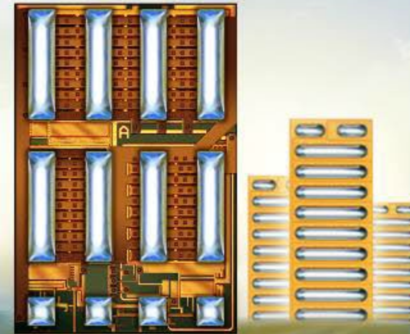
The eGaN® Technology Journey Continues



EPC2044 Thermal Model

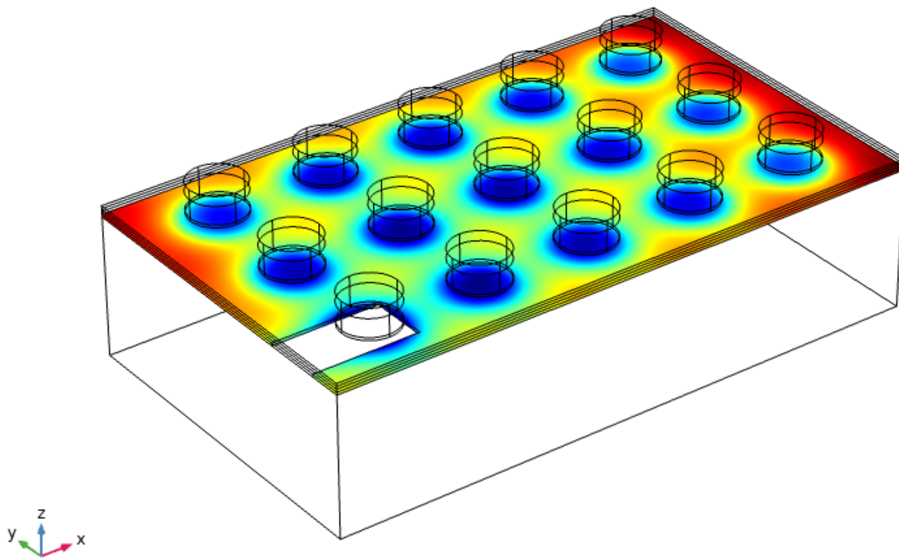
EPC2044 FEA thermal simulations

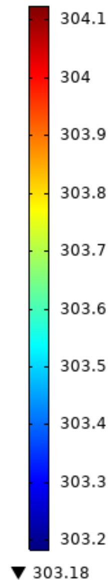
- The thermal model applies to EPC2044.
- A power dissipation of 1 W in the device active area is assumed.
- Finite element analysis (FEA) thermal simulations
  - $R_{\Theta JB}$ and $R_{\Theta JC}$ are obtained by stationary simulations.
  - $Z_{\Theta JB}$ and $Z_{\Theta JC}$ are obtained by transient simulations.
- R-C thermal model is generated.

