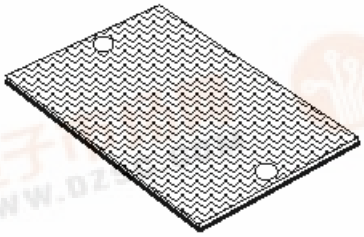
# THERMAL Pads

**For SC, SV and SO relays**
**Low thermal resistance**
**Easy to use**

## 5TH21000 / 5TH23000 and 1LWP2300

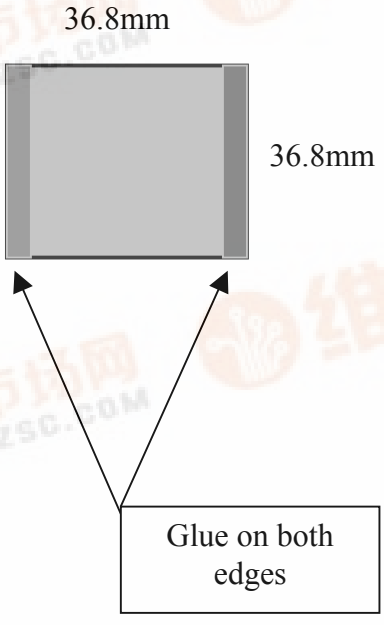
For an efficient cooling of power components, it is usual to apply a thermally conducting media, such as thermal grease, between the power element and the heatsink.
Thermal grease is considered problematic due to difficulties in applying it to the heat-dissipating surface and also performances in the life of the product.
An alternative, **celduc** tested a range of products and compared their thermal resistance characteristics (Rth c/h : Thermal Resistance between case to heatsink)
**celduc** recommends Aluminium materials thermal pads with very good thermal performances and no modification in the long term. (See comparison tests on last page):



Thermal pad

**5TH21000**

**And now in the same technology, celduc introduce an adhesive thermal PAD.**




**5TH23000**

## celduc thermal pads performances :

5THxxxx thermal PAD is a thermally conductive phase change material coated on both sides of aluminium foil. At temperatures greater than 52°C, 5THxxxx changes into a molten state and, under low closure force, wets the heat sink and component surfaces to create a very thin, low thermal resistance interface. 5THxxxx has great heat spreading characteristics and won't flow from the interface. 5THxxxx has superior thermal performance comparable to the highest performing grease and phase change products available.

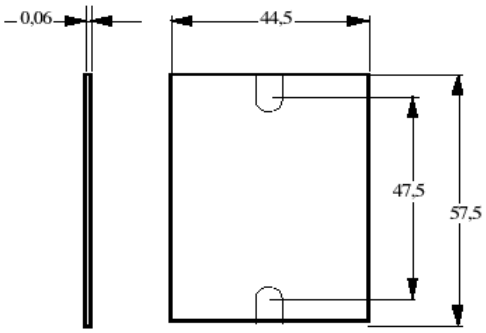
### Typical Properties

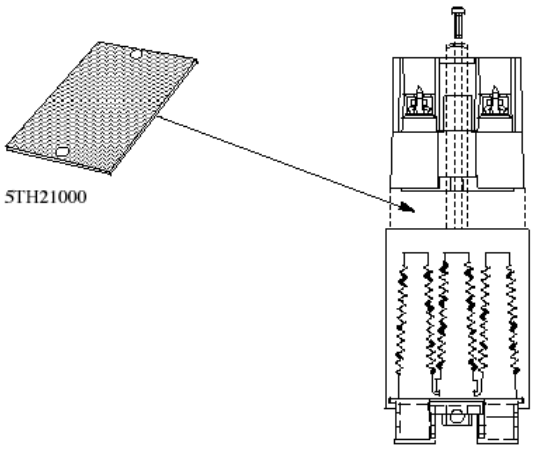
| | |
|---|---|
| **Colour** | Gray |
| **Thickness** | 0.003" (0.076mm) |
| **Standard Coating Thickness per side** | 0.0005" (0.013mm) |
| **Density** | 2.1 g/cc |
| **Shelf Life** | Indefinite |
| **UL Flammability Rating** | 94 V0 |
| **Maximum Use Temperature** | 200°C |
| **Phase Change Softening Temperature** | 52°C |
| **Thermal Impedance**<br>**@ 5 psi**<br>**@ 34.5 Kpa** | <br>0.03 °C-in²/W<br>0.193 °C-cm²/W |

