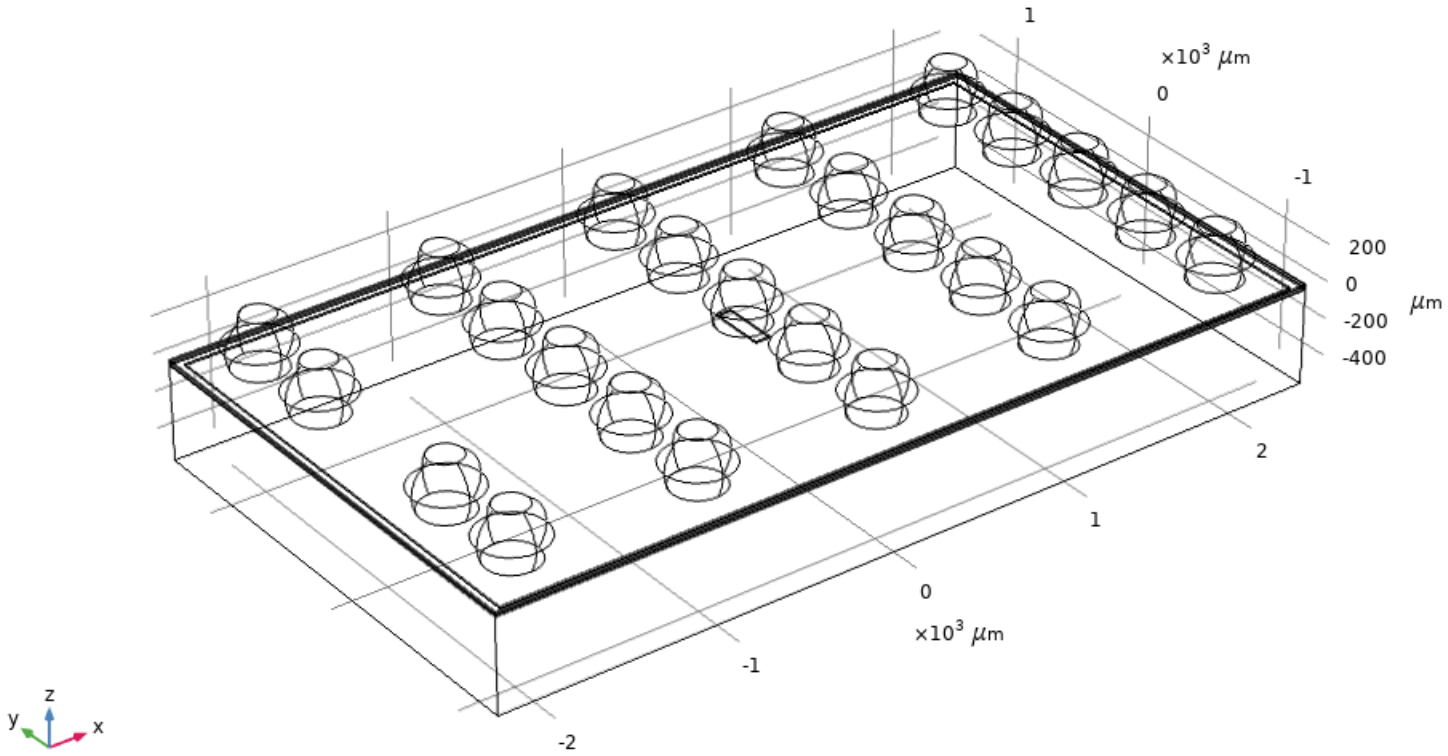
Thermal Model of EPC2029, EPC2030, EPC2031, EPC2032, EPC2033, and EPC2034(C)

