

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	383.3629 m
RT2	7.4755	23.8824 m	2.9708
RT3	10.4813	959.1097 m	41.5326 m
RT4	48.7717	216.4666 m	4.3045 m
Thermal Capacitance (Joules/°C)			
Junction to	Ambient	Case Drain Top	Case Source
CT1	2.1640 m	45.9474 m	1.0193 m
CT2	230.0674 m	33.4132 m	16.5484 m
CT3	42.6031 m	18.2706 m	1.1648
CT4	1.2991	2.5656 m	6.8513 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	422.0638 m
RF2	7.6744	555.8000 u	1.2538
RF3	7.6389	52.0767 m	727.6428 m
RF4	46.5993	837.3209 m	996.4934 m
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)			
Junction to	Ambient	Case Drain Top	Case Source
CF1	11.6397 m	2.0570 m	924.6388 u
CF2	60.3507 m	396.0260 u	14.1029 m
CF3	17.0829 m	16.5376 m	1.3296 m
CF4	1.3018	85.3684 u	9.2135 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



