The purpose of this document is to present a glossary regarding the criteria utilized by the Texas Instruments Die Products Business Unit for the inspection of unpackaged die and wafers. This is intended for use as a general guideline only to provide end users of unpackaged die and wafers a baseline for performing visual inspection.

Glossary

ACTIVE CIRCUIT AREA - All areas from outside edge of the bond pads inward, except where there is an active line in the device located beyond the outside edge of the bond pads.

AIR (COUPLING) BRIDGE - A raised layer of metallization used for interconnection that is isolated from the die surface by only air.

BALL GRID ARRAY (BGA) - A packaging technology similar to a pad grid array, in which a device's external connections are arranged as an array of conducting pads on the base of the package. However, in the case of a ball grid array, small balls of solder are attached to the conducting pads.

BARE DIE - An unpackaged discrete or integrated circuit. Bare die have bond pads on the upper surface suitable for interconnection to the substrate or package by wire bonding or soldered wiring.

BCB - Type of transparent insulating material that covers the active circuit area except the bond pads and the scribe street. This is deposited on die destined for Flip-Chip use prior to tri-metal layer deposition.

BICMOS - Bipolar CMOS. A type of semiconductor design that utilizes both bipolar and CMOS technologies. The logic gate is primarily made of CMOS, but its output stage uses bipolar transistors which can handle higher current.

BIPOLAR - A type of semiconductor design in which electronic transmission is achieved by pulsing a line called the "base" which allows current to flow from the "emitter" to the "collector" or vice versa depending on the design. Common varieties are TTL (Transistor-Transistor-Logic) and ECL (Emitter Coupled Logic).

CHIP - See DIE.

CHIP ON BOARD - Technology where bare die are bonded to boards/substrates and wire bond connections are made from board to die.

CLEAN ROOM - An area in which a high degree of cleanliness is achieved and maintained by controlling the generation and distribution of particulate matter inside the room. Cleanliness is achieved by air filtering and/or dilution systems in a controlled environment.

CMOS - Complementary MOS. Uses both PMOS (Positive) and NMOS (Negative) technology together.

DIE - A single square or rectangular piece of semiconductor material into which a specific electrical circuit has been fabricated.

DIELECTRIC ISOLATION - Electrical isolation of one or more elements of an integrated circuit by surrounding the elements with an isolating barrier such as semiconductor oxide.

DIFFUSION - Process by which electrical isolation of one or more active circuits is achieved.

DIRECT CHIP ATTACH (DCA) - A name applied to any of the chip-to-substrate connections used to eliminate the first level of packaging: see also Chip-on-Board.

ENCAPSULATE - Sealing or covering of a microcircuit to provide mechanical and environmental protection.

FOREIGN MATERIAL - Any material that is foreign to the microcircuit or package, or any non-foreign material that is displaced from its original or intended position within the microcircuit package.

FUNCTIONAL CIRCUIT ELEMENTS - Diodes, transistors, crossunders, capacitors, and resistors.

GATE OXIDE BRIDGE - The area lying between the source and drain diffusions of MOS structures. References to the metallization covering the gate oxide bridge shall include all materials that are used for the gate electrode (i.e. "poly").

GLASSIVATION - Top layer of transparent insulating material that covers active area except for bond pads.

INTEGRATED CIRCUIT (IC) - An electronic circuit in which many active or passive elements are fabricated and connected together on a single substrate, as opposed to discrete devices such as transistors, resistors, capacitors, and diodes.

INSULATOR - A material that is a poor conductor of electricity or heat, and used to separate conductors from one another.

INTERCONNECTION - The conductive path required to achieve electrical connection from a circuit element to the rest of the circuit.
JUNCTION - The outer edge of a passivation step that delineates the boundary between "P" and "N" type semiconductor material.

KERF - That portion of the component area from which material has been removed or modified by trimming or dicing.

LINE OF SEPARATION - Visible distance or space between two features that are observed not to touch at the magnification in use.

MIL - One-thousandth of an inch (x 10-3 inches). Equal to 25.4 microns.

METALLIZATION - One or more layers of microcircuit metal conduction paths.

MOS - Metal Oxide Semiconductor. Chips constructed using metal, oxide and semiconductor layers.

MULTILAYERED METALLIZATION - Two or more layers of metal or any other material used as interconnections that are not isolated from each other by a grown or deposited insulating material. The term "underlying metal" shall refer to any layer below the top layer of metal.

MULTILEVEL METALLIZATION - Two or more levels of metal or any other material used for interconnections that are isolated from each other by insulating material.

MICROCIRCUIT - A section of semiconductor wafer with circuitry and components etched into the top. Also called a die or chip.

MICRON (um) - A unit of length equal to one millionth of a meter.

OPERATING METALLIZATION - All metal or any other material used for interconnection except metallized scribe lines, test patterns, unconnected functional circuit elements, and unused bond pads.

ORIGINAL WIDTH - The width dimensions or distances that is intended by design.

OXIDE LAYER - A layer of an integrated circuit created to provide isolation between conductive layers.

PASSIVATION - Insulating layer directly over a circuit or circuit element to protect the surface from contaminants, moisture, or particles.

PERIPHERAL METAL - All metal that lies immediately adjacent to or over the scribe grid.

SCRIBE STREET - The lines that separate the die from each other on a wafer where dicing occurs.

SILICON CHIP - Although a variety of semiconductor materials are available, the most commonly used is silicon and integrated circuits are popularly known as silicon chips, or simply chips.

SLURRY - A thick mixture of water and fine wafer particles produced during the wafer sawing process. If wafer is not cleaned properly, slurry can be seen as a very fine particle deposit over the surface of individual die, sometimes forming patterns from the spray of the mixture.

SUBSTRATE - The base material upon which the passivation, metallization and circuit elements are added to built a device.

VIA - A small hole formed through the wafer or Printed Circuit Board and metallized, causing electrical connection to be made from the front (the side on which the circuitry is formed) to the backside of the wafer, substrate, or Printed Circuit Board.

VISIBLE LINE OF SEPARATION - Is understood to be separation between two elements that is clearly visible at 100x magnification.

VOID - Any region where bare semiconductor material or passivation is visible within the design areas of the metallization.

WAFFER - A disk of semiconductor material that forms the base on which a number of integrated circuits are built. Typical 4, 6, 8, or 12 inches in diameter and between .010" and .030" thick.