**With the 5TH23000 adhesive thermal PAD, as glue is only on the edges, there is no incidence in terms of thermal performances.**

**On the last page you can see comparison tests between different technologies**

## How to use 5TH21000 ?

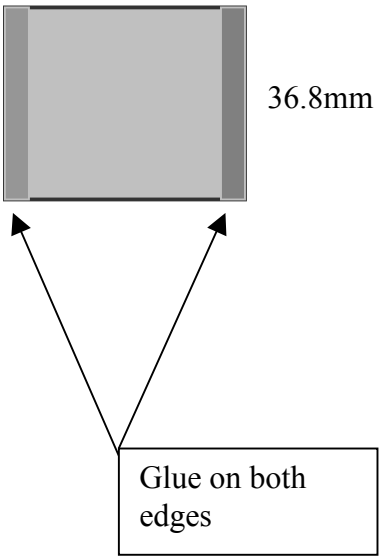


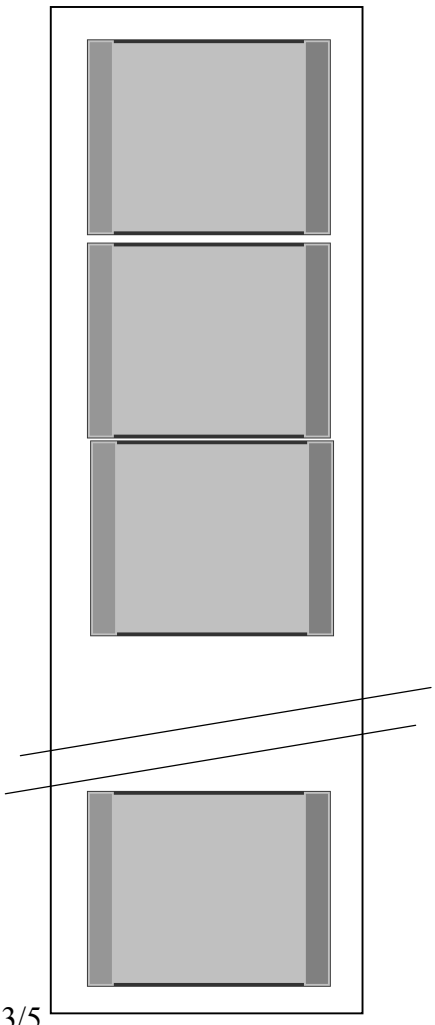




## How to use 5TH23000 (adhesive model).

36.8mm

We can deliver in Roll of 2500 pieces



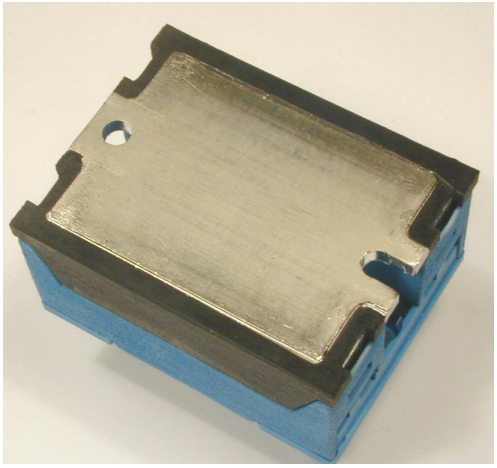



**We can deliver the SSR with the 5TH23000 thermal PAD already mounted.**

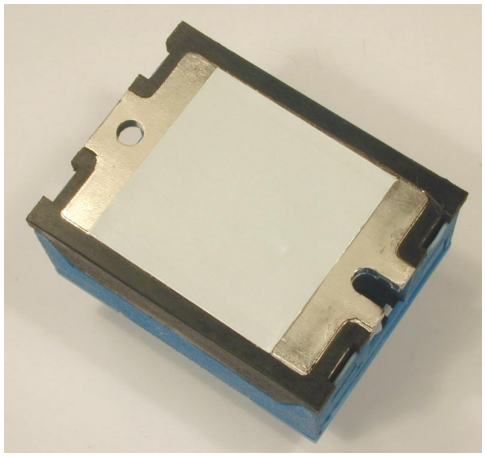
**For all SC, SV or SO range we can ask for the option "with thermal PAD 5TH23000 mounted on the SSR": 1LWP23000**

