

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	Case Drain Top	Case Source
RT1	1.2715	541.9300 u	420.8703 m
RT2	7.4755	23.8824 m	2.9560
RT3	10.4814	959.1091 m	18.8355 m
RT4	48.7717	216.4667 m	4.2819 m
Thermal Capacitance (Joules/°C)			
Junction to	Ambient	Case Drain Top	Case Source
CT1	2.1640 m	46.0378 m	1.1574 m
CT2	230.0674 m	25.0865 m	17.2324 m
CT3	42.6031 m	17.6767 m	853.1085 m
CT4	1.2991	2.5951 m	4.8476 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	Case Drain Top	Case Source
RF1	6.0874	310.0466 m	410.9662 m
RF2	7.6744	555.7670 u	1.2834
RF3	7.6389	52.0767 m	726.9760 m
RF4	46.5993	837.3209 m	978.6087 m
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)			
Junction to	Ambient	Case Drain Top	Case Source
CF1	11.6397 m	2.0618 m	953.0745 u
CF2	60.3507 m	387.3382 u	13.7066 m
CF3	17.0829 m	16.2399 m	1.2515 m
CF4	1.3018	90.5205 u	11.0749 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