Efficient Power Conversion Corporation

FEA thermal simulation

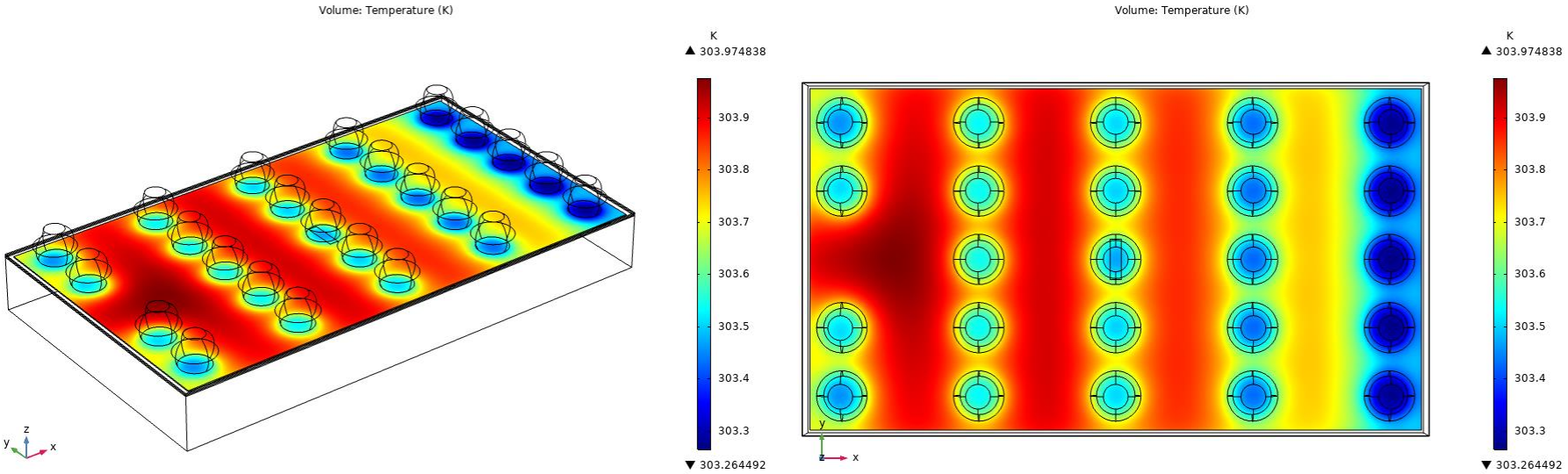
- The thermal model applies to EPC2029, EPC2030, EPC2031, EPC2032, EPC2033, and EPC2034(C).
- A power dissipation of 1 W in the device active area is assumed.
- Finite element analysis (FEA) thermal simulations
  - $R_{\Theta JB}$ and $R_{\Theta JC}$ are obtained by stationary simulations.
  - $Z_{\Theta JB}$ and $Z_{\Theta JC}$ are obtained by transient simulations.
- R-C thermal model is generated.

