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Standard Specification for Semiconductor Device Passivation Opening Layouts[1]

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ε[1] NOTE—Keywords were added editorially in September 1994.

1. Scope

1.1 This specification covers standard semiconductor device passivation opening layouts for various tape automated bonding interconnection technologies.

1.2 This specification established the nominal passivation opening dimensions, nominal passivation, opening spacing, nominal corner passivation opening offset, minimum scribe guard and minimum die size for the most common input/output counts within each technology.

1.3 This specification is extendable to other interconnection technologies if the passivation opening and spacing are adjusted in such a way that the progression is not modified.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

2. Terminology

2.1 *Definitions:*

2.1.1 *corner offset*—The orthogonal distance between the corner passivation opening on adjacent sides of the die where a corner passivation opening is indentified as the end passivation opening on a die side.

2.1.2 *lead count*—The number of passivation openings available on a fully populated die layout.

2.1.3 *minimum die edge guard*—The minimum distance between the die edge and the passivation opening nearest to the die edge herein used to establish the minimum die size.

2.1.4 *minimum die size*—The minimum die size is calculated by the following equation:

$$\text{minimum die size} = ((\text{lead count}/4)\ (\text{p.o. size} + \text{p.o. space})) - \text{p.o. space} + (2\ (\text{corner offset} + \text{p.o. size} + \text{die edge guard}))$$

2.1.5 *passivation opening*—The unpassivated area within the device metal bonding pad area.

2.1.6 *passivation opening size*—The minimum othagonal dimensions of the passivation opening for the particular technology herein used as the nominal passivation opening size.

2.1.7 *passivation opening space*—The minimum space between adjacent passivation openings for the particular technology herein used as the nominal passivation opening spacing.

2.1.8 *progression*—The dimension as measured from a reference point on one passivation opening to the same reference point on the adjacent passivation opening.

2.1.9 *technology*—The minimum passivation opening progression allowable for a specific interconnection method.

3. Classification

3.1 The passivation opening layouts are separated into four technology types where:

Type I = 220 µm technology (220 µm = 8.7 mils)
Type II = 185 µm technology (185 µm = 7.3 mils)
Type III = 150 µm technology (150 µm = 5.9 mils)
Type IV = 100 µm technology (100 µm = 3.9 mils)

4. Dimensions, Mass, and Permissible Variations

4.1 The primary unit of measure is micrometres (µm) (1 micrometre = 1 micron) and the secondary unit of measure is mils (1/1000 of an in.), where 1 mil (0.001 in.) = 25.4 µm.

4.2 Fig. 1 shows the generic dimension measurement for each defined dimension.

4.3 The lead count independent dimensions are summarized in Table 1 for all technologies.

4.4 The specific standard layouts are listed in Tables 2-5 for Type I, Type II, Type III and Type IV technologies respectively.

4.5 *Progression*—Any variations must be noncumulative.

4.6 *Lead Count*—All passivation openings as specified in this specification must be included in the design whether they are or are not connected internally.

5. Keywords

5.1 opening layouts; passivation; semiconductor devices

[1] This specification is under the jurisdiction of ASTM Committee F-1 on Electronic and is the direct responsibility of Subcommittee F01.16 on Tape Automated bonding.

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