

**REDUCTION OF MECHANICAL STRESS IN METAL STACKS OF
SOPHISTICATED SEMICONDUCTOR DEVICES DURING DIE-SUBSTRATE
SOLDERING BY AN ENHANCED COOL DOWN REGIME**

ABSTRACT

In a reflow process for connecting a semiconductor die and a package substrate the temperature gradient and thus the thermally induced mechanical forces in a sensitive metallization system of the semiconductor die may be reduced during the cooling phase. To this end, one or more heating intervals may be introduced into the cooling phase, thereby efficiently reducing the temperature difference. In other cases, the central region may additionally be cooled providing appropriate locally restricted mechanisms, such as a locally restricted gas flow, and the like. Consequently, desired short overall process times may be obtained without contributing to increased yield losses when processing sophisticated metallization systems on the basis of a lead-free contact regime.

Figure 2a