Geometry Representation (Figure 1)
- R2 represents the Thermoelectric Module (k=6W/mK)
- SQ1 represents the current space filled with a thermal paste (k=2.8 W/mK)
- CO1 represents the upper portion of the aluminum test unit (k=160W/mK)

Boundary Conditions (Figure 2)
- Blue has a temperature of 30°C or 303K
- Green has a temperature of 200°C or 473K
- Pink represents insulated boundaries
- Black represents internal boundaries

Mesh (Figure 3)
- There are 67584 elements
FEA Solution (Figure 4)

\[
\bar{T} = \text{average temperature}
\]

\[
\bar{T} = \frac{\int_0^L \int_0^W T(x,y) \, dx \, dy}{A}
\]

\[
\bar{T}_{R1} = 361.2K
\]

\[
\bar{T}_{SQ1} = 409.5K
\]

\[
\bar{T}_{CO1} = 460.2K
\]
Boundary Integral (Figure 5)

\[ \bar{T} = \frac{\int_0^L T(x) dx}{L} \]

\[ \bar{T} = \frac{16.775457 m \cdot K}{0.04 m} \]

\[ \bar{T} = 419.4 K \]
Solution – Closer Look (Figure 6)
Possible Change (Figure 7)
- Boundary integral yields $\bar{T} = 420.7\,K$
- Specific points range from 414K in the center to 441K on the bottom corner of the TEM