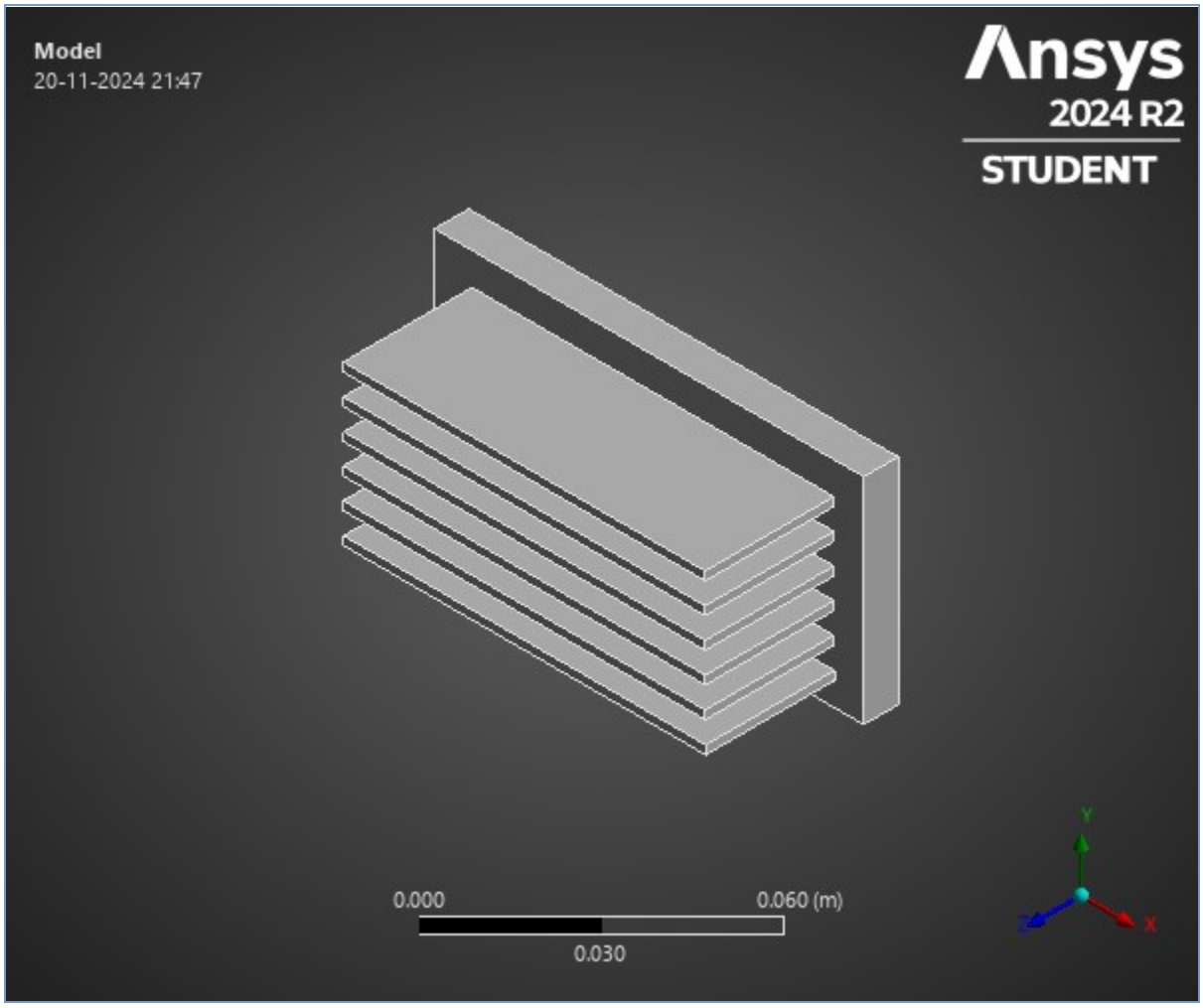
Project*

First Saved	Sunday, November 17, 2024
Last Saved	Sunday, November 17, 2024
Product Version	2024 R2
Save Project Before Solution	No
Save Project After Solution	No



Contents

Units

TABLE 1

Unit System	Metric (m, kg, N, s, V, A) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (A4)

TABLE 2
Model (A4) > Geometry Imports

Object Name	*Geometry Imports*
State	Solved

TABLE 3
Model (A4) > Geometry Imports > Geometry Import (A3, B3)

