

The eGaN[®] FET
Journey Continues

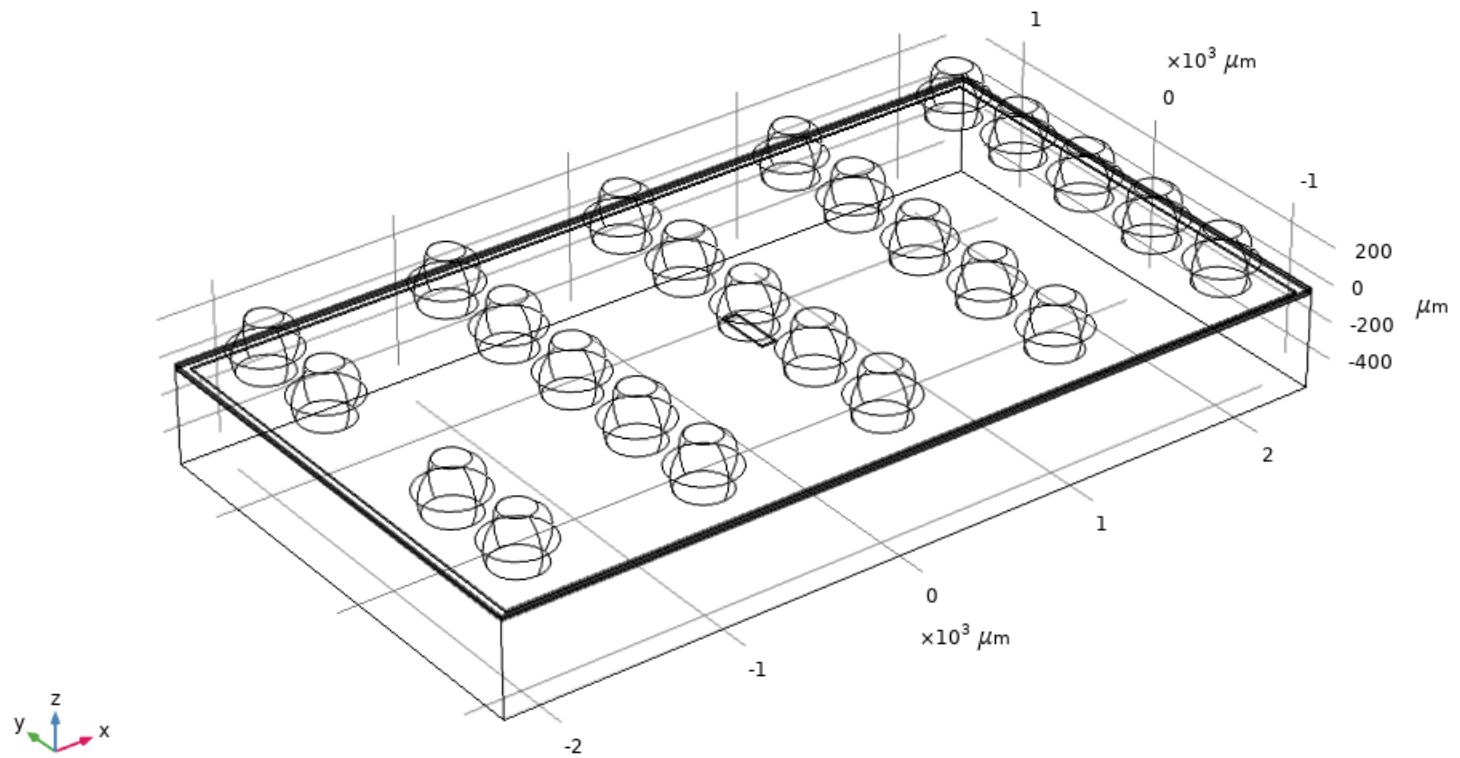


Thermal Model of EPC2029, EPC2030,
EPC2031, EPC2032, EPC2033, EPC2234,
EPC2034(C)

