R-C Thermal Model Parameters

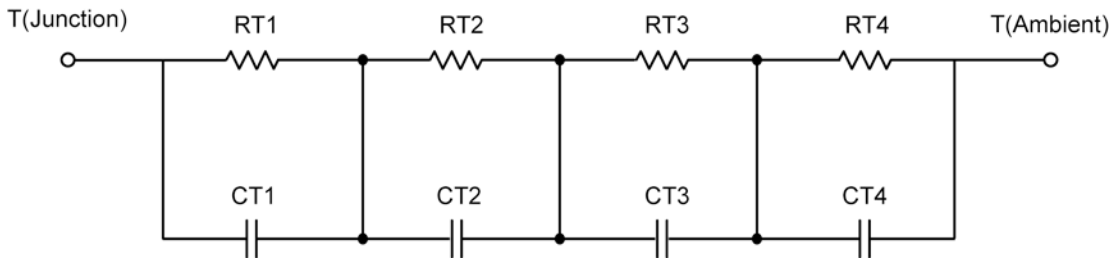
DESCRIPTION

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.