Object Name	*Geometry Import (A3, B3)*
State	Solved
Definition	
Source	C:\Users\shrey\Downloads\fin v1.STEP
Type	Step
Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes

Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	None
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

Geometry

TABLE 4
Model (A4) > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	
Source	C:\Users\shrey\Downloads\fin v1.STEP
Type	Step
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	0.1 m
Length Y	5.e-002 m
Length Z	3.8e-002 m
Properties	
Volume	7.0348e-005 m³
Mass	0.19698 kg
Scale Factor Value	1.
Statistics	
Bodies	1
Active Bodies	1
Nodes	26747
Elements	13810
Mesh Metric	None
Update Options	
Assign Default Material	No
Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes

Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	None
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

TABLE 5
Model (A4) > Geometry > Parts

Object Name	*fin v1-FreeParts|FIN*
State	Meshed
Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Treatment	None
Material	
Assignment	Aluminum
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	0.1 m
Length Y	5.e-002 m
Length Z	3.8e-002 m
Properties	
Volume	7.0348e-005 m³
Mass	0.19698 kg
Centroid X	2.5389e-002 m
Centroid Y	-2.5433e-002 m
Centroid Z	1.2197e-002 m
Moment of Inertia Ip1	5.9965e-005 kg·m²
Moment of Inertia Ip2	1.6804e-004 kg·m²
Moment of Inertia Ip3	1.7934e-004 kg·m²
Statistics	

Nodes	26747
Elements	13810
Mesh Metric	None

TABLE 6
Model (A4) > Materials

Object Name	*Materials*
State	Fully Defined
Statistics	
Materials	2
Material Assignments	1

TABLE 7
Model (A4) > Materials > Aluminum Assignment

Object Name	*Aluminum Assignment*
State	Fully Defined
General	
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Material Name	Aluminum
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Reference Temperature	By Environment
Suppressed	No

Coordinate Systems

TABLE 8
Model (A4) > Coordinate Systems > Coordinate System

Object Name	*Global Coordinate System*
State	Fully Defined
Definition	
Type	Cartesian
Coordinate System ID	0.
Origin	
Origin X	0. m
Origin Y	0. m
Origin Z	0. m
Directional Vectors	
X Axis Data	[1. 0. 0.]
Y Axis Data	[0. 1. 0.]
Z Axis Data	[0. 0. 1.]
Transfer Properties	
Source	
Read Only	No

Mesh

TABLE 9
Model (A4) > Mesh

Object Name	*Mesh*

State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical
Element Order	Program Controlled
Element Size	Default
Sizing	
Use Adaptive Sizing	Yes
Resolution	5
Mesh Defeaturing	Yes
Defeature Size	Default
Transition	Fast
Span Angle Center	Coarse
Initial Size Seed	Assembly
Bounding Box Diagonal	0.11808 m
Average Surface Area	1.2075e-003 m²
Minimum Edge Length	2.e-003 m
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Aggressive Mechanical
Target Element Quality	Default (5.e-002)
Smoothing	Medium
Mesh Metric	None
Inflation	
Use Automatic Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0.272
Maximum Layers	5
Growth Rate	1.2
Inflation Algorithm	Pre
Inflation Element Type	Wedges
View Advanced Options	No
Advanced	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	26747
Elements	13810
Show Detailed Statistics	No

TABLE 10
Model (A4) > Mesh > Mesh Controls

Object Name	*Patch Conforming Method*
State	Fully Defined
Scope	
Scoping Method	Geometry Selection

Geometry	1 Body
Definition	
Suppressed	No
Method	Tetrahedrons
Algorithm	Patch Conforming
Element Order	Use Global Setting
Advanced Improve Options	
Aggressive Thin Face Collapse	Program Controlled
Automatic Node Movement	Program Controlled
Refinement Options	
Refine at Thin Section	No

Steady-State Thermal (A5)

TABLE 11
Model (A4) > Analysis

Object Name	*Steady-State Thermal (A5)*
State	Solved
Definition	
Physics Type	Thermal
Analysis Type	Steady-State
Solver Target	Mechanical APDL
Options	
Generate Input Only	No

TABLE 12
Model (A4) > Steady-State Thermal (A5) > Initial Condition

Object Name	*Initial Temperature*
State	Fully Defined
Definition	
Initial Temperature	Uniform Temperature
Initial Temperature Value	35. °C

TABLE 13
Model (A4) > Steady-State Thermal (A5) > Analysis Settings

Object Name	*Analysis Settings*
State	Fully Defined
Step Controls	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Solver Pivot Checking	Program Controlled
Radiosity Controls	
Radiosity Solver	Program Controlled
Flux Convergence	1.e-004
Maximum Iteration	1000.
Solver Tolerance	0.1 W/m²
Over Relaxation	0.1
Hemicube Resolution	10.

