Module
thermal

Module thermal{
  name = *somename*
  regions = *set_of_regions*
   ...

Physics
 { *somemodel* { } }

Contact *somecontact*
{type = *bc_model*}
}

Physical models

Implemented models:

- Heat_source
  - *constant*
  - *Joule*
- Thermal_conductivity
  - *constant*

Physical models

```
heat_source constant
{
  H = power density [W/m^3]
}
```

```
heat_source joule
{
  transport_simulation = dd_sim
}
```

Heat generated by Joule effect

Transport model from which heating is calculated

Boundary conditions

Implemented models:

- Dirichlet
- Surface resistance
- thermal flux

Contact *anode*{
type = *heat_reservoir*
temperature= T_0 *[k]*}

imposes a fixed temperature $T = T_0$

Contact *substrate*{
type = *surface_resistance*
r_surf = *R*
temperature = *300*
}

imposes a surface resistance R, so that the heat flux is constrained to

$$J_i n_i = \frac{(T - T_0)}{R}$$

Boundary conditions

Implemented models:

- Dirichlet
- Surface resistance
- thermal flux

Contact *substrate*{
type = *thermal_flux*
heat_flux = T_0 *[W/m²]*}

imposes a fixed thermal flux, $\mathbf{J} \cdot \mathbf{n} = J_0$ here n is the normal to the surface and J_0 the prescribed thermal flux.