Efficient Power Conversion Corporation

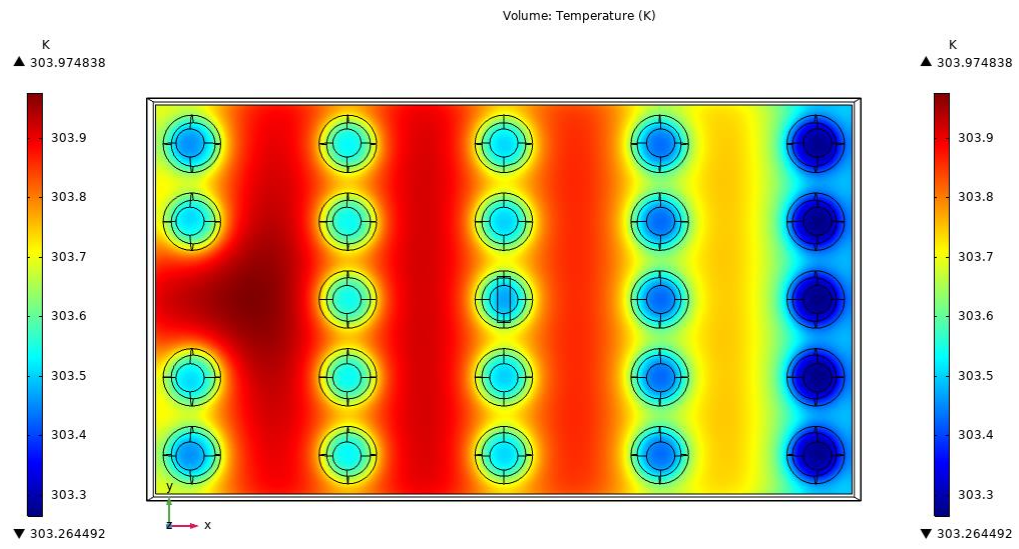
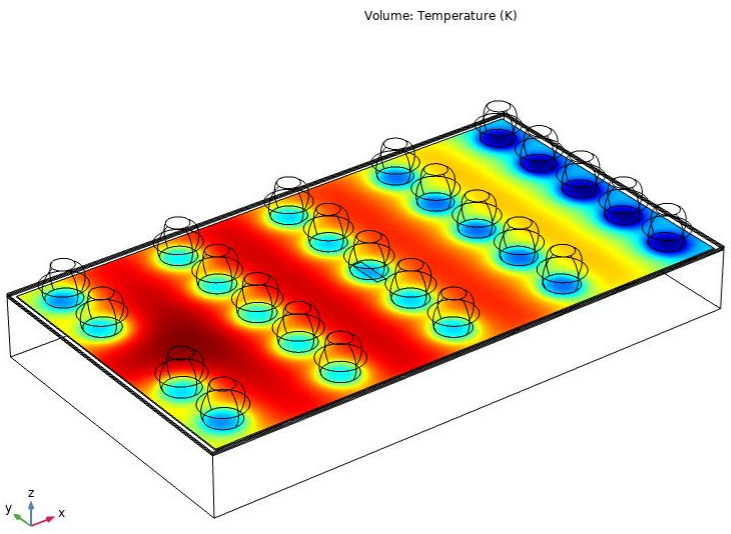
- The thermal model applies to EPC2029, EPC2030, EPC2031, EPC2032, EPC2033, EPC2234 and EPC2034(C).
- A power dissipation of 1 W in the device active area is assumed.
- Finite element analysis (FEA) thermal simulations
 - $R_{\Theta JB}$ and $R_{\Theta JC}$ are obtained by stationary simulations.
 - $Z_{\Theta JB}$ and $Z_{\Theta JC}$ are obtained by transient simulations.
- R-C thermal model is generated.