Nonlinear Controls	
Heat Convergence	Program Controlled
Temperature Convergence	Program Controlled
Line Search	Program Controlled
Advanced	
Contact Split (DMP)	Program Controlled
Output Controls	
Output Selection	None
Calculate Thermal Flux	Yes
Contact Data	Yes
Nodal Forces	No
Volume and Energy	Yes
Euler Angles	Yes
General Miscellaneous	No
Contact Miscellaneous	No
Store Results At	All Time Points
Result File Compression	Program Controlled
Analysis Data Management	
Solver Files Directory	C:\Users\shrey\OneDrive\Desktop\Ansys\Heat Sink_files\dp0\SYS-2\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	Yes
Solver Units	Active System
Solver Unit System	mks

TABLE 14
Model (A4) > Steady-State Thermal (A5) > Loads

Object Name	*Heat Flux*	*Radiation*
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	35 Faces
Definition		
Type	Heat Flux	Radiation
Magnitude	1500. W/m² (ramped)	
Suppressed	No	
Correlation		To Ambient
Emissivity		1. (step applied)
Ambient Temperature		35. °C (ramped)

FIGURE 1
Model (A4) > Steady-State Thermal (A5) > Heat Flux

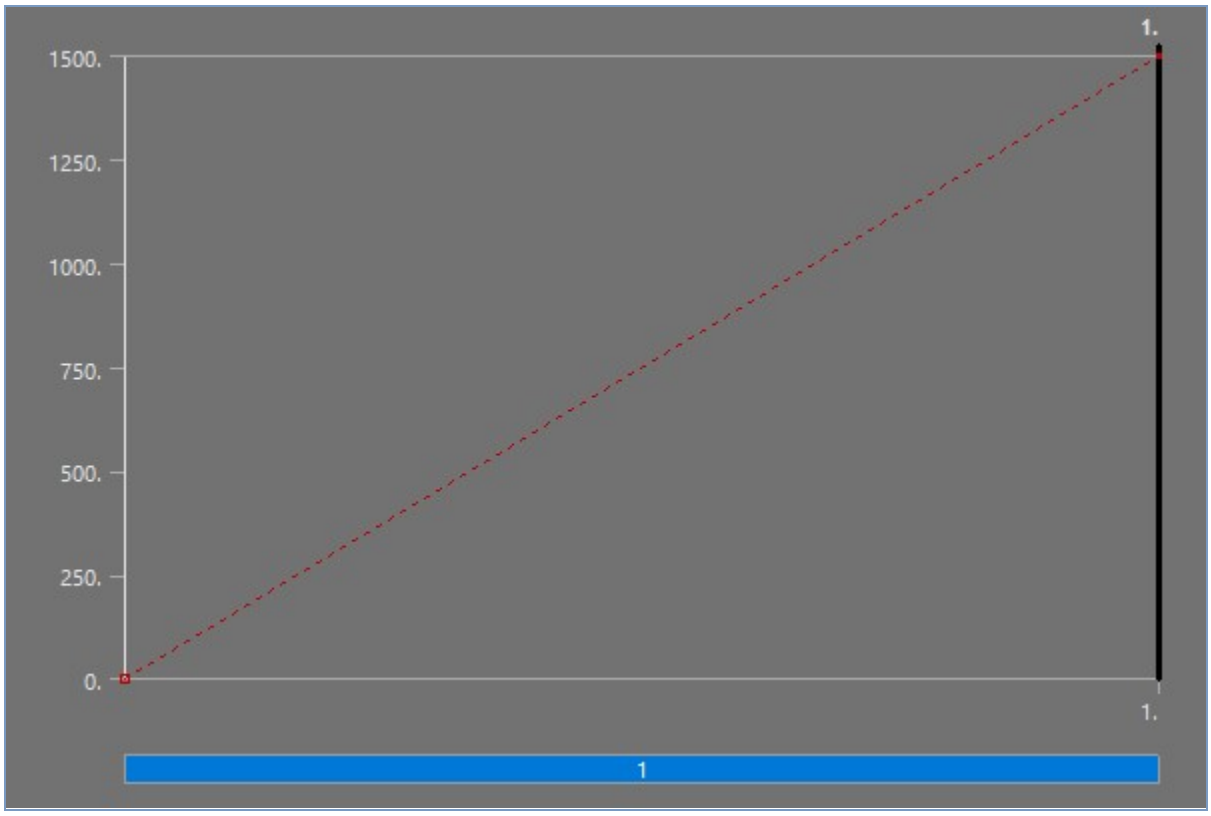
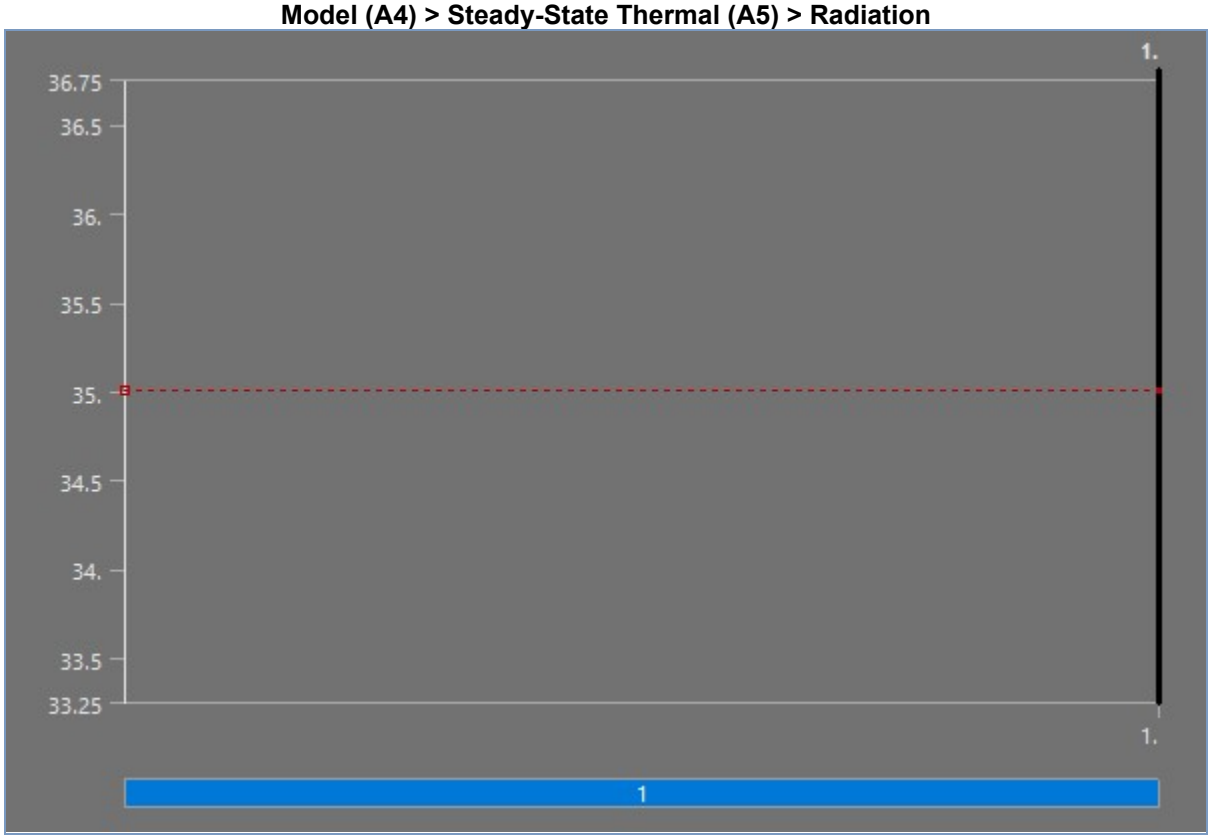


FIGURE 2
Model (A4) > Steady-State Thermal (A5) > Radiation



Solution (A6)

TABLE 15
Model (A4) > Steady-State Thermal (A5) > Solution

Object Name	*Solution (A6)*
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	7. s
MAPDL Memory Used	703. MB
MAPDL Result File Size	7.75 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 16
Model (A4) > Steady-State Thermal (A5) > Solution (A6) > Solution Information

