Tgard™ TNC-4 Application Note

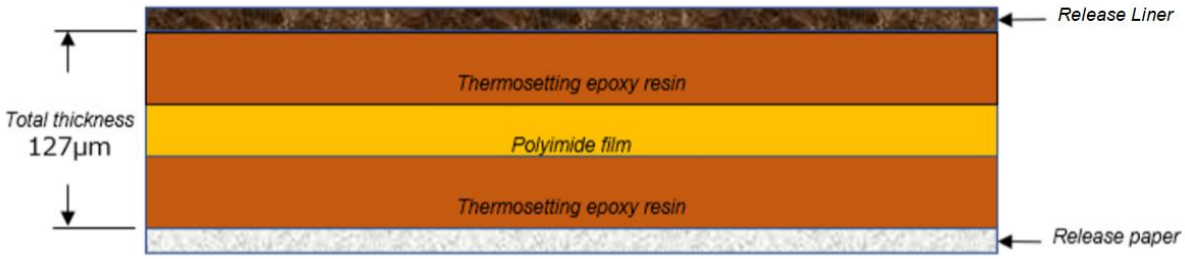
Introduction

Tgard™ TNC-4 is an electrically insulating, thermally conductive, heat curable adhesive insulator. It consists of a thin electrically insulating film coated on both sides with a thermally conductive polymer composite material.

It can be used to permanently attach an IC or other electronic packages to a heatsink.

Product structure

Tgard™ TNC-4 is supplied as a sheet with release paper applied on one side and release film is applied on the other side. The structure is shown in the below sketch.



Application

Tgard TNC-4 can be easily applied, and the application procedure can be adjusted according to customer's requirement. It is typically used to bond power components to heat sinks after curing.

Procedures

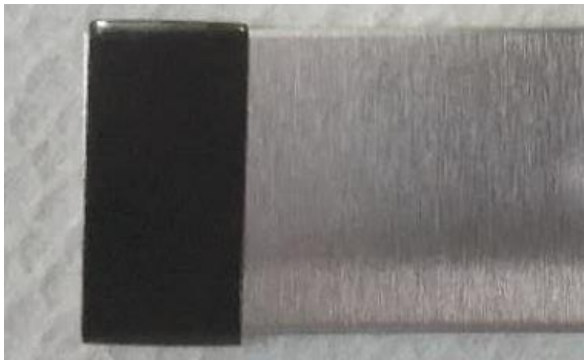
Summary:

Parts are assembled at room temperature (~*25*C) and then cured under heat and pressure. To reach optimized product performance and remove trapped air easily, pre-cure of Tgard TNC-4 pads is strongly recommended. When the die cut width is less than 20mm the pre-cure step can be adjusted or skipped according to customer's process.

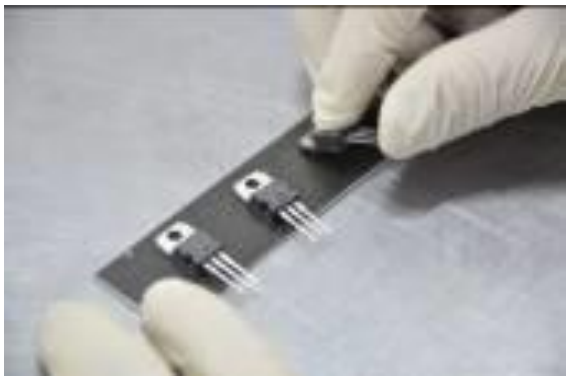
Step 1 – Thoroughly clean bonding surfaces with alcohol or other solvents.

Step 2*(note a) – Place and pre-cure Tgard TNC-4*

1. Peel off base paper liner from Tgard™ TNC-4 and place on top of heatsink. Remove remaining liner and heat in oven for 5 minutes at ~100C.

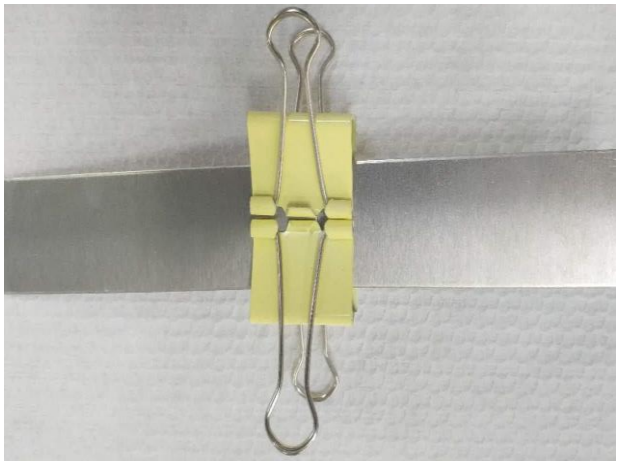


2. Remove Tgard TNC-4 from oven and mount to assembly. Clamping is not required at this step. For best results apply within 12 hours and avoid contamination on the TNC surface.



Step 3 *- Final curing at clamping force (pressure 10-30 psi) at 150°C*(note b) for over 6 mins or 130°C for over 20 mins*

1. To promote adhesion and reach minimum bond line, a clamp is recommended to maintain uniform 10-30 psi pressure during cure. Cure at 150°C for 6-15 minutes depending on part size.



2. The final curing process will complete after 12 -24 hours to get the highest design adhesion strength.

3. Please note when material temperature reaches 150°C, curing can finish in 6 minutes by lab data. However, different heatsink sizes and oven conditions may require actual curing time to be extended. Assembly should lay flat during curing process to avoid movement, miss-placement, or skew before final curing.

*Notes:

a. Pre-cure step can accommodate surface roughness of component and heatsink to enhance mating between electronic components (ex. MOSFET) on heat sink to minimize air bubbles trapped during mounting process.

b. We do not recommend curing temperature lower than 130°C to ensure curing reaction of product will initiate well and reach designed bonding strength.

Storage & Shelf-life

a. The temperature of storage and transport environment should be controlled between 5-25°C by ice bag and thawing half hour before use.

b. Shelf life of TNC-4 is six months at room temperature.