Device structure



Steady-state $R_{\Theta JB}$

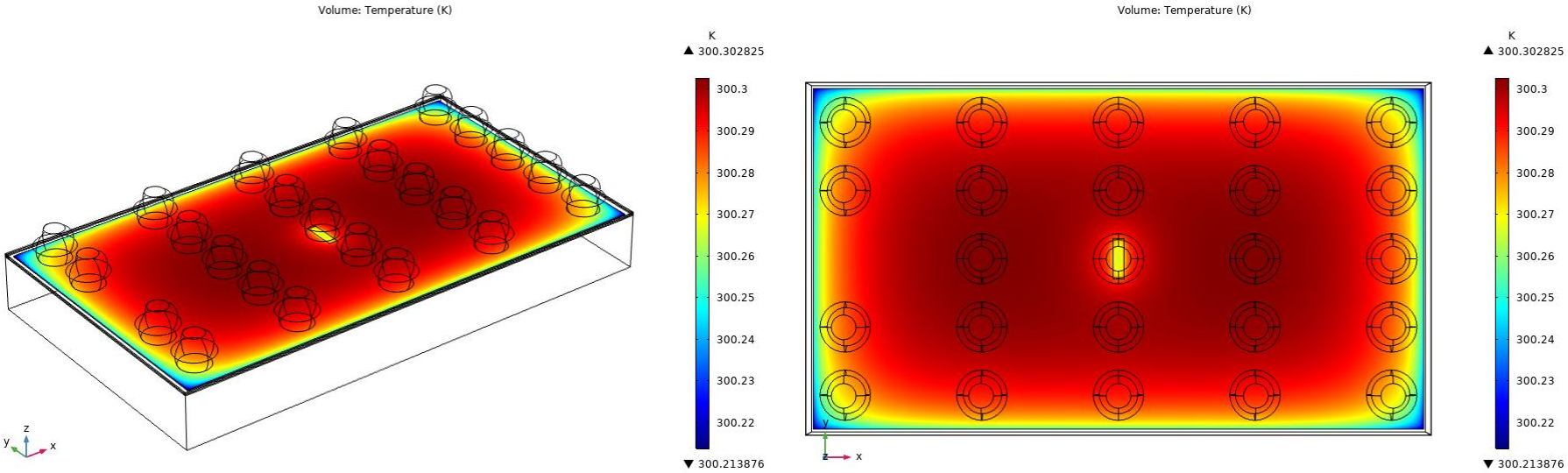
Typical $R_{\Theta JB}$ = 4 °C/W



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

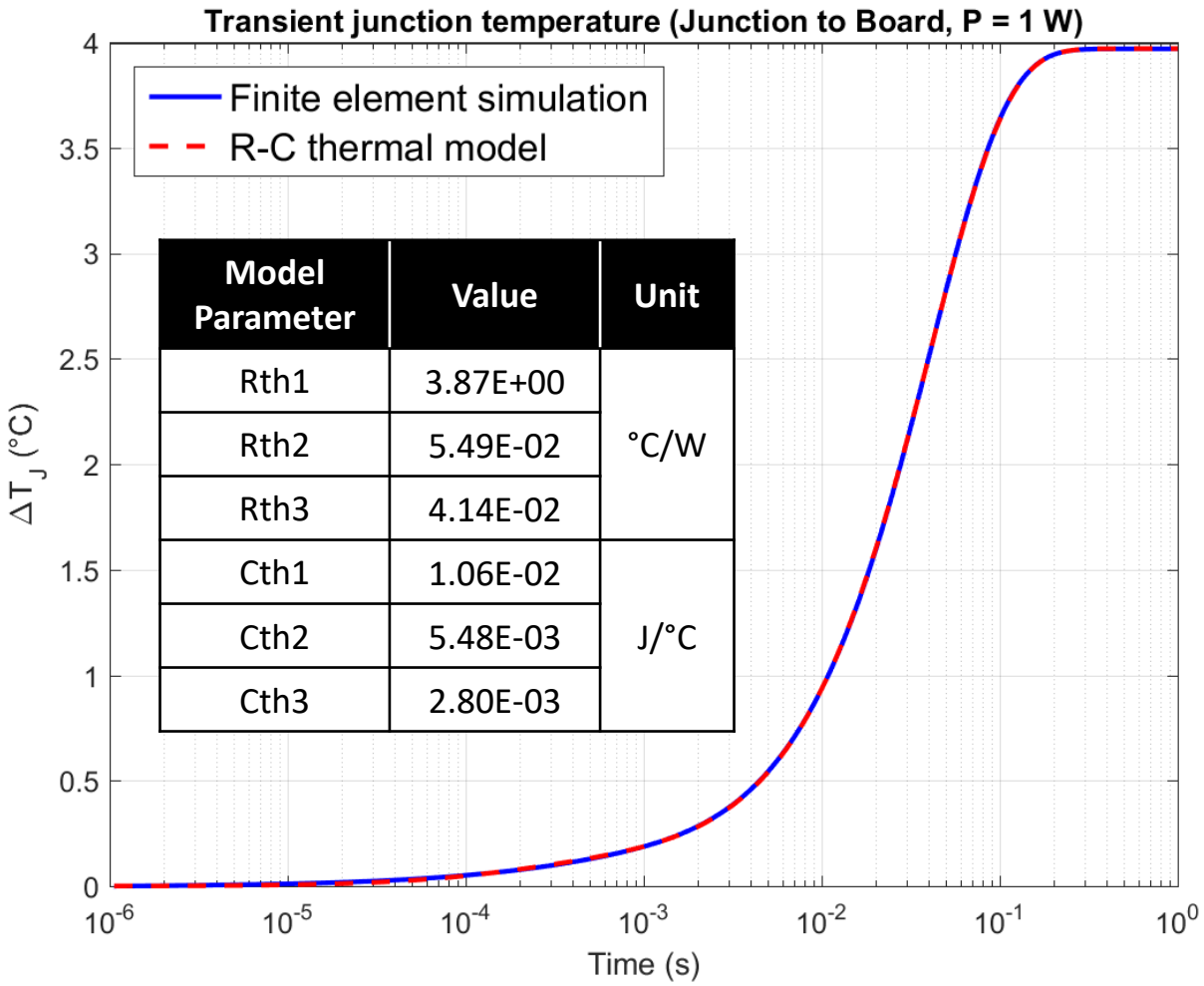
