The eGaN® Technology Journey Continues

EPC
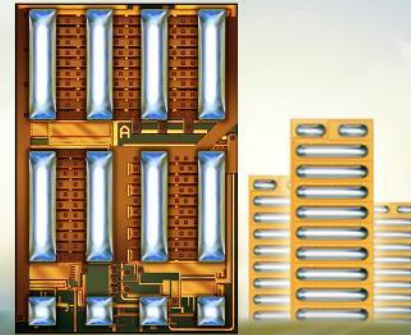EFFICIENT POWER CONVERSION

EPC2055 Thermal Model

EPC2055 FEA thermal simulations

- The thermal model applies to EPC2055.

- A power dissipation of 1 W in the device active area is assumed.

- Finite element analysis (FEA) thermal simulations
  - $R_{\Theta JB}$ and $R_{\Theta JC}$ are obtained by stationary simulations.
  - $Z_{\Theta JB}$ and $Z_{\Theta JC}$ are obtained by transient simulations.
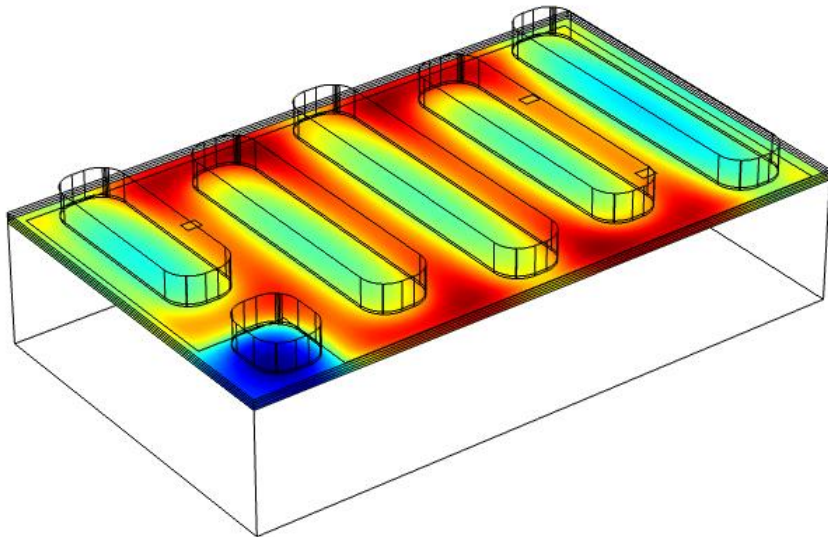
