DESCRIPTION
THERMAL MODEL FOR
BMR 480 SERIES

FLEX INC.

Contents

General

The model is an estimation for the thermal behavior of BMR 480 0100 and BMR 480 2113, which are a Through Hole Pin designs.

The model is intended for steady-state thermal simulations.

Model Description

The model is a readymade Flotherm 11.1 model. The model consists of four major components:

3D CAD Geometry

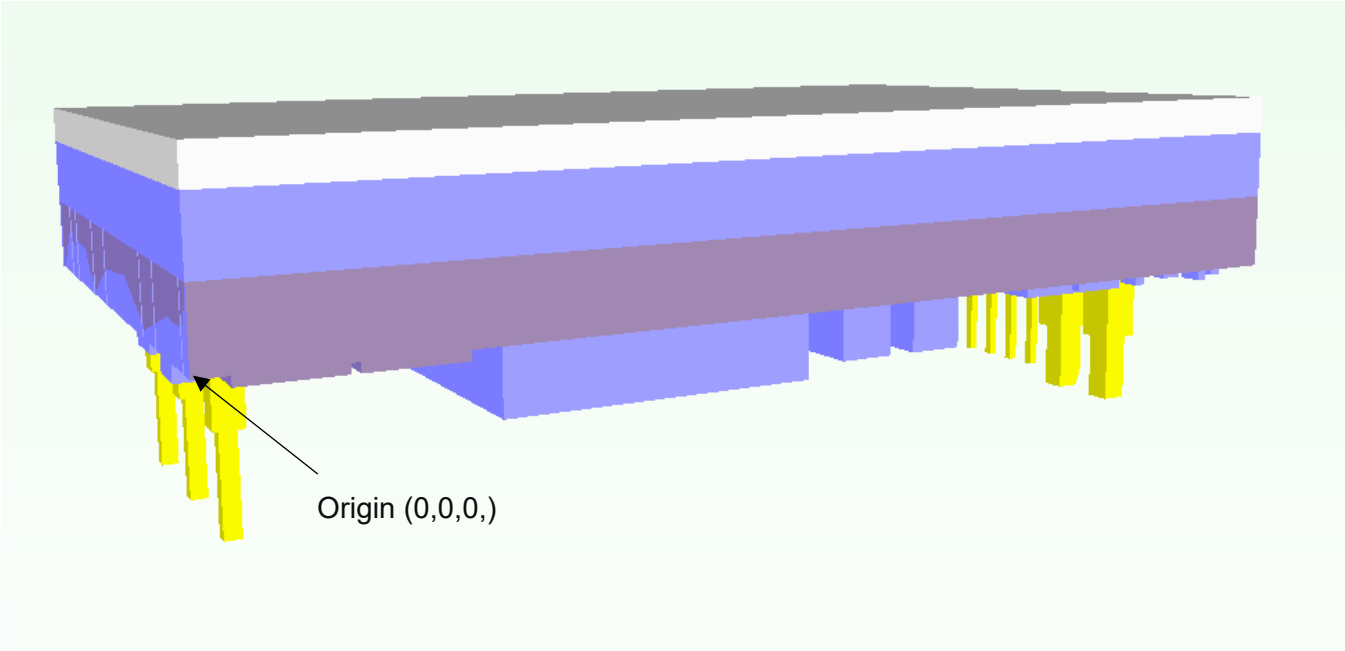

Figure 1 Model origin in lower left corner of PCB and axis orientation.

Origin has been placed so that [0,0,0] is in the lower left corner of the PCB.

Unit in file: [mm]

Domains of power loss distribution

There are several sources for power loss. The power loss for each of them, at certain module total power, are given in *Appendix 1 - Power Loss Distribution.* Note that the source list in the model contains "PCB_Correction" with negative value. The purpose of it is to compensate for cut-outs and for other sources within the same volume.