**When you order your SSR, add the option 1LWP23000**
**The SSR will be delivered with the thermal PAD.**


**New okpac® range**



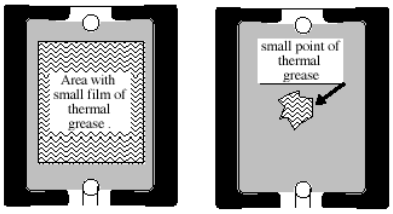
**Without thermal PAD**

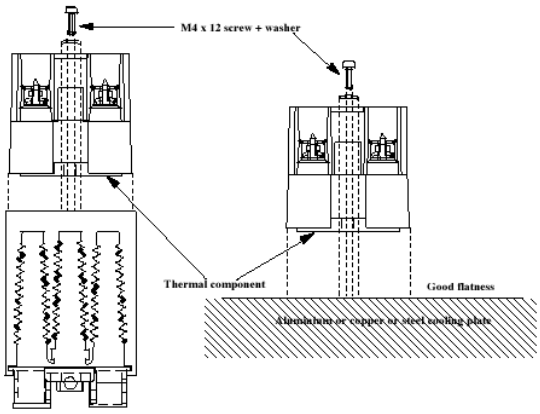


**With 5TH23000 adhesive thermal PAD**
**On aluminium base of the SSR**

# Fixing of solid state device on its heatsink or on a cooling plate

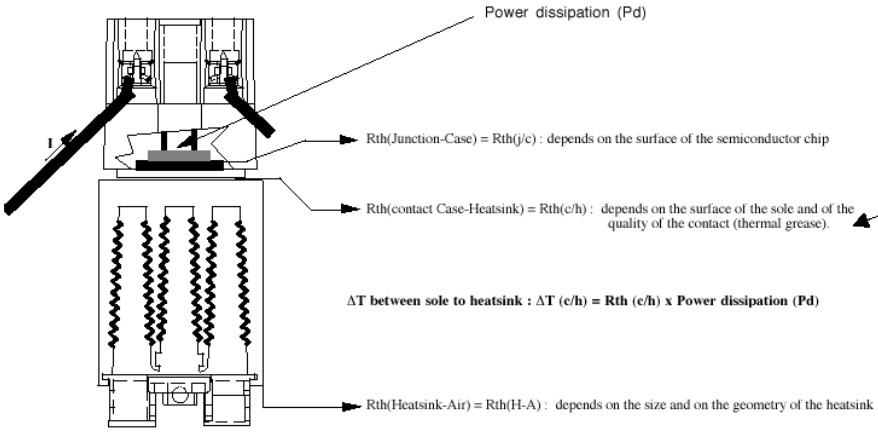
For an efficient cooling of power components , it is usual to apply a thermally conducting media , such as thermal grease , between the power element and the heatsink .
There are two main techniques :
- a small film of thermal grease applied over an area .
- a point of thermal grease at the centre of the power element

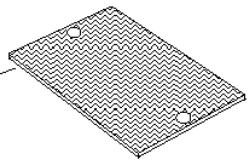



Thermal grease is considered problematic due to difficulties in applying it to the heat dissipating surface . As a replacement , a new range of components , thermal pads , are now readily available on the market .
To qualify the different technologies , **celduc** tested a range of products and compared their thermal resistance characteristics ( Rth c/h) . The thermal pads have been divided into three categories :
**1- thermal pads with insulation . 2- thermal pads with carbon materials . 3- thermal pads with aluminium materials .**

## test method and results:



Thermal pad or grease

| | Without Grease or pad | with grease and a small film | with grease and a point of grease | with "thermalpads " with insulation . | with "thermalpads " with carbon materials . | with "thermalpads " with aluminium materials . |
|---|---|---|---|---|---|---|
| **Rth c/h for a hockey puck SSR** | 0,2K/W | **0.05K/W** | **0.045K/W** | 0,3K/W | 0,15K/W | **0. 04K/W** |

The difference in temperature between the SSR case and the heatsink is dependant upon the thermal resistance of the heat conducting media ( Rth c/h) and the power dissipation of the SSR (Pd) and is defined by the following equation :
**ΔT case / heatsink = Rthc/h x Pd**
In conclusion :
For low power ( under 10 watts ) , the temperature difference ΔT is < 3°C for all solutions .
For higher power dissipations , it is important to use an efficient heat conducting material .
**celduc recommend thermal grease or thermal pads with aluminium materials .**

**Problems in the long term**

**Usual products**

**celduc solution : high initial and in long term performances**