Device structure



Steady-state $R_{\Theta JB}$

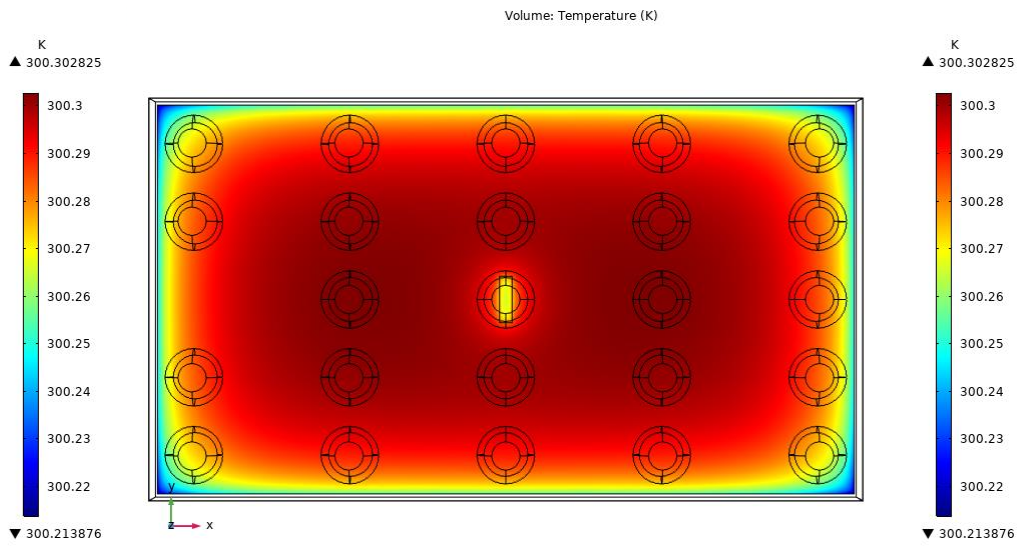
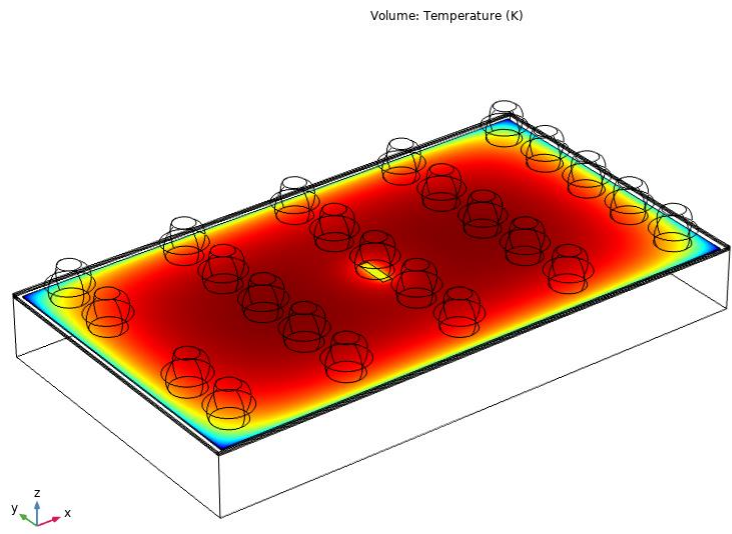
Typical $R_{\Theta JB} = 4 \text{ }^\circ\text{C/W}$



