

SEMI M13-0998^E SPECIFICATION FOR ALPHANUMERIC MARKING OF SILICON WAFERS

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^E This document was modified by the Global Traceability Committee in April 1999 to reflect the creation of SEMI AUX1 as the source for vendor identification codes. Changes were made to numerous sections.

1 Scope

1.1 This specification defines the geometric and spatial limits of the alphanumeric code, specifically for flatted and notched silicon wafers. It also defines the basic code used to characterize the individual wafer, thereby providing practical operator interpretation. This specification will ensure the consistency of all wafer marking performed by silicon manufacturers. This will allow simplification of the performance requirements of Automatic Optical Character Reading (OCR) equipment. This document does NOT address the marking techniques that may be employed when complying with this standard.

2 Applicable Documents

2.1 SEMI Standards

SEMI AUX1 — List of Vendor Identification Codes

2.2 ANSI Standard¹

ANSI X 3.17 — Character Set and Print Quality for Optical Character Recognition (OCR-A).

3 Selected Definitions

3.1 *character misalignment* — the vertical distance, R, between the character baselines of two adjacent characters on the same line (see Figure 6a.).

3.2 *character separation* — the horizontal distance between the adjacent boundaries of any characters (see Figure 1).

3.3 *character spacing* — the horizontal distance between the character spacing reference lines of the adjacent characters (see Figure 1).

3.4 *line spacing misalignment* — the vertical distance, R, between the character baselines of two characters on the same line (see Figure 6b).

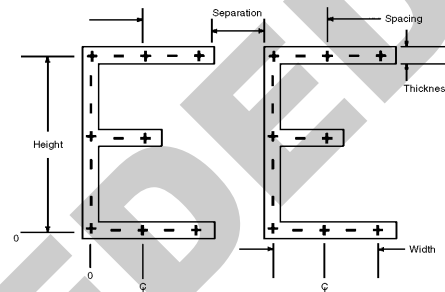


Figure 1
Character Outline

4 Method of Marking

4.1 Solid line or dot matrix method may be used to write characters. The minimum matrix shall be 5 dots horizontal and 9 dots vertical as shown in Figure 1.

NOTE 1: The 5 × 9 dot matrix shown in Figure 1 is the minimum number of dots allowed. More dots may be used, up to and including a solid line.

NOTE 2: The diagonal thickness of the letter "N" is 0.138 + 0.05 mm.

4.2 *Character Dimensions and Spacing* — See Table 1 and Figure 1.

4.3 *SEMI OCR Standard Character Set* — See Table 2 and Appendix 1.

5 Alphanumeric Code

5.1 *Vendor Code* — Limited to one line of 18 characters (See Figure 2 and Table 3.)

NOTE 3: In the absence of a character at any assigned location, a dash (-) must be used.

¹ American National Standards Institute, 11 West 42nd Street, New York, NY 10036, tel 212.642.4900, fax 212.398.0023

Table 1 Character Dimensions

Character	100 mm, 125 mm, and 150 mm Flat Wafers mm	150 mm and 200 mm Notched Wafers mm
Height	0.812 ± 0.025	1.624 ± 0.025
Width	0.406 ± 0.025	0.812 ± 0.025
Thickness	0.100 ± 0.050	0.200 + 0.025 or - 0.150
Spacing	0.710 ± 0.025	1.420 ± 0.025
Minimum Separation	0.104	0.308

6 Code Field Location

6.1 Vendor Code Field to be located on the polished and/or front surface of wafers (see SEMI AUX1 for a list of codes).

6.2 All characters must be contained within field (dashed lines).

6.3 *Dimensions* — See Figures 3 and 4.

7 Character Alignment

7.1 *Character Skew* — 3 maximum allowable (See Figure 5.)

7.2 Maximum Character Misalignment — See Figures 6a and 6b.

Table 2 Standard Character Set

A B C D E F G H I J K L M N O
 P Q R S T U V W X Y Z -
 0 1 2 3 4 5 6 7 8 9 .

