

## **ADHESION:**

The quality of the chip termination connection to the ceramic capacitor body.

## **BOND STRENGTH:**

The ability of the ceramic chip termination to adhere to other surfaces such as the conductive solder pads on a printed circuit board or ceramic substrate following installation.

## **SHEAR STRENGTH:**

The ability of the mounted chip to withstand a force parallel to a printed circuit board or substrate. The Force, which is usually applied perpendicular to the length of the axis of the chip, takes into consideration the bond strength.

## **LEACHING:**

The loss of the chip termination metal through a chemical reaction between the termination and the solder paste. This is also referred to as “dewetting”.

## **COMPONENT ATTACHMENT**

Although various methods of chip attachment to printed circuit boards are used, reflow soldering is by far the most recommended and widely used method of attachment in the industry. Other soldering methods commonly used in the industry are wave soldering and vapor phase soldering. These methods all involve thermal cycling of the components and therefore the rate of heating and cooling must be controlled to avoid thermal shock cracking of the devices. In general, rates which do not exceed 200°C per minute and a maximum temperature spike “T” of 100° C for any of the soldering processes is advisable. Other precautions include post-soldering handling, dwell-time and bonding temperature considerations, solder hardness, substrate material/chip termination compatibility, and process cleanliness.

## **ATTACHMENT CONSIDERATIONS**

Termination peeling and leaching are two of the most prevalent problems seen in chip attachment. Termination peeling is caused by excessive stress

energy within the solder bond and leaching is promoted by termination-solder compositional incompatibility.

Nickel barrier termination, with exceptional solder leach resistance, is recommended for all applications involving solder. Silver palladium termination is required for epoxy and wire bonding attachment methods as well as for solder reflow below 230° C (the reflow temperature of the nickel barrier solder coating).