



PROTON-ELECTROTEX
POWER SEMICONDUCTOR DEVICES

IGBT Modules with Pre-applied Thermal Interface

JSC "PROTON-ELECTROTEX" now offers our customers modules with pre-applied thermal interface. Such modules have a low added cost and longer service life. The applied material meets all commonly accepted standards: it is not flammable, not toxic, does not cause corrosion and contains no silicone.

Why PCM?

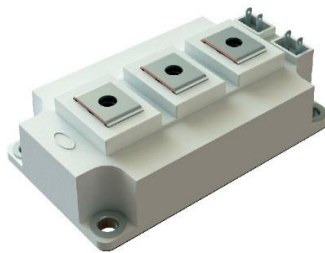
PCM combine advantages of thermal pads and properties of thermal pastes. This material transitions from solid to liquid state when it reaches the phase transition temperature. Just like thermal pastes, PCM ensure a low thermal resistance, but do not have issues with bleeding-out, drying and other degradation properties of a material. Besides, modules with pre-applied thermal interface do not require re-tightening throughout their operation.

λ Thermal conductivity 3,4 W*m/K

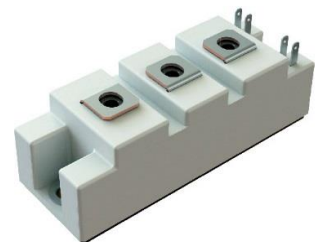
T_{pch} Phase-change temperature 45°C



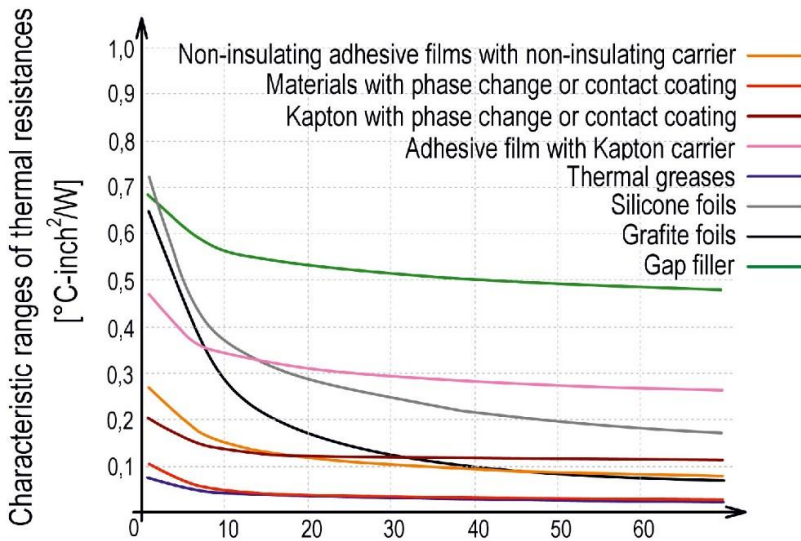
Thermal resistance
housing – heatsink $R_{th(c-h)} = 0.009$



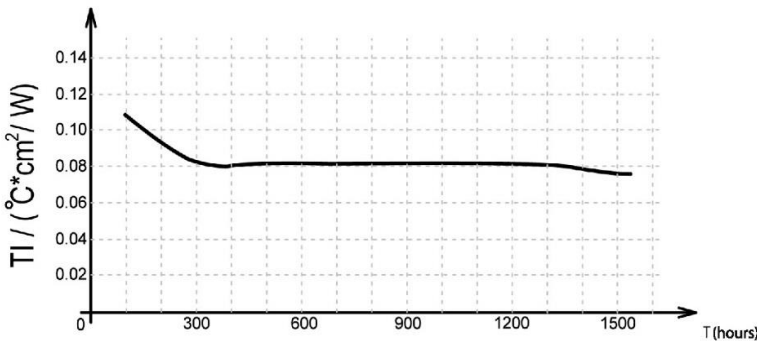
Thermal resistance
housing – heatsink $R_{th(c-h)} = 0.02$



Thermal resistance
housing – heatsink $R_{th(c-h)} = 0.04$



Typical pressure dependencies of the thermal resistance for representative TIMs



All thermal interfaces have a specific relation between thermal resistance and pressure.

As it is shown on the graph, **PCM** is similar to thermal pastes. It allows **PCM** to have all merits of thermal pastes while not having their disadvantages.

High Temperature Bake at 150°C TI vs. Hours of Exposure

Testing demonstrated excellent results, including high long-term thermal stability, and prove high reliability and thermal stability throughout the entire service life of the device.

Advantages of Modules with Pre-applied Thermal Interface

- **Optimal layer thickness**
- **High thermal stability and resistance to thermal cycling**
- **Optimized application topology**
- **Clean mounting procedure**
- **Low added cost**

