

R-C Thermal Model Parameters

DESCRIPTION

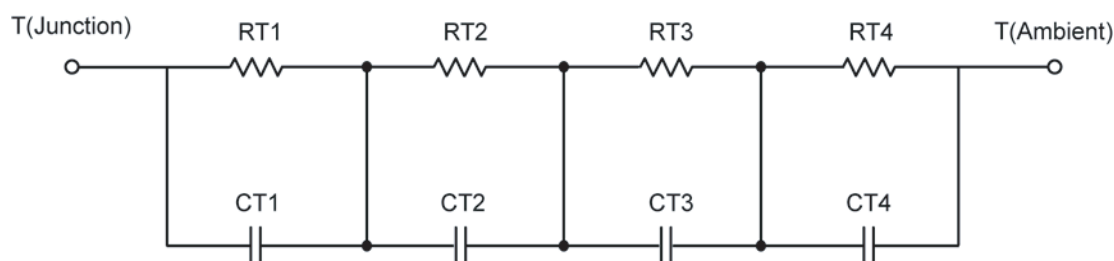
The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "[A Simple Method of Generating Thermal Models for a Power MOSFET](#)"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse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

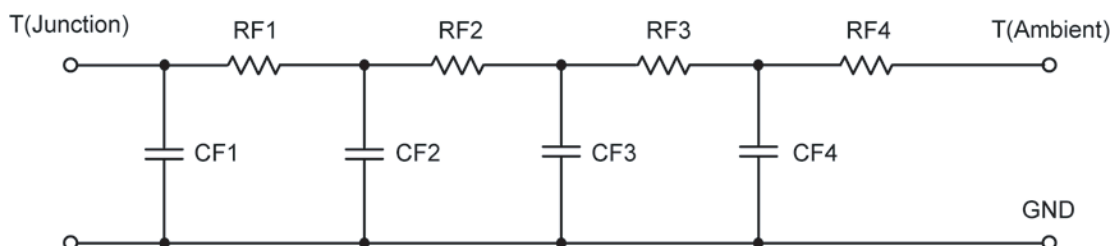
For a detailed explanation of implementing these values in P-SPICE, refer to [Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform](#).

R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	Ambient N-P-Ch	Ambient Schtky	Case	Foot N-P-Ch	Foot Schtky
RT1	28.8997	28.3470	N/A	22.9528	22.9528
RT2	7.3047	6.6928	N/A	5.9111	5.9111
RT3	20.9223	24.2556	N/A	1.7928	1.7928
RT4	52.5607	55.3802	N/A	9.9214	9.9214
Thermal Capacitance (Joules/°C)					
Junction to	Ambient N-P-Ch	Ambient Schtky	Case	Foot N-P-Ch	Foot Schtky
CT1	1.4667 m	1.2031 m	N/A	980.9062 u	980.9062 u
CT2	165.3221 u	210.6537 u	N/A	168.5356 u	168.5356 u
CT3	32.4158 m	22.3403 m	N/A	2.5381	2.5381
CT4	1.3579	1.2609	N/A	13.6418 m	13.6418 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 ($^{\circ}\text{C}/\text{W}$)					
Junction to	Ambient N-P-Ch	Ambient Schtky	Case	Foot N-P-Ch	Foot Schtky
RF1	9.9324	10.1144	N/A	5.3124	5.3124
RF2	28.9353	29.6094	N/A	16.3119	16.3119
RF3	19.4955	20.8920	N/A	14.0691	14.0691
RF4	51.4401	54.0297	N/A	4.0773	4.0773
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)					
Junction to	Ambient N-P-Ch	Ambient Schtky	Case	Foot N-P-Ch	Foot Schtky
CF1	170.1651 u	158.8364 u	N/A	105.4782 u	105.4782 u
CF2	1.3594 m	1.2321 m	N/A	549.2108 u	549.2108 u
CF3	32.6863 m	28.4527 m	N/A	1.7158 m	1.7158 m
CF4	1.3801	1.2668	N/A	70.8657 m	70.8657 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

