

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	8.8676	8.0977	N/A	16.7278	13.3024
RT2	27.7565	27.0042	N/A	3.8783	2.8848
RT3	24.2293	21.0690	N/A	8.3007	9.2451
RT4	59.1466	63.8291	N/A	13.0932	11.5677
Thermal Capacitance (Joules/°C)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CT1	1.3320 m	1.8718 m	N/A	3.7828 m	12.2250 m
CT2	83.9842 m	85.2607 m	N/A	422.4969 u	927.6159 u
CT3	9.6504 m	28.5449 m	N/A	23.8528 m	91.3537 m
CT4	1.2711	1.1136	N/A	102.4246 m	179.1048 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 Nch	Ambient Pch	Case	Foot Nch	Foot Pch
RF1	6.5745	7.6637	N/A	4.7167	2.6342
RF2	25.5693	21.2153	N/A	22.1294	18.1801
RF3	30.6743	27.1339	N/A	11.8191	13.6378
RF4	57.1819	63.9871	N/A	3.3348	2.5479
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CF1	685.5712 u	1.4329 m	N/A	348.0846 u	660.5382 u
CF2	4.7071 m	15.2663 m	N/A	2.8567 m	8.5762 m
CF3	51.0707 m	27.4530 m	N/A	45.5402 m	74.9996 m
CF4	1.2250	959.7691 m	N/A	645.9281 m	152.8111 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