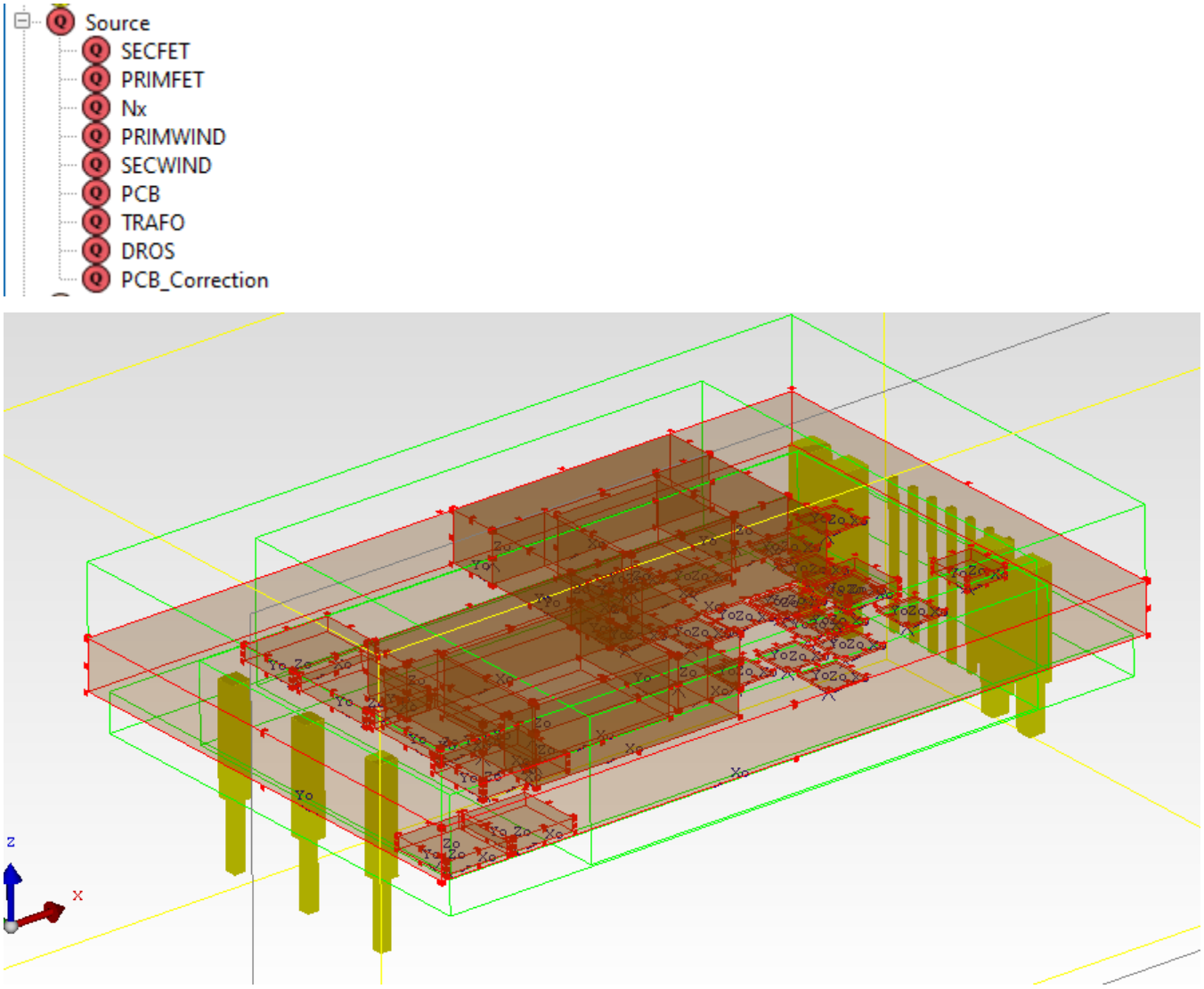

Figure 2: Heat Sources

Domains of material data

There are several material domains. The heat conductivity for each of them is given either as isotropic, or anisotropic values in x-,y-, and z-direction (x,y,z) per the following list.

