

## **MCM & Hybrid Handling and Storage Precautions**

Use this section to control the environment the parts are used in and in establishing procedures to safeguard the parts.

### **Moisture sensitivity**

Moisture inside a plastic device turns to steam and expands rapidly when the package is exposed to the high temperature of vapor phase reflow, infrared soldering, or, if the package is submerged in molten solder, wave soldering. Under certain conditions, the pressure from this expanding moisture can cause internal delamination of the plastic from the chip, internal cracks that do not extend to the outside of the package, bond damage, wire necking, bond lifting, thin film cracking, or cratering beneath the bonds. In the most severe case, the stress can result in external package cracks. This is commonly referred to as the “popcorn” phenomenon because the internal stress causes the package to bulge and often crack with an audible “pop”.

### **ESD**

Parts must be properly protected during test-handling insertion and all stages of manufacturing. The metal oxide semiconductor (MOS) technology used in high-impedance input stages is quite sensitive to ESD. Precautions against ESD are simple. First, store the parts in a fixture that shorts all the leads together. Second, the circuits must be handled with care, preferably by ESD trained personnel who are grounded by a ground strap during work operations. To reduce ESD at the source, assembly and test areas should not be carpeted. The moisture in the air should be regulated at a 40 or 50 percent humidity level. Soldering irons should be designed to prevent electric potential to be collected or generated at the tip during use. Grounded soldering tips may be required. Equipment containing these sensitive parts should not be handled while wires are still hanging loose. The ESD section in the Library provides background information relative to the impact of ESD charges on part reliability.

### **Temperature sensitivity**

Plastic parts have limited operating temperature capability (typically +159°C – the glass transition temperature of most encapsulants) and for this reason must be protected from the heat of soldering baths and soldering irons. Plastic packages cannot give 100 percent protection to the parts against various contamination liquids, so these parts must be sealed and stored in a relatively dry and uncontaminated atmosphere. When active cleaning baths are used as part of the assembly process, additional less active cleaning baths must follow to remove all traces of the active cleaning baths, which may become a source of destruction to

the plastic part. Most plastic packages have a small area on the end of the package through which the chip has been mounted. It is electrically connected to the circuit, and proper precautions must prevent bringing it into contact with any other potential.