- R-C thermal model is generated.
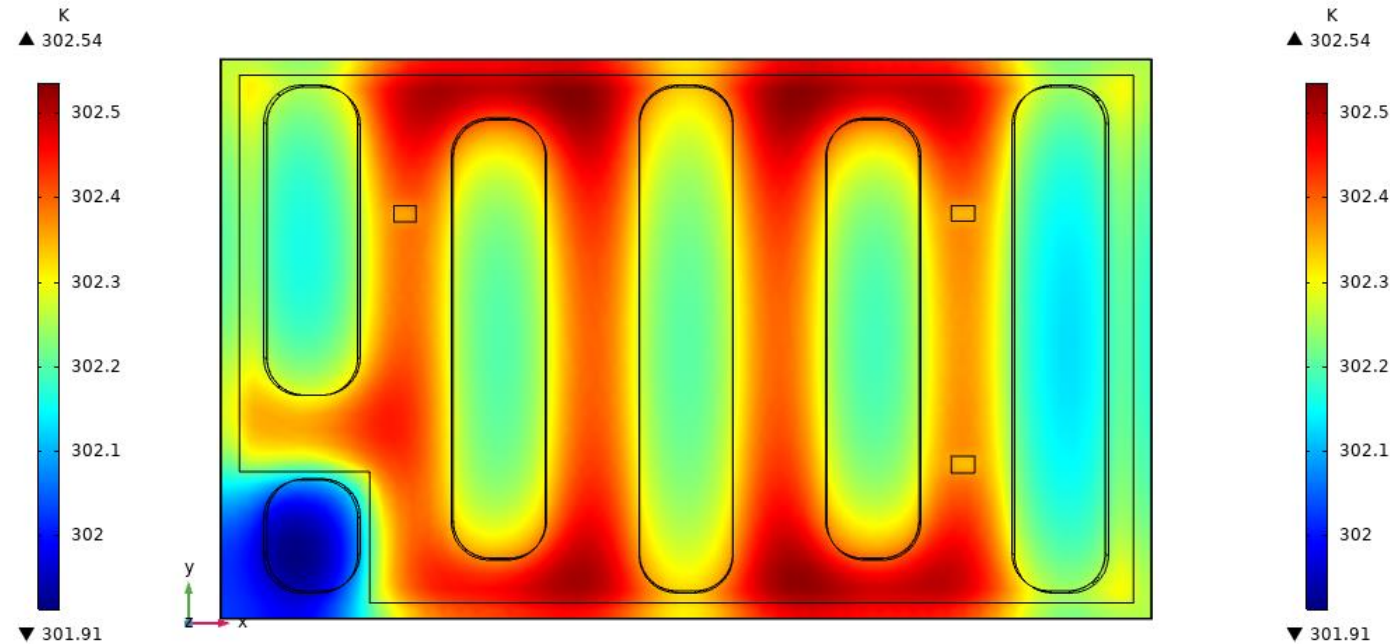
EPC2055 geometry in simulation
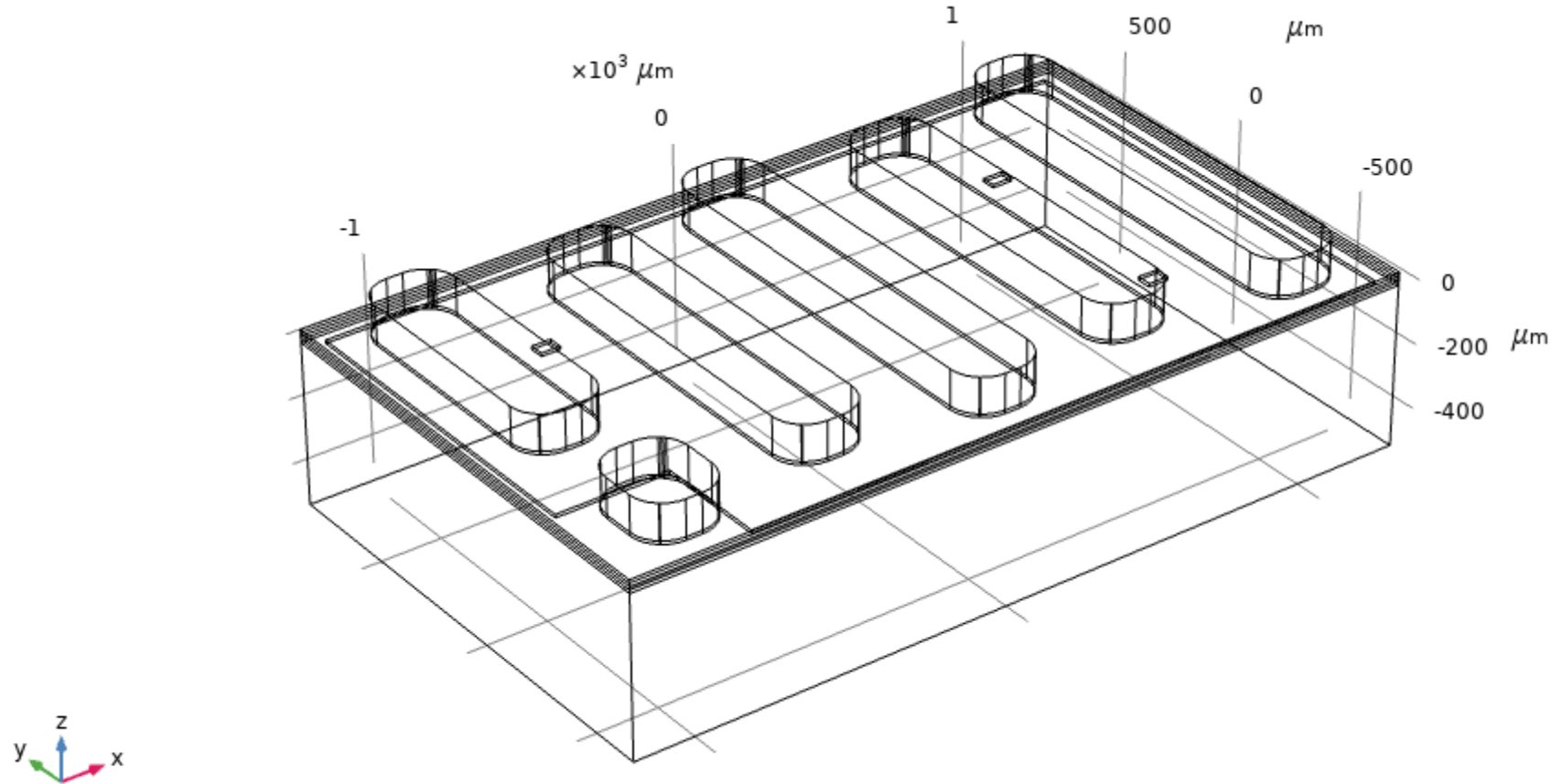
EPC2055 Steady-state $R_{\Theta JB}$
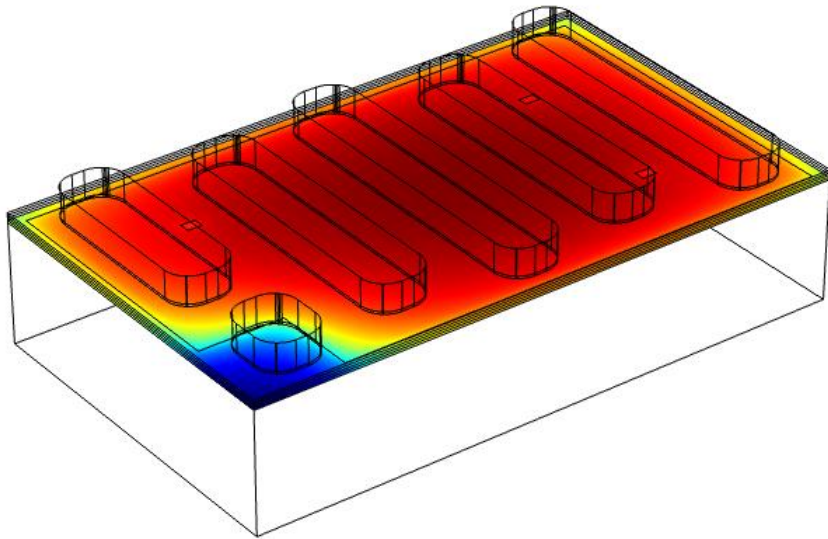
Typical $R_{\Theta JB}$ = 2.5 °C/W