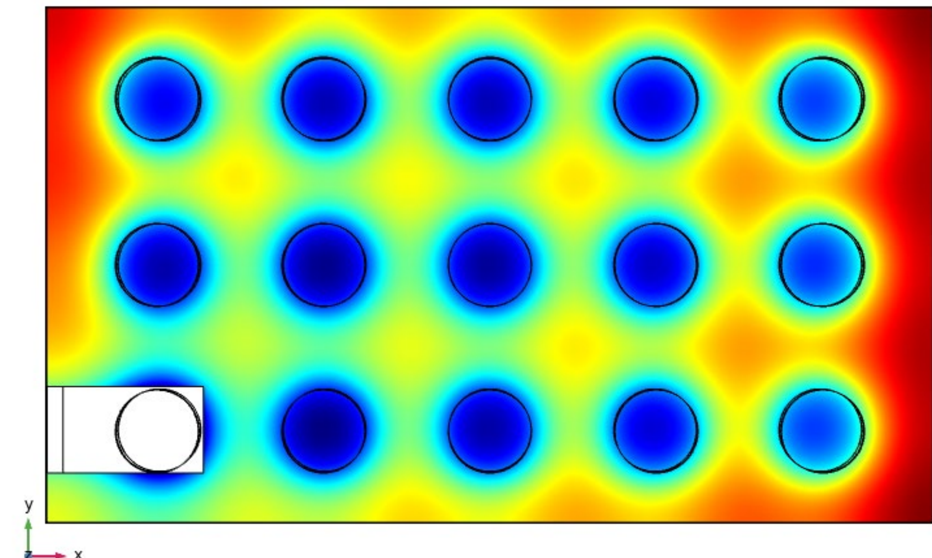
EPC2044 Steady-state $R_{\Theta JB}$

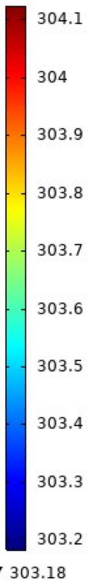
EFFICIENT POWER CONVERSION

Typical $R_{\Theta JB}$ = 4.1 °C/W





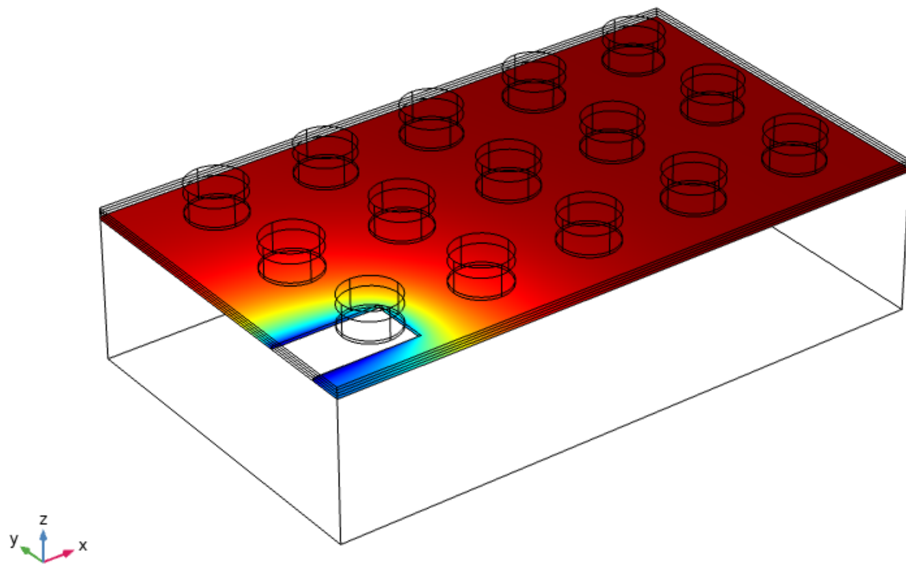


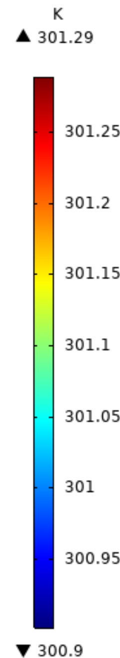


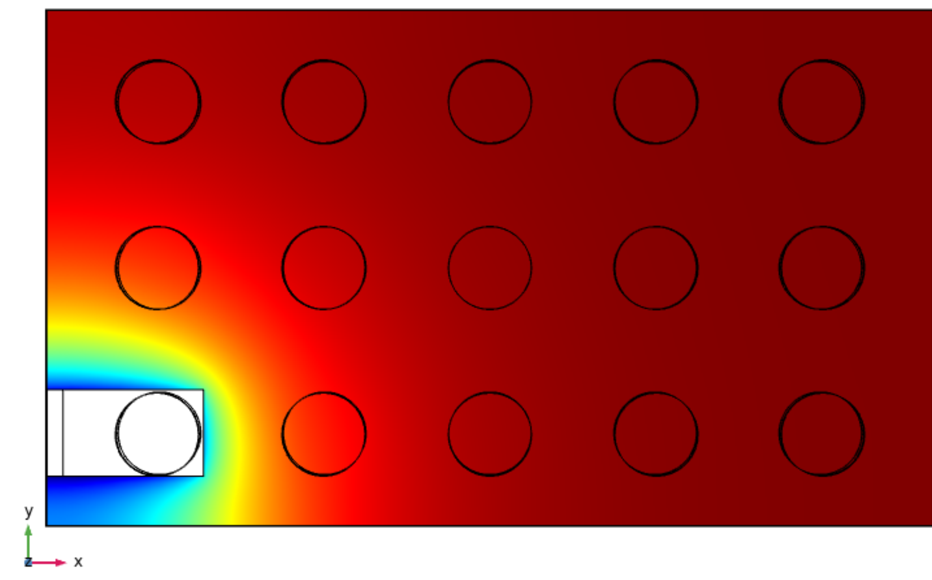
- Operating condition: Power = 1 W in the active area.
- Boundary condition: Temperature of top of Cu pillars set to be 300 K.

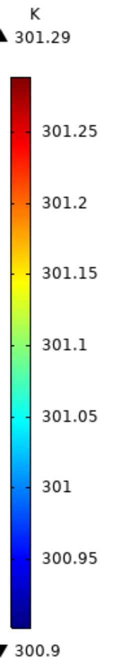
EPC2044 Steady-state $R_{\Theta JC}$

Typical $R_{\Theta JC}$ = 1.3 °C/W









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

EPC2044 $Z_{\Theta JB}$ R-C thermal model

EFFICIENT POWER CONVERSION

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

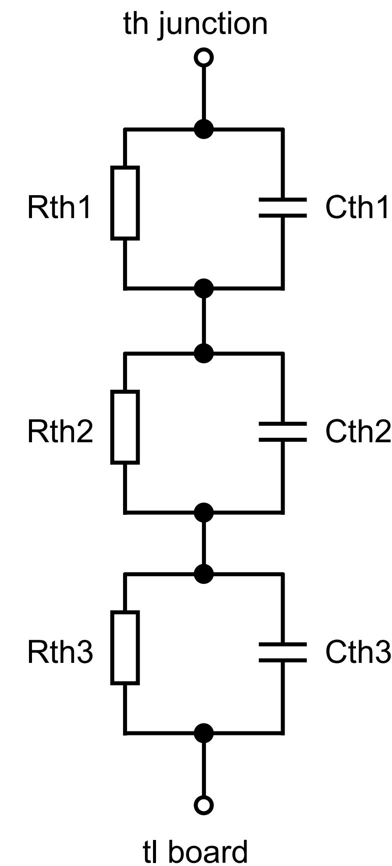
Finite element simulation

R-C thermal model

Model Parameter	Value	Unit
Rth1	3.75E+00	°C/W
Rth2	3.17E-01	
Rth3	5.30E-02	
Cth1	2.48E-03	J/°C
Cth2	6.54E-04	
Cth3	3.58E-04	

ΔT_J (°C)

Time (s)



EPC2044 $Z_{\Theta JC}$ R-C thermal model

EFFICIENT POWER CONVERSION

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

Finite element simulation

R-C thermal model

ΔT_J (°C)

Time (s)

Model Parameter	Value	Unit
Rth1	1.07E+00	°C/W
Rth2	1.84E-01	
Rth3	3.86E-02	
Cth1	1.35E-03	J/°C
Cth2	5.95E-04	
Cth3	3.01E-04