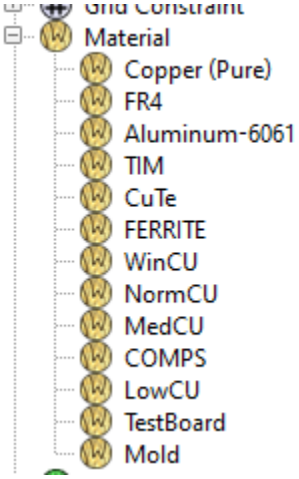

Figure 3. Domains of material data

Note. The given heat conductivities are only intended to model the temperature distribution of the module in this application. The values should not be treated as physically true or transferable to other applications.

Monitor points

The model comes with predefined monitor points:

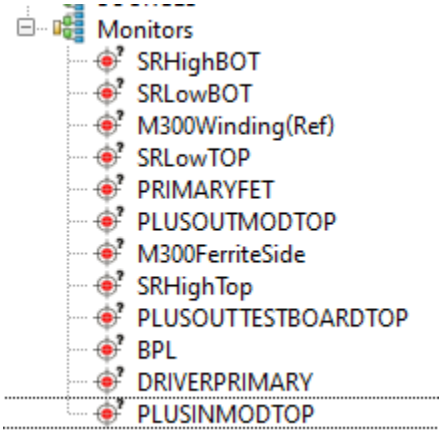

Figure 4. Probe points.

Model Calibration

The model has been calibrated to give temperatures as similar as possible compared to thermal verification document 2/102 65-BMR 480 0000 Rev A for Vin=53.5[V], Vout=10.4[V], I=90[A], 1 [m/s]. The calibration was done using power loss settings per Appendix 1 - Power Loss Distribution, and by setting measured baseplate and pin temperature as boundary conditions. No flow calculations were performed, only conduction.

Simulation temperatures are within ±2.5 [C] compared to measured values.

