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Introduction

Delamination of the interfaces between the die, lead frame and the ambient materials is one of the major issues of IC reliability. There are several methods described in the literature how to characterize the adhesion of the die at these interfaces. Some of them are standardized. This publication gives guidance which method to choose for material selection, qualification or monitoring.

CHARACTERIZATION OF INTERFACIAL ADHESION IN SEMICONDUCTOR PACKAGES

(From JEDEC Board Ballot JCB-20-33 and JCB-20-33A, formulated under the cognizance of the JC-14.1 Subcommittee on Reliability Test Methods for Packaged Devices.)

1 Scope

This document identifies methods used for the characterization of die adhesion. It gives guidance which method to apply in which phase of the product or technology life cycle.

NOTE Inclusion in this directory of methods does not imply applicability to all die-package configurations.

2 Terms and definitions

die adhesion: Steady or firm attachment between die and an adhesive material e.g. mold compound

adhesion strength: the force needed to separate two materials by an defined method like shear or pull.

creep: the tendency of a solid material to slowly and permanently deform under stress.

Mode I (crack failure mode): An opening or tensile crack caused by loading normal to the crack

Mode II (crack failure mode): A sliding or in-plane shear crack caused by loading parallel to the crack surface sliding direction.

NOTE The crack surfaces slide over one another in direction perpendicular to the leading edge of the crack.

Mode III (crack failure mode): A tearing or out-of-plane shear crack caused by loading coplanar to the crack surface and perpendicular to the crack propagation direction.

wear: The erosion of material from a solid surface caused by interaction with another material.