Steady-state $R_{\Theta JC}$

Typical $R_{\Theta JC}$ = 0.3 °C/W

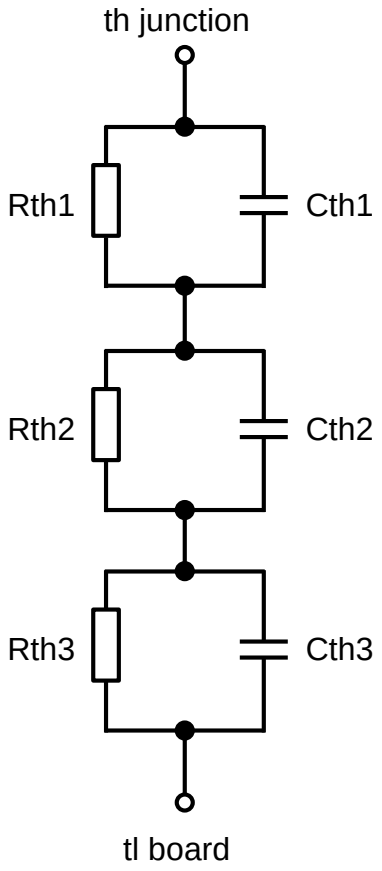


- Operating condition: Power = 1 W in the active area.
- Boundary condition: Temperature of bottom of the device backside set to be 300 K.