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

Steady-state $R_{\Theta JC}$

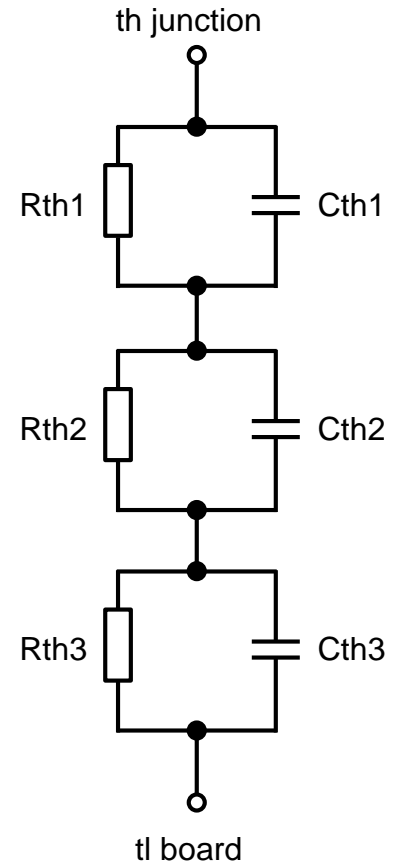
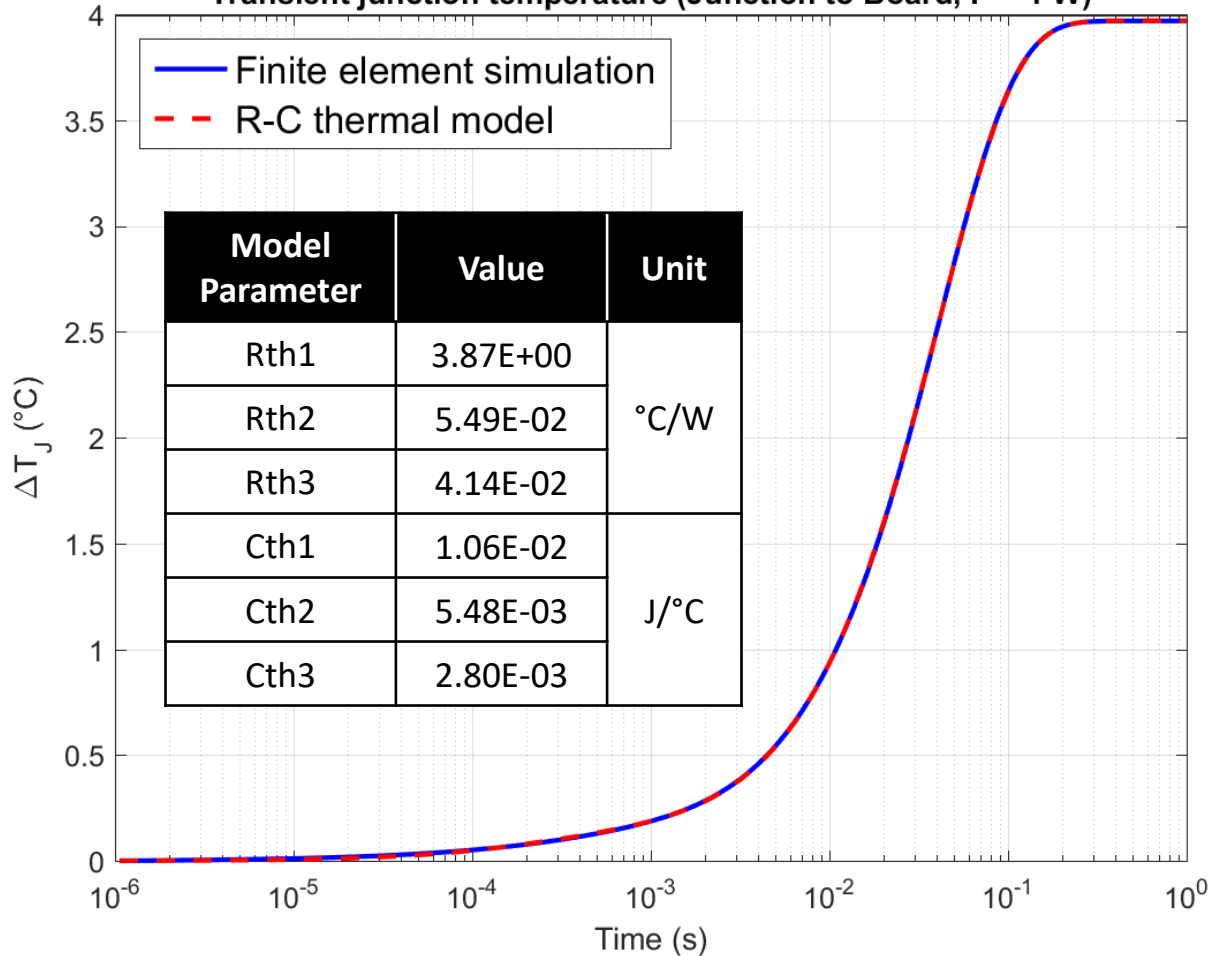
Typical $R_{\Theta JC} = 0.3 \text{ } ^\circ\text{C/W}$



