April 18, 2003)

Updated General Description and Distinctive Characteristics.

Die Pad Locations

Added X and Y axis marker.

Product Test Flow

Updated text.

Physical Specifications

Added ACtive Die Dimensions, Scribe Width, Step Dimensions, Minimum Pad Pitch, Ink dot height, Ink dot diameter, and Edge Die Inked specifications.

Terms and Conditions of sale for AMD Non-volatile memory die

Updated text following first paragraph.