

Handling Moisture Sensitive Packages

It is common knowledge throughout the electronics industry that high pin-count (≥ 44 pins) plastic packages are susceptible to moisture related failure mechanisms during board assembly. Excess moisture in these packages can turn to steam during the board solder process, causing package blistering and mechanical problems. This sensitivity to the moisture content of a plastic package led to the implementation of the industry standard practice known as Dry Pack.

Dry Pack is a process whereby plastic encapsulated semiconductors are first baked to drive all moisture out of the package and then vacuum-sealed in a waterproof bag by the manufacturer to prevent any subsequent absorption of moisture. As a further precaution, a desiccant (moisture absorbing) material and a Humidity Indicator Card (see figure 1) are sealed in the bag as well. The desiccant absorbs any residual moisture in the sealed bag. The Humidity Indicator Card indicates the relative humidity inside the sealed bag and provides an instant alert to any user who opens a sealed bag and finds a Humidity Indicator Card reading of 20% or higher.

Lattice Semiconductor Dry Packs all shipments of 44-pin and higher pin-count plastic packages in compliance with this industry standard practice. Unfortunately, Dry-Packed shipments alone can't guarantee trouble free use of these moisture sensitive packages. Special handling procedures must be followed by all who handle this product after initial shipment by Lattice Semiconductor. If these Dry-Pack

handling procedures are followed, unwanted moisture will not be absorbed by the packages and a vapor-phase or infrared solder reflow process will not cause any moisture induced quality problems.

Lattice Semiconductor documents proper Dry-Pack handling procedures on a label (see figure 2) placed on the outside of every Dry-Packed bag shipped. The text contained in the label is as follows:

- 1) Shelf life in the sealed bag is 12 months when stored at $< 40^{\circ}\text{C}$ and 90% relative humidity (RH) conditions.
- 2) After the bag is opened, devices that will be subjected to infrared reflow, vapor phase reflow, or equivalent processing (peak package body temperature of no more than 220°C) must be:
 - a) Mounted within 48 hours at factory conditions of $< 30^{\circ}\text{C}$ and 60% RH, or
 - b) Stored at less than 20% RH.
- 3) Devices require baking before mounting if either:
 - a) The Humidity Indicator Card is $> 20\%$ when read at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, or if
 - b) Items 2a or 2b are not met.
- 4) If baking is required, devices may be baked for:
 - a) 192 hours at $40^{\circ}\text{C} + 5^{\circ}\text{C} / - 0^{\circ}\text{C}$ and $< 5\%$ RH for low temperature device containers, or
 - b) 24 hours at $125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for high-temperature device containers.

Figure 1. Humidity Indicator Card

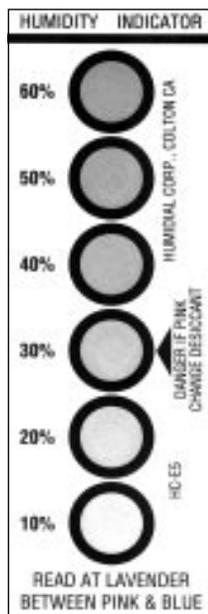


Figure 2. Dry-Pack Label





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November 1996