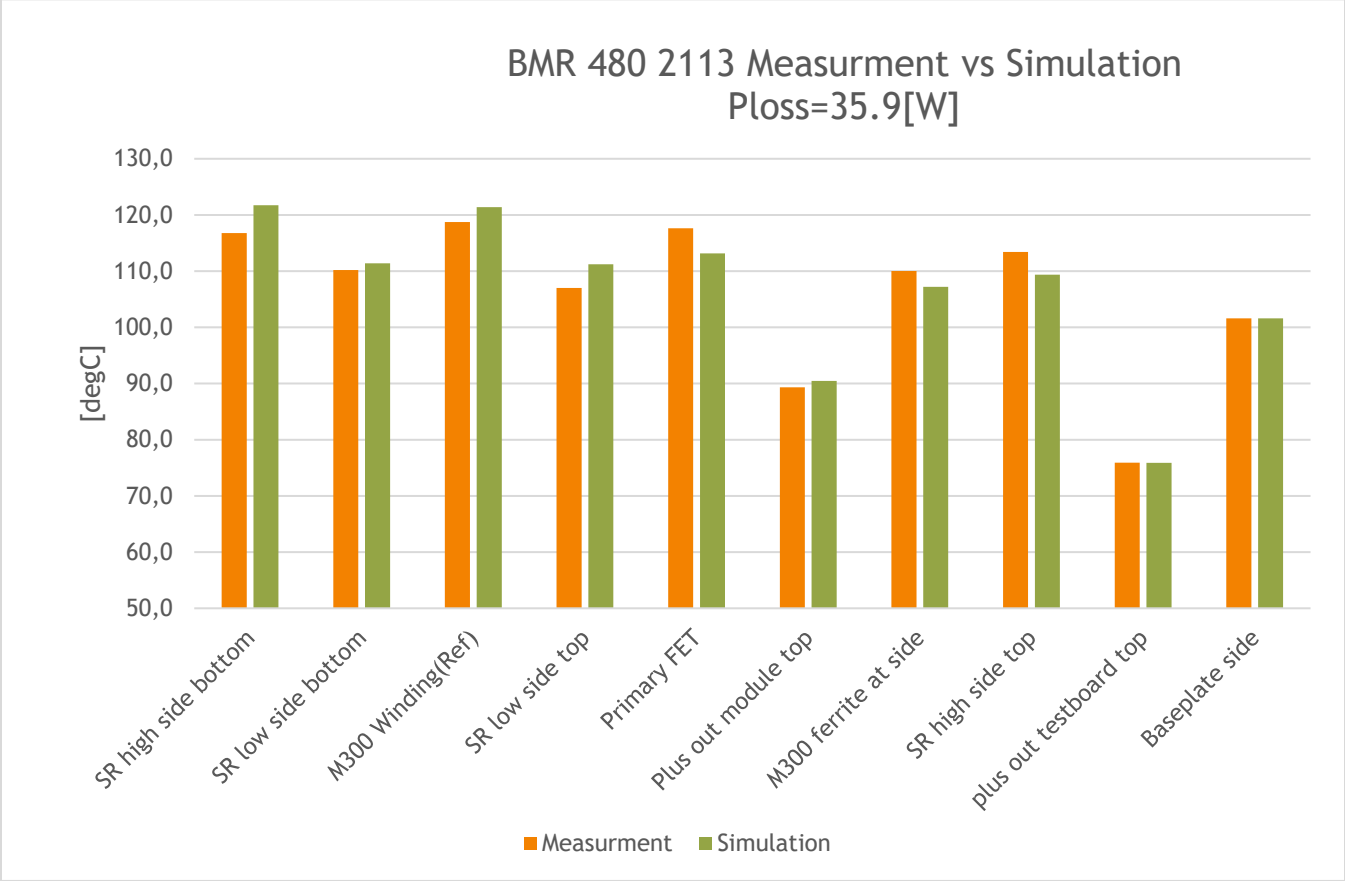

Figure 5: Model calibration result. "plus out testboard top" and "Baseplate side" are set boundary conditions.

Model Usage

Import the *.pdml file into the desired project.

Adjust the dissipated power by altering the thermal sources per Figure 2, according to Appendix 1 - Power Loss Distribution. Default settings are for Vin=53.5[V], Vout=10.4[V], Iout=90[A]

If the model is rotated, make sure that the orientation of the orthotropic materials properties are preserved (also rotated).

Do not change the order of power sources and geometry objects, as this can change the power and material settings.

The module temperatures can be monitored in predefined monitor points.

Additional Information

Model has been constructed with SI units.

Reference

BMR4802113A.pdml

Disclaimer

The model and model documentation described herein are provided for the sole purpose of facilitating thermal modeling of a structure where the referenced product is included. It should not and cannot be interpreted neither as a detailed description of the product itself, nor as a statement of the product's performance.

The model has been constructed on a best effort basis, but we cannot accept liability for any discrepancy between model predictions and actual values.

Revision history

A	2018-04-05	New document
B	2018-10-15	Editorial changes
C	2020-12-09	Made Flotherm 11.1 version. Editorial changes accordingly.

Appendix 1 - Power Loss Distribution

Power loss distribution examples for BMR 480 2113.

Condition: Vin=53.5[V], Vout=10.4[V], Iout=90[A]

Domain	Number of domains	Power loss per domain [W]	Power loss per volume [mW/mm^3]	Subtotal [W]
PRIMFET	4	2.25	-	9.4
SECFET	18	0.48	-	8.64
TRAFOWIND	4	-	12.12	10.18
TRAFO	1	3.14	-	3.14
CHOKEWIND	4	-	1.38	1.15
CHOKE	1	0.17	-	0.17
PCB	1	2.29	-	2.29
Nx	4	0.225	-	0.9
Total [W]				35.9