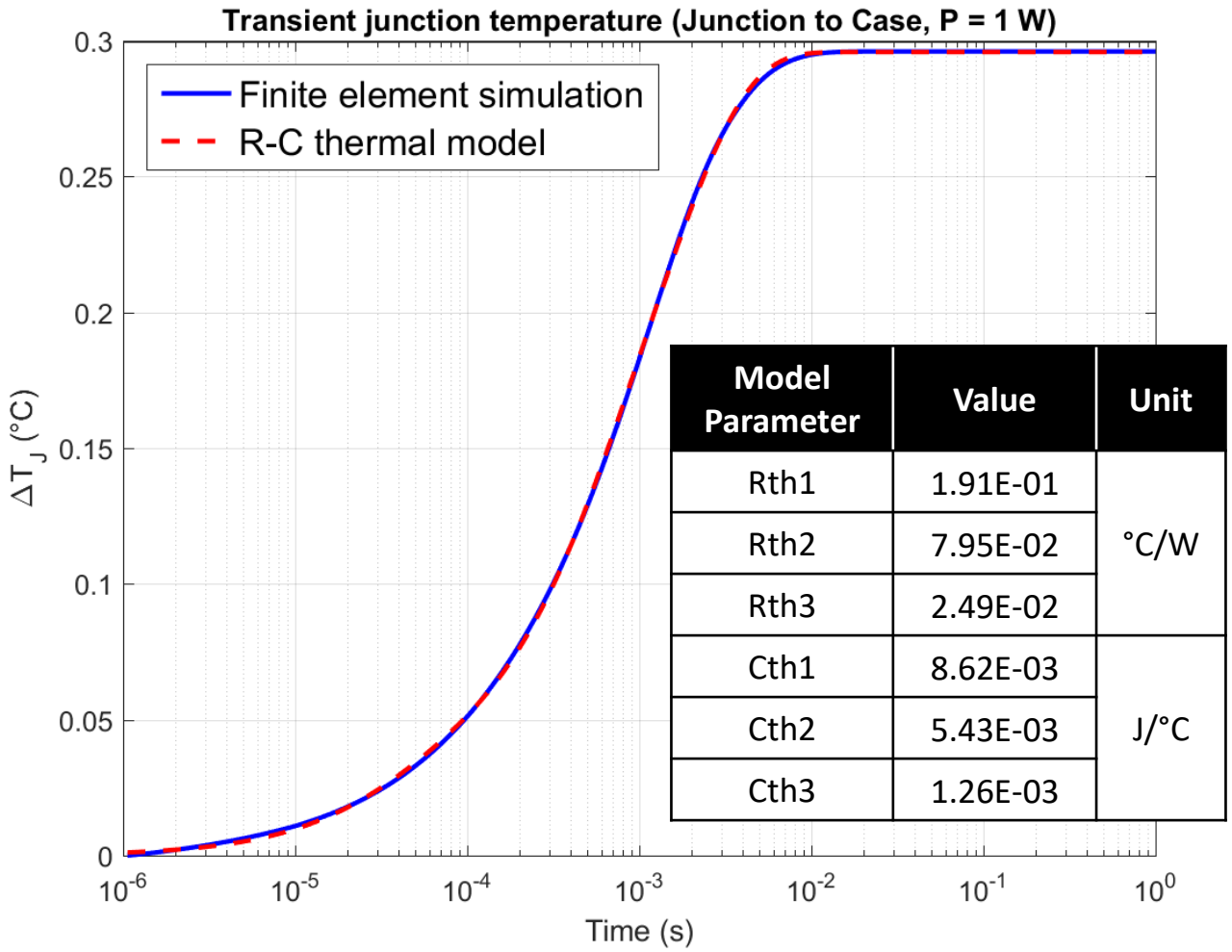
$Z_{\Theta JB}$ R-C thermal model



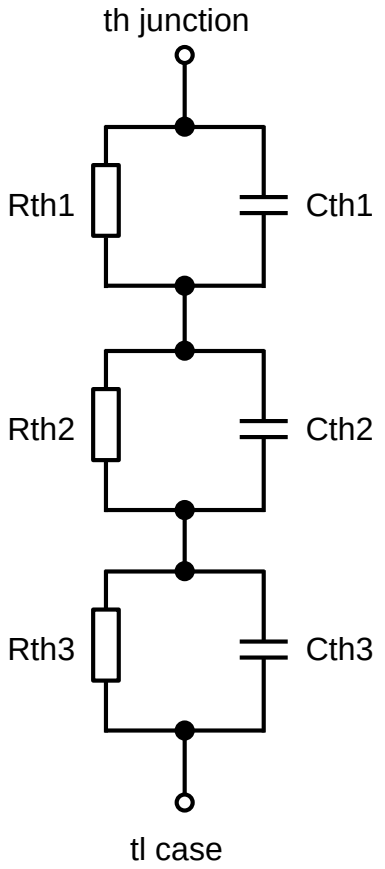
Model Parameter	Value	Unit
Rth1	3.87E+00	°C/W
Rth2	5.49E-02	
Rth3	4.14E-02	
Cth1	1.06E-02	J/°C
Cth2	5.48E-03	
Cth3	2.80E-03	



$Z_{\Theta JC}$ R-C thermal model



Model Parameter	Value	Unit
Rth1	1.91E-01	°C/W
Rth2	7.95E-02	
Rth3	2.49E-02	
Cth1	8.62E-03	J/°C
Cth2	5.43E-03	
Cth3	1.26E-03	



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