

R-C Thermal Model Parameters

DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "[A Simple Method of Generating Thermal Models for a Power MOSFET](#)"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse Transient Thermal Impedance curves for the MOSFET.

R-C values for the electrical circuit in the Foster/Tank and Cauer/Filter configurations are included.

Note:

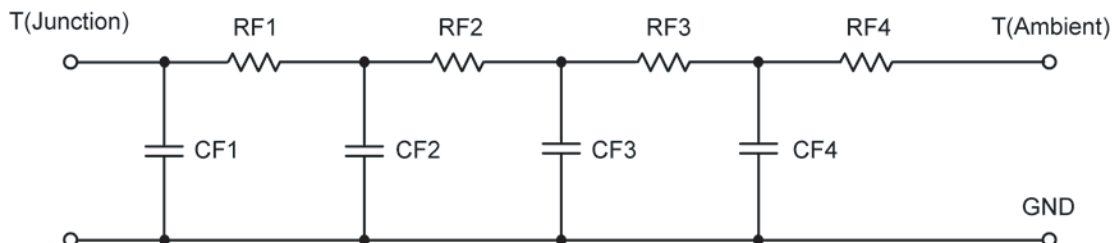
For a detailed explanation of implementing these values in P-SPICE, refer to [Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform](#).

R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
RT1	19.5392	25.3899	N/A	13.5271	12.1190
RT2	7.1560	8.3098	N/A	5.9620	2.8132
RT3	30.9052	37.8506	N/A	18.6111	15.7090
RT4	51.8296	32.7340	N/A	11.8230	14.2911
Thermal Capacitance (Joules/°C)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CT1	7.2584 m	14.1554 m	N/A	3.0188 m	2.9834 m
CT2	332.3182 u	1.3923 m	N/A	321.7206 u	171.2325 u
CT3	52.8205 m	96.4726 m	N/A	9.5061 m	15.8368 m
CT4	1.4020	2.5086	N/A	102.0017 m	161.0789 m

This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION**R-C VALUES FOR FILTER CONFIGURATION**

Thermal Resistance (°C/W)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
RF1	7.4669	7.5414	N/A	9.9556	5.9982
RF2	20.3767	32.2037	N/A	26.7385	18.3288
RF3	32.2020	35.9884	N/A	10.9191	11.0877
RF4	49.7231	28.7179	N/A	2.6699	9.5210
Thermal Capacitance (Joules/°C)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CF1	252.3032 u	864.8301 u	N/A	321.8448 u	439.5991 u
CF2	5.1236 m	9.4280 m	N/A	2.9098 m	3.4656 m
CF3	39.2085 m	95.7015 m	N/A	58.1570 m	28.0161 m
CF4	1.4272	3.0037	N/A	460.3757 m	211.0121 m

Note: NA indicates not applicable

Reference:

[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya. IEEE / SEMITHERM 2002