- Operating condition: Power = 1 W in the active area.
- Boundary condition: Temperature of top of solder bumps set to be 300 K.

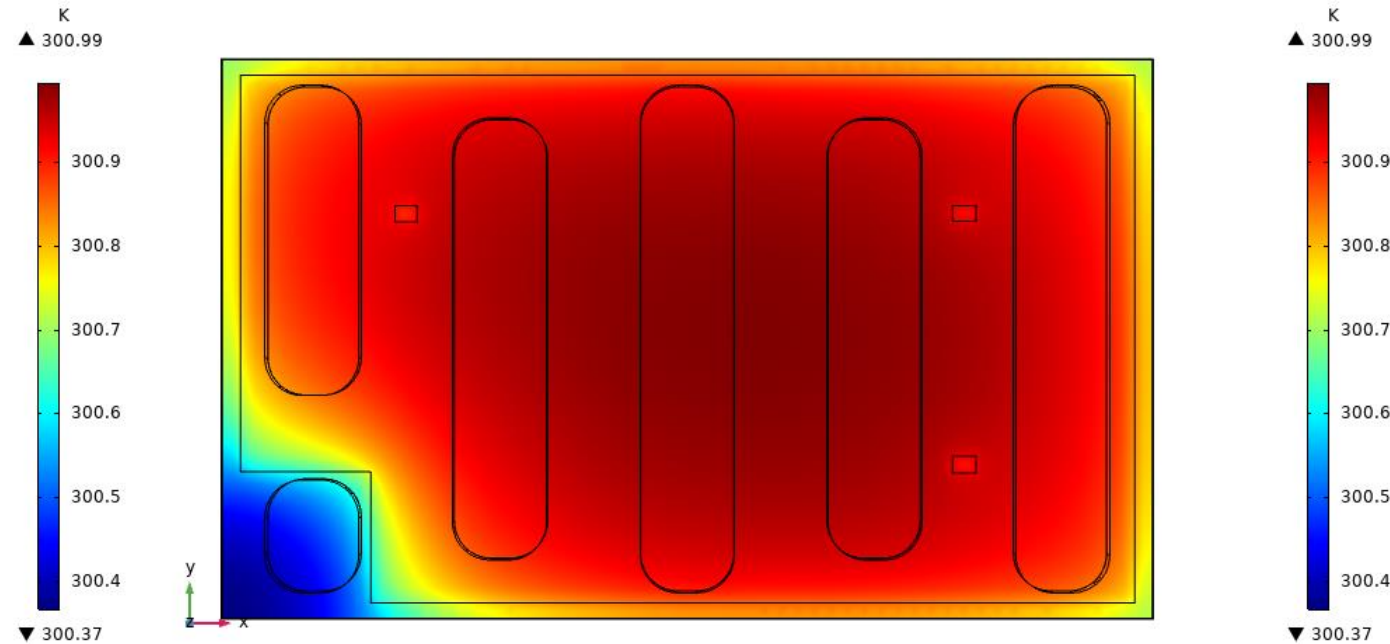# EPC2055 Steady-state $R_{\Theta JC}$

Typical $R_{\Theta JC}$ = 1 °C/W
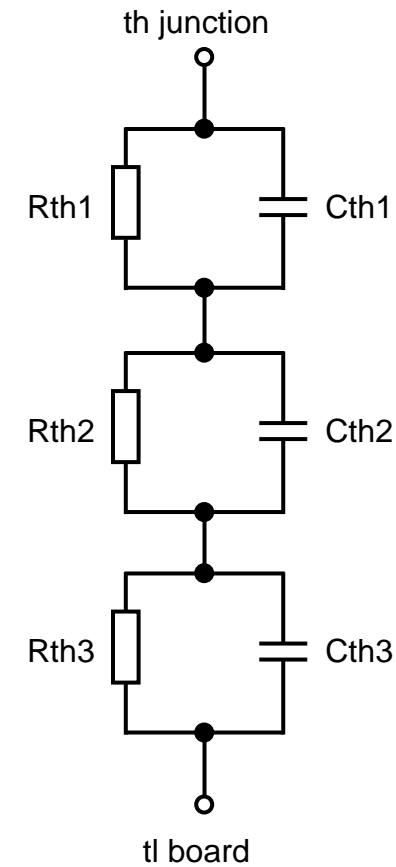

- Operating condition: Power = 1 W in the active area.
- Boundary condition: Temperature of the device backside set to be 300 K.

EPC2055 $Z_{\Theta JB}$ R-C thermal model

Transient junction temperature (Junction to Board, P = 1 W)