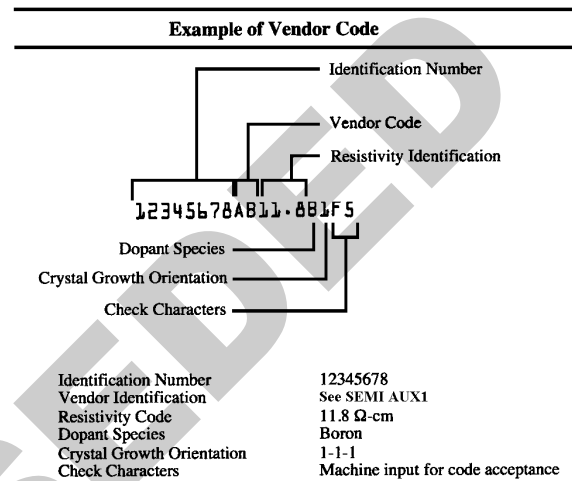
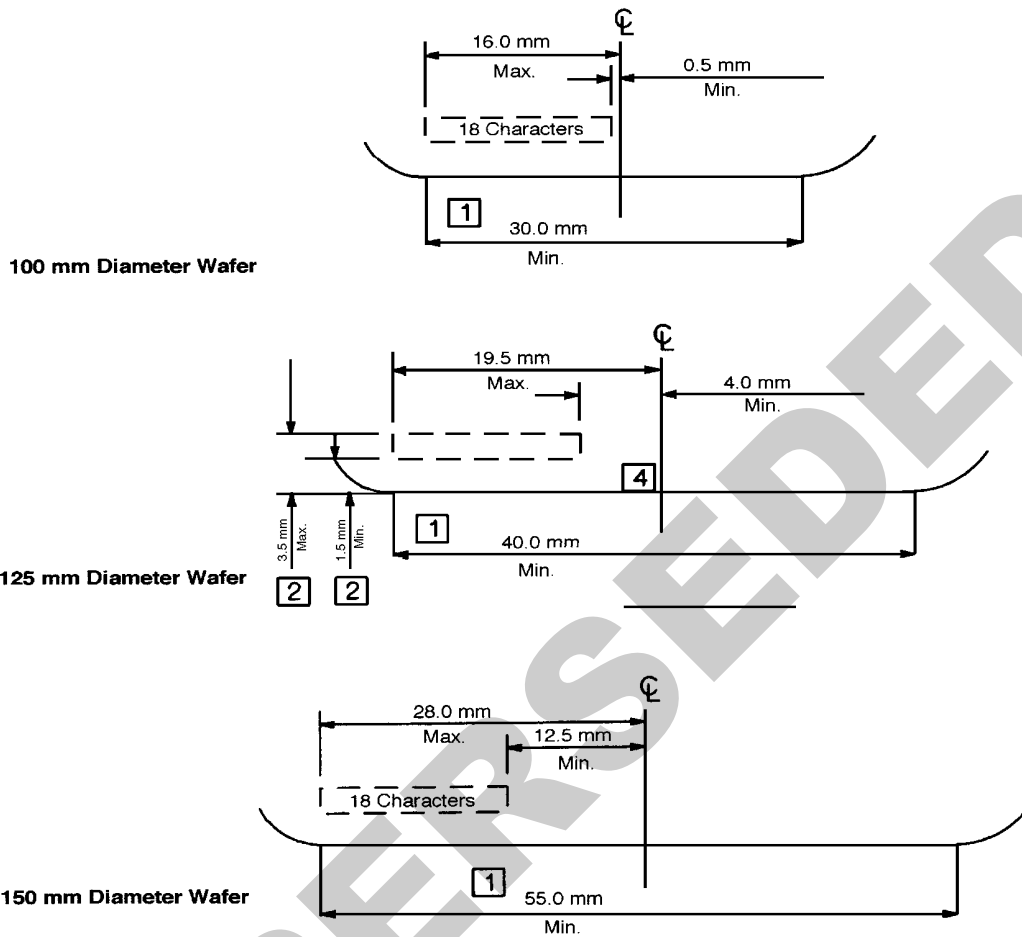


Figure 2
Example of Vendor Code

Table 3 Vendor Code

<i>Character Location</i>	<i>Character Style</i>	<i>Parameter</i>	<i>Code</i>	<i>Definition</i>
1	Alpha/Numeric	IDENTIFICATION NUMBER	ABCDEFGH	Vendor-Assigned
2	Alpha/Numeric	IDENTIFICATION NUMBER	HIJKLMN	Vendor-Assigned
3	Alpha/Numeric	IDENTIFICATION NUMBER	OPQRSTU	Vendor-Assigned
4	Alpha/Numeric	IDENTIFICATION NUMBER	VWXYZ	Vendor-Assigned
5	Alpha/Numeric	IDENTIFICATION NUMBER	0123	Vendor-Assigned
6	Alpha/Numeric	IDENTIFICATION NUMBER	4567	Vendor-Assigned
7	Alpha/Numeric	IDENTIFICATION NUMBER	89	Vendor-Assigned
8	Numeric Only	IDENTIFICATION NUMBER	-	Vendor-Assigned
9	Alpha Only	VENDOR IDENTIFICATION	A through Z	(see SEMI AUX1)
10	Alpha Only	VENDOR IDENTIFICATION	A through Z	Resistivity (ohm-cm) identification is assigned by vendor in whole or partial numbers. No accuracy is implied.
11	Numeric Only	RESISTIVITY IDENTIFICATION	012	Resistivity (ohm-cm) identification is assigned by vendor in whole or partial numbers. No accuracy is implied.
12	Numeric Only	RESISTIVITY IDENTIFICATION	345	Resistivity (ohm-cm) identification is assigned by vendor in whole or partial numbers. No accuracy is implied.
13	Numeric Only	RESISTIVITY IDENTIFICATION	678	Resistivity (ohm-cm) identification is assigned by vendor in whole or partial numbers. No accuracy is implied.
14	Numeric Only	RESISTIVITY IDENTIFICATION	9.	Resistivity (ohm-cm) identification is assigned by vendor in whole or partial numbers. No accuracy is implied.
15	Alpha Only	DOPANT SPECIES	B	Boron
			F	Phosphorous
			A	Arsenic
			S	Antimony
16	Numeric Only	CRYSTAL GROWTH ORIENTATION	0	1-0-0
			1	1-1-1
			2	1-1-0
			3	0-1-1
			5	5-1-1
			-	
17	Alpha Only	CHECK CHARACTERS	A through H	Error-Detecting Method
18	Numeric Only	CHECK CHARACTERS	0 through 7	(see Sections 8 - 13)



- 1** Minimum flat length shown for 100 mm, 125 mm, and 150 mm diameter wafers.
- 2** This dimension applies to 100 mm, 125 mm, and 150 mm diameter wafers.

Figure 3
Vendor Code Field Location for Flatted Wafers