

## Tgard<sup>™</sup> TNC-4 Application Note

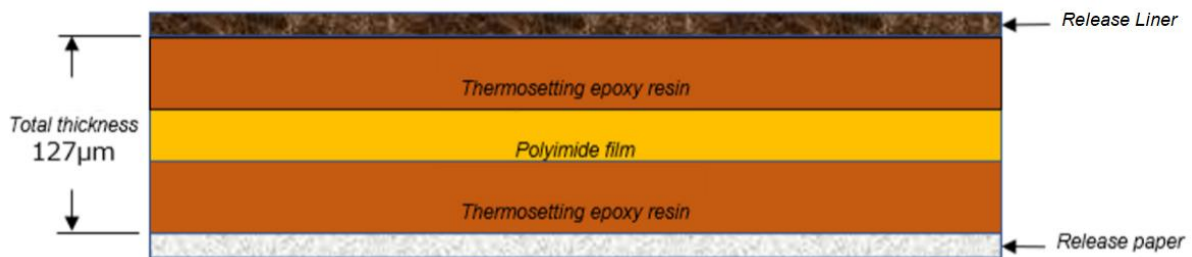
### Introduction

Tgard<sup>™</sup> 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<sup>™</sup> 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:

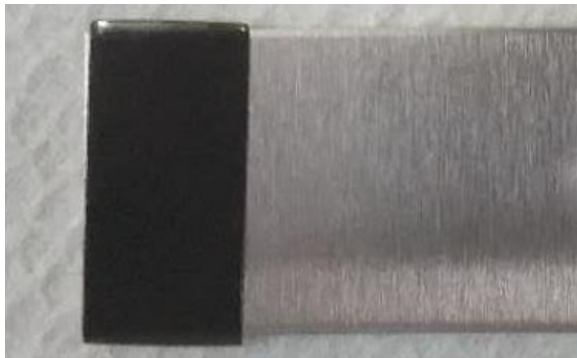
Parts are assembled at room temperature (~25C) and then cured under heat and pressure. To reach optimized product performance and remove trapped air easily, pre-cure of Tgard TNC-4 pads is strongly recommended. When the die cut width is less than 20mm the pre-cure step can be adjusted or skipped according 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<sup>™</sup> TNC-4 and place on top of heatsink.  
Remove remaining liner and heat in oven for 5 minutes at ~100C.



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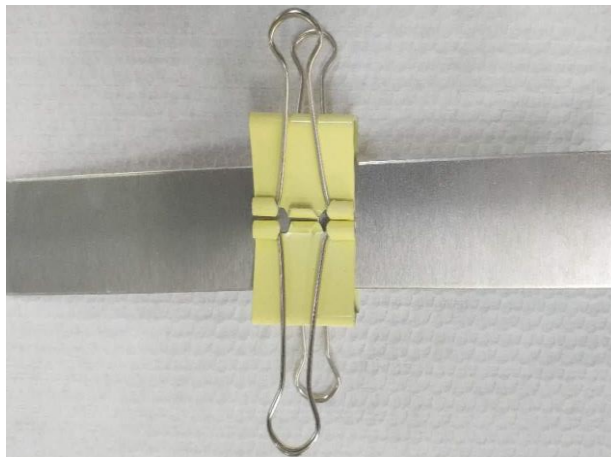
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2. Remove Tgard TNC-4 from oven and mount to assembly. Clamping is not required at this step. For best results apply within 12 hours and avoid contamination on the TNC surface.



**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.

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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.

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