Object Name	*Solution Information*
State	Solved
Solution Information	
Solution Output	Solver Output
Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
Activate Visibility	Yes
Display	All FE Connectors
Draw Connections Attached To	All Nodes
Line Color	Connection Type
Visible on Results	No
Line Thickness	Single
Display Type	Lines

TABLE 17
Model (A4) > Steady-State Thermal (A5) > Solution (A6) > Results

Object Name	*Temperature*	*Total Heat Flux*
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Temperature	Total Heat Flux
By	Time	
Display Time	Last	
Separate Data by Entity	No	
Calculate Time History	Yes	
Identifier		
Suppressed	No	
Results		
Minimum	60.69 °C	65.83 W/m²
Maximum	61.491 °C	7612.7 W/m²
Average	61.079 °C	2523.3 W/m²
Minimum Occurs On	fin v1-FreeParts|FIN	

Maximum Occurs On	fin v1-FreeParts|FIN	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	2	
Integration Point Results		
Display Option		Averaged
Average Across Bodies		No

FIGURE 3
Model (A4) > Steady-State Thermal (A5) > Solution (A6) > Temperature

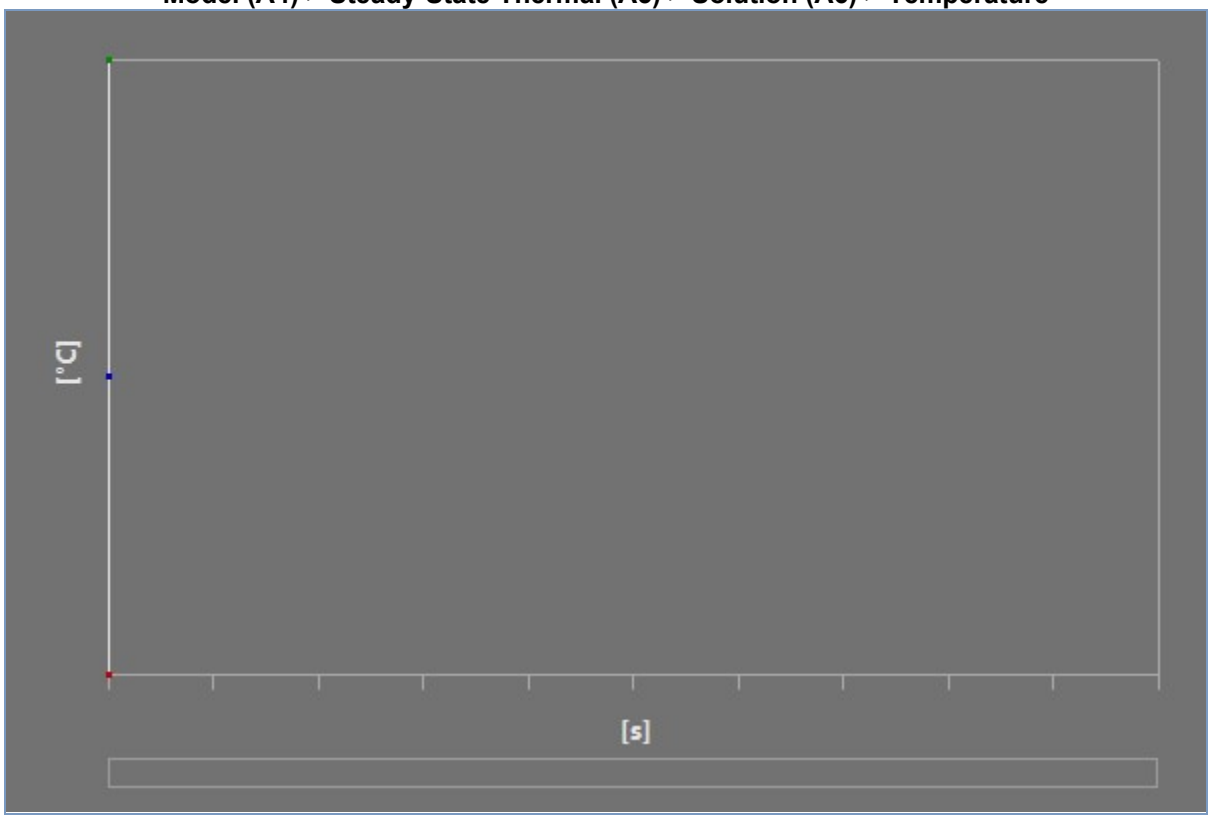


TABLE 18
Model (A4) > Steady-State Thermal (A5) > Solution (A6) > Temperature

Time [s]	Minimum [°C]	Maximum [°C]	Average [°C]
1.	60.69	61.491	61.079

FIGURE 4
Model (A4) > Steady-State Thermal (A5) > Solution (A6) > Total Heat Flux