Model Parameter	Value	Unit
Rth1	2.24E+00	°C/W
Rth2	2.42E-01	
Rth3	3.17E-02	
Cth1	3.75E-03	J/°C
Cth2	7.46E-04	
Cth3	4.94E-04	
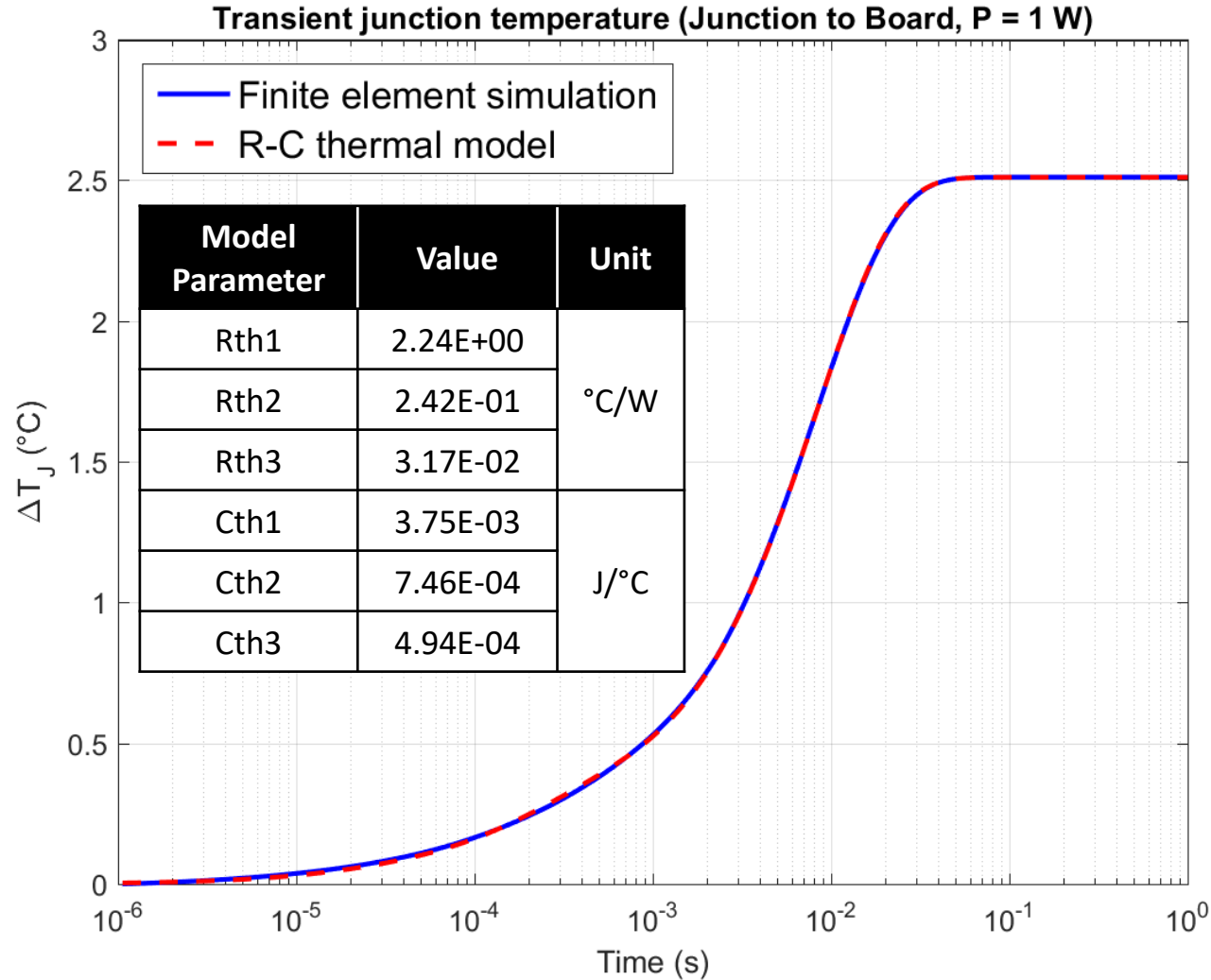
EPC2055 $Z_{\Theta JC}$ R-C thermal model

Transient junction temperature (Junction to Case, P = 1 W)

- Finite element simulation
- R-C thermal model

Model Parameter	Value	Unit
Rth1	8.22E-01	
Rth2	1.41E-01	°C/W
Rth3	3.63E-02	
Cth1	2.01E-03	
Cth2	8.17E-04	J/°C
Cth3	3.42E-04	