R-C Thermal Model Parameters

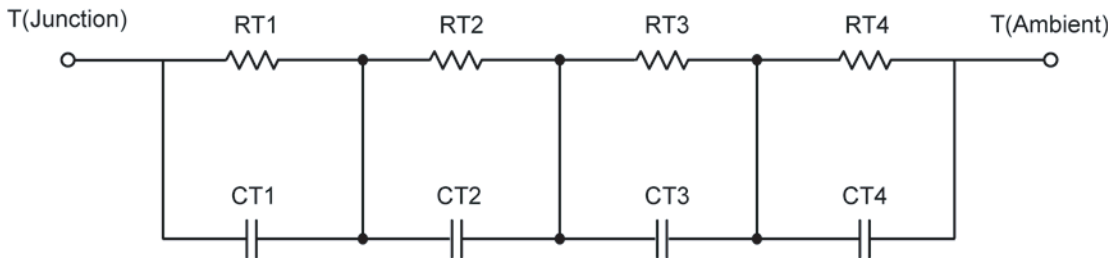
DESCRIPTION

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.

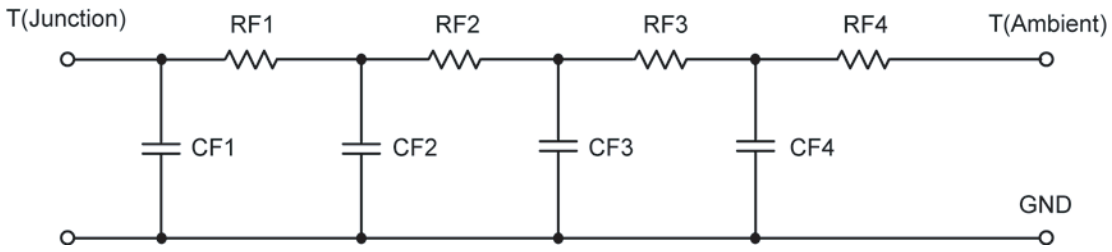
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION		
Thermal Resistance (°C/W)		
Junction to	**Ambient**	**Case**
RT1	65.0590	N/A
RT2	47.9499	N/A
RT3	41.1976	N/A
RT4	9.6796	N/A
Thermal Capacitance (Joules/°C)		
Junction to	**Ambient**	**Case**
CT1	1.1621	N/A
CT2	17.4265 m	N/A
CT3	3.0416 m	N/A
CT4	583.1417 μ	N/A

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

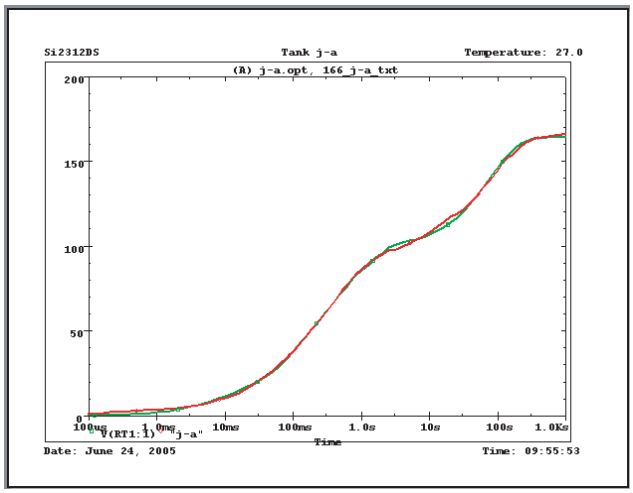


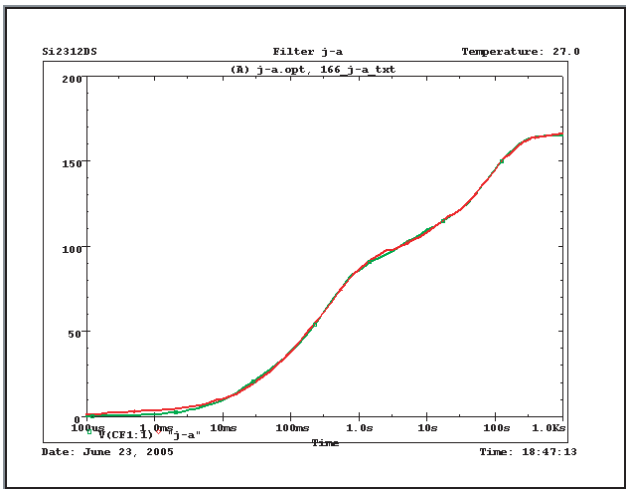
R-C VALUES FOR FILTER CONFIGURATION		
Thermal Resistance (°C/W)		
Junction to	**Ambient**	**Case**
RF1	28.5209	N/A
RF2	57.6873	N/A
RF3	22.4320	N/A
RF4	56.0253	N/A
Thermal Capacitance (Joules/°C)		
Junction to	**Ambient**	**Case**
CF1	823.4954 μ	N/A
CF2	4.2882 m	N/A
CF3	154.2192 m	N/A
CF4	1.4060	N/A

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


Si2312DS
Tank j-a
Temperature: 27.0
(A) j-a.opt, 166_j-a_txt
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: June 24, 2005
Time: 09:55:53


Si2312DS
Filter j-a
Temperature: 27.0
(A) j-a.opt, 166_j-a_txt
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CE1:1) "j-a"
Time
Date: June 23, 2005
Time: 18:47:13