Technical Note

SEMI®-Defined Wafer Map Format

Introduction

Micron has adopted the wafer map file format approved by Semiconductor Equipment and Materials International (SEMI®). Using a mapping format defined by a worldwide standards committee alleviates possible compatibility issues resulting from different semiconductor companies using internal, possibly proprietary, formats. With SEMI formatting, Micron's customers can be confident they will always receive consistent, compatible, reliable map files.

Specifications

The following SEMI specifications outline the format and data items contained in the map file:

G81-0703 Specification for Map Data Items

G85-0703 Specification for Map Data Format

These documents may be requested from SEMI's Web site (http://wps2a.semi.org/wps/portal).

Sending Wafer Maps

Micron uses three methods for sending wafer maps; they are listed here in order of preference:

1. Micron FTP site
2. E-mail distribution
3. CD with shipment

Description

Table 1 lists and defines the attributes used in Micron's implementation of the SEMI specifications for wafer map format. Figure 1 on page 3 is an example of a one-wafer-lot map file (formatting has been added for easier reading).

Table 1: Attributes and Definitions for SEMI-Defined Wafer Map Format

Attribute	Definition
xmlns	Default value must be "http://www.semi.org"
SubstrateId	Identifying scribe on the physical wafer
SubstrateType	The type of substrate = "Wafer"
FormatRevision	SEMI specification version used for map creation
Rows	The number of rows on the map

Table 1: Attributes and Definitions for SEMI-Defined Wafer Map Format (continued)

Attribute	Definition
LotId	Production lot identifier for this map data
BinType	The format in which the bin code for each device will be represented in the map Micron uses a single ASCII character
Columns	The number of columns in the map
MapType	Possible variations of data structure. Micron uses the array format (all bin data is expressed in a one-dimensional array)
NullBin	Code to indicate no device or an untested device
ProductId	Product identifier Micron uses the Micron marketing part number ordered by the customer Marketing part numbers comprise up to 34 alphanumeric characters
WaferSize	Diameter of wafer in millimeters
CreateDate	Date and time when the map data is acquired, formatted as YYYYMMDDhhmmssmmm (year-month-date-hour-minute-second-millisecond)
DeviceSizeX	Device size on x-axis in microns
DeviceSizeY	Device size on y-axis in microns
MicronLotId	Internal Micron lot number
Orientation	Orientation of wafer flat or notch in relation to the map data Micron uses “0” = the flat or notch is at the bottom of map data
SupplierName	Name of the wafer supplier = “Micron Technology, Inc.”
OriginLocation	Location of the origin of the coordinates Micron uses “2” = upper left – top side
ReferenceDeviceX	X coordinate of the reference device to align device matrix on the wafer with the map data
ReferenceDeviceY	Y coordinate of the reference device to align device matrix on the wafer with the map data
BinCode	BinCode Bin category in map Micron uses BinCode “G” for each good probed die in map Micron uses BinCode “X” for each failed die in map Micron uses BinCode “0” for each Null Bin in the map
BinCount	The number of devices on the wafer with the specified BinCode
BinQuality	Describes the quality (pass or fail) of the specified BinCode