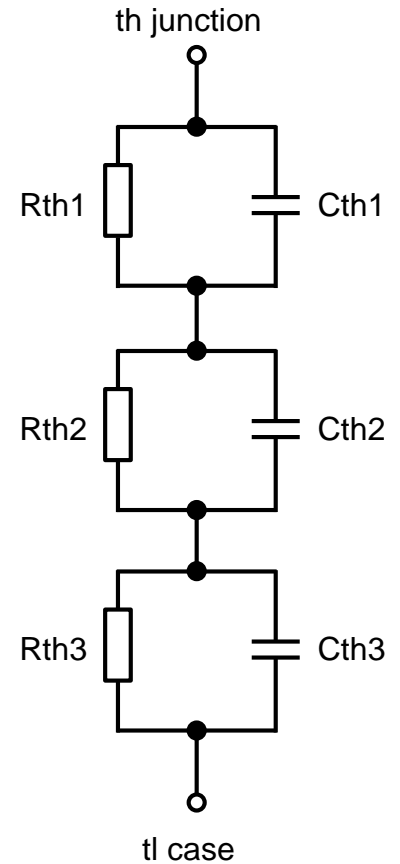
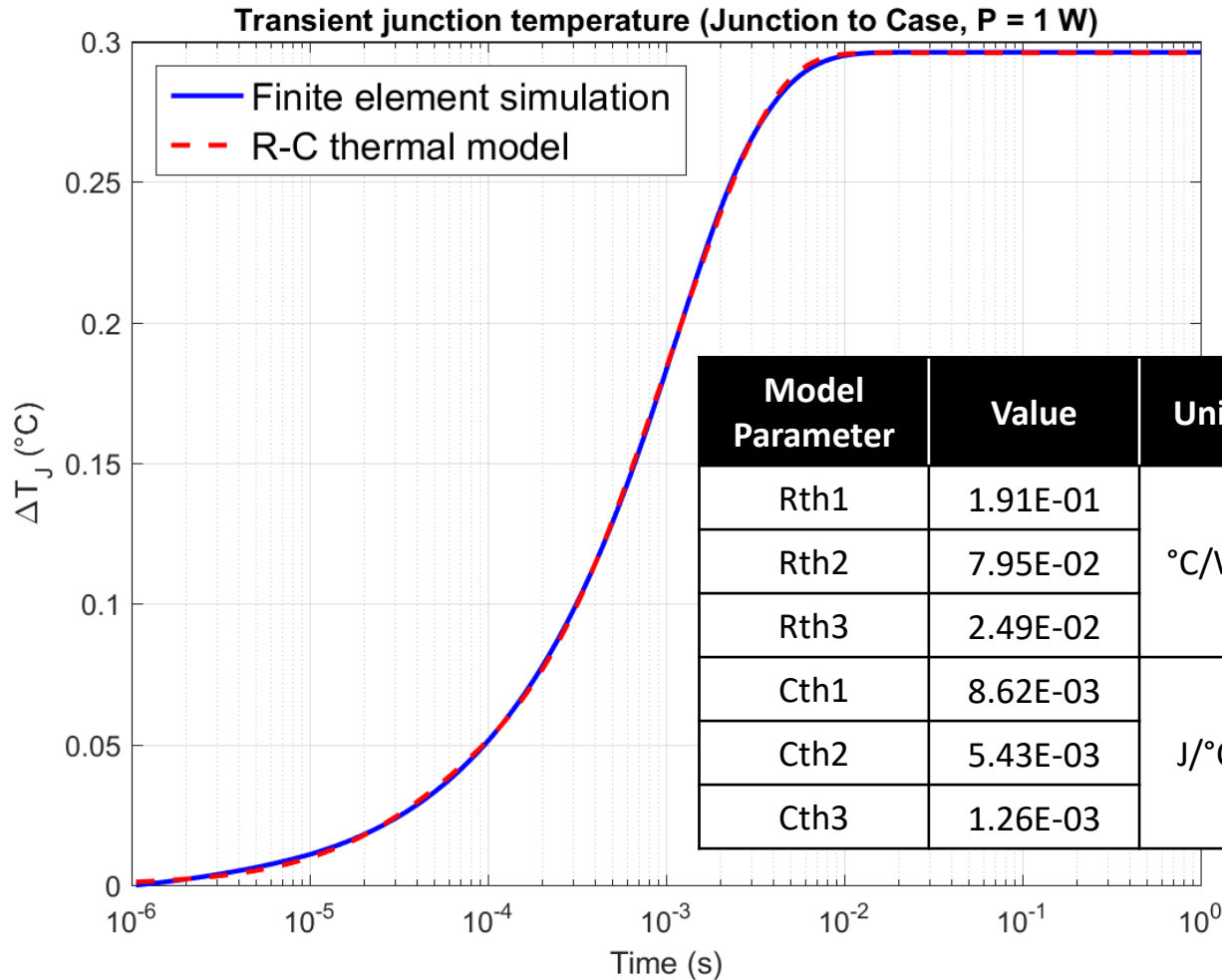
- Operating condition: Power = 1 W in the active area.
- Boundary condition: Temperature of bottom of the device backside set to be 300 K.

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

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



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





*The end of the
road for silicon...
but a clear road
ahead for GaN
FETs and ICs!*