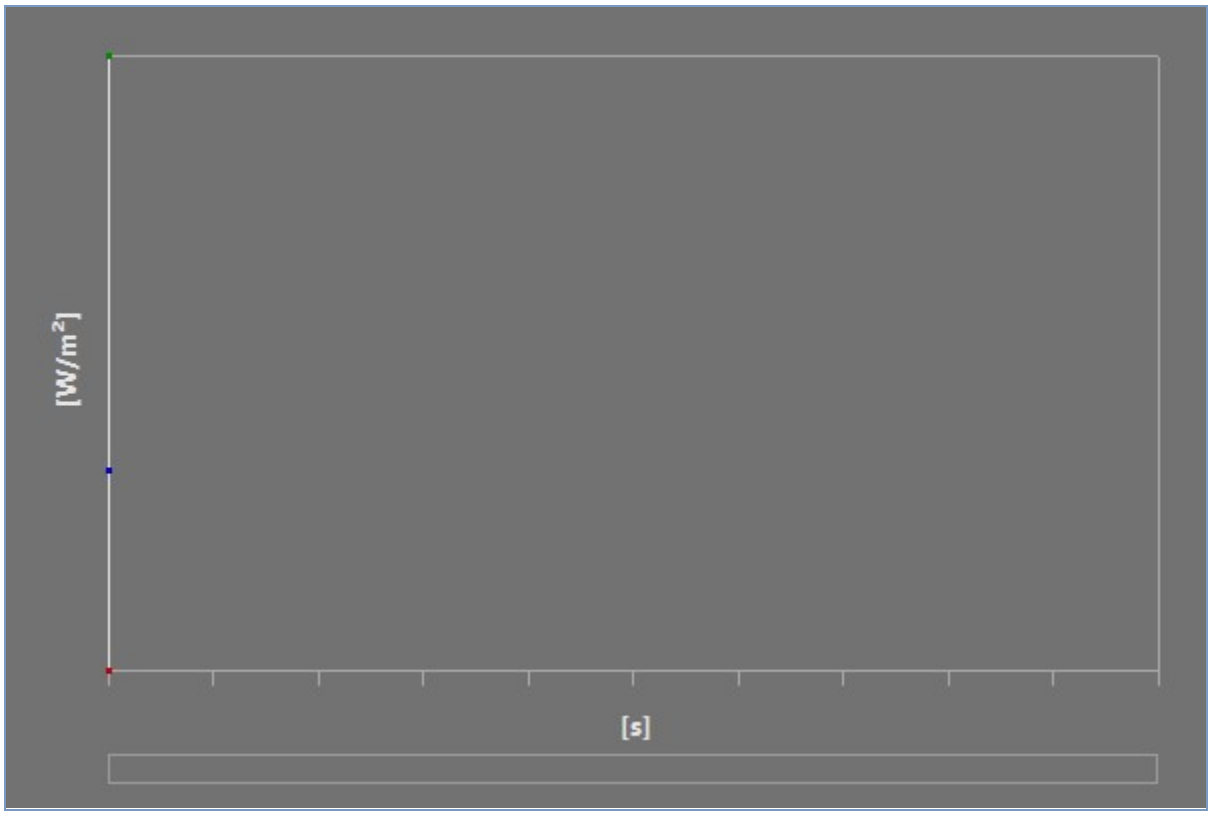


TABLE 19
Model (A4) > Steady-State Thermal (A5) > Solution (A6) > Total Heat Flux

Time [s]	Minimum [W/m²]	Maximum [W/m²]	Average [W/m²]
1.	65.83	7612.7	2523.3

Material Data

Aluminum

TABLE 20
Aluminum > Constants

Thermal Conductivity	170 W m^-1 C^-1
Density	2800 kg m^-3
Specific Heat	870 J kg^-1 C^-1
Coefficient of Thermal Expansion	2.2e-005 C^-1

TABLE 21
Aluminum > Color

Red	Green	Blue
182	229	228

TABLE 22
Aluminum > Isotropic Elasticity

Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa	Temperature C
7.e+010	0.33	6.8627e+010	2.6316e+010	