Figure 1: Example of a One-Wafer-Lot Map File

```
  <?xml version='1.0' encoding='utf-8'?>
- <Maps>
- <Map xmlns="http://www.semi.org" SubstrateId="123456705F2" SubstrateType="Wafer"
FormatRevision="SEMI G85-0703">
  - <Device Rows="35" LotId="1234567.111" BinType="ASCII" Columns="40" MapType="Array"
NullBin="0" ProductId="MT*" WaferSize="200" CreateDate="20050117093925000" DeviceSizeX="4800.60"
DeviceSizeY="5484.12" MicronLotId="1234567.111" Orientation="0" SupplierName="Micron Technology,
Inc." OriginLocation="2">
    <ReferenceDevice ReferenceDeviceX="27" ReferenceDeviceY="34"/>
    <Bin BinCode="G" BinCount="830" BinQuality="Pass"/>
    <Bin BinCode="X" BinCount="256" BinQuality="Fail"/>
  - <Data>
    -<Row><![CDATA[00000000000000XXXXGXXGGGXX00000000000000]]></Row>
    -<Row><![CDATA[0000000000000XXXGGXXGXGGXGGGX000000000000]]></Row>
    -<Row><![CDATA[000000000XGXGGGGGGGGXXXGGGGGX0000000000]]></Row>
    -<Row><![CDATA[00000000GGGGGXGGGGGXGXGGGGGXGGXX00000000]]></Row>
    -<Row><![CDATA[000000XGXGGGGGGGGGGGGGGGGGGGGGGG0000000]]></Row>
    -<Row><![CDATA[00000XXXGXXXGGGGGGGGXXGGGXGGGGGGGGX00000]]></Row>
    -<Row><![CDATA[0000XXGGGGGGGGGGGGGGGGGGGGGGGGGGGX00000]]></Row>
    -<Row><![CDATA[0000GGGGGXGGGGGGGGGGGGGGXGGGXGGGGGGX0000]]></Row>
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    -<Row><![CDATA[00XXGGGGXGGXGGGGGGGXGGGGGXXGGGGGGXXGGX00]]></Row>
    -<Row><![CDATA[00GGGGGGXGXGGGGGGGGGGGGGGGXXGGXGGGGGG00]]></Row>
    -<Row><![CDATA[0XGGGGXGGXGGXGGGGGGGGGGGGGGGGGGGGGGGX0]]></Row>
    -<Row><![CDATA[0GGGXXGGGXXXGGGGGGGGGGGGGXGGXGGGXXGGGX0]]></Row>
    -<Row><![CDATA[0XGGGGGGGGGXGGGGGGGGGXGGGGXXGGGGGGGGG0]]></Row>
    -<Row><![CDATA[XGGGGGGGGGXGGGXGGXGGGGGXGXXGGGGGGGXGGX]]></Row>
    -<Row><![CDATA[XGGGGGGXGXXGGGGGGGGGGGGGXGGXGGGXGGXGGX]]></Row>
    -<Row><![CDATA[XGGGGGXXGGXGGGGGGGXXGGGXGGXGXXGGXGXXGX]]></Row>
    -<Row><![CDATA[XGXGGGGXGXXXXGGGGGXXGGGXXXXXXXGXGGGGGX]]></Row>
    -<Row><![CDATA[XGGGXGGGGXGGGGGGGGXGGGXXGGGXXGGGGGGGX]]></Row>
    -<Row><![CDATA[XGXGXGGGGGXGGGXGGGGGXGGGGXXGGGGGGGGX]]></Row>
    -<Row><![CDATA[XGGGGGGXXGGGGGXGGXGGGXGGGGXGGGGGGGXGX]]></Row>
    -<Row><![CDATA[0GXGGGGGGGGGGGGXGGGGGGGGGGGGGXGGGGGG0]]></Row>
    -<Row><![CDATA[0GXGGGGGGGGGGGGGGGXGGGGGXXGXGXGGGX0]]></Row>
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    -<Row><![CDATA[0000000000000XXGGGXXXXGXXXX0000000000000]]></Row>
    -<Row><![CDATA[000000000000000XXXXXXX00000000000000000]]></Row>
    </Data>
    </Device>
  </Map>
</Maps>
```

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Revision History

Rev. F 3/14

- Corrected failed BinCount in Figure 1.

Rev. E 2/09

- Updated SubstrateId in Figure 1.
- Updated template.

Rev. D 7/08

- Added “Sending Wafer Maps” section.
- Updated BinCode information in Table 1.

Rev. C 9/07

- Changed ProductID to Micron marketing part number ordered.

Rev. B 6/06

- Added BinCode and BinCount for failed probe die.

Rev. A 9/05

- Initial release.