

## 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:*

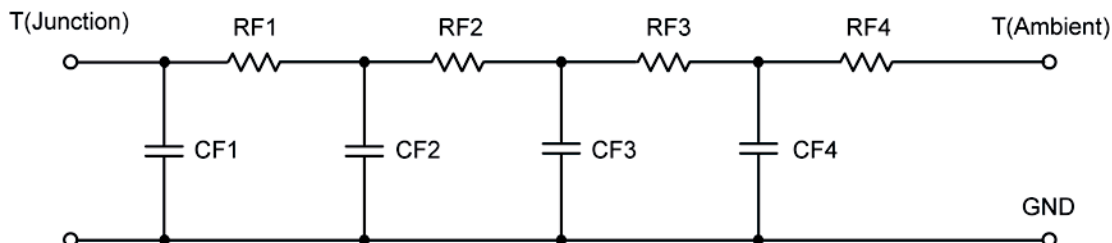
For a detailed explanation of implementing these values in P-SPICE, refer to [Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform](#).

### R-C THERMAL MODEL FOR TANK CONFIGURATION



<b>R-C VALUES FOR TANK CONFIGURATION</b>					
Thermal Resistance (°C/W)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
RT1	41.3839	41.3839	N/A	40.4167	40.4167
RT2	17.8424	17.8424	N/A	22.9343	22.9343
RT3	45.3883	45.3883	N/A	17.3862	17.3862
RT4	45.3854	45.3854	N/A	9.2628	9.2628
Thermal Capacitance (Joules/°C)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CT1	16.2051 m	16.2048 m	N/A	3.0281 m	3.0281 m
CT2	382.0459 u	382.0456 u	N/A	1.3611 m	1.3611 m
CT3	2.2483 m	2.2483 m	N/A	52.5443 m	52.5443 m
CT4	1.8851	1.8851	N/A	185.6658 u	185.6658 u

*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	22.8768	22.8768	N/A	20.1603	19.6121
RF2	52.3054	52.3054	N/A	46.1553	49.1762
RF3	29.9906	29.9906	N/A	14.2631	10.9809
RF4	44.8272	44.8272	N/A	9.4213	10.2308
Thermal Capacitance (Joules/ $^{\circ}\text{C}$ )					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CF1	297.9253 u	297.9253 u	N/A	228.7538 u	228.5220 u
CF2	1.7174 m	1.7174 m	N/A	1.2098 m	1.2090 m
CF3	18.6658 m	18.6658 m	N/A	10.7636 m	10.7473 m
CF4	1.8697	1.8697	N/A	111.7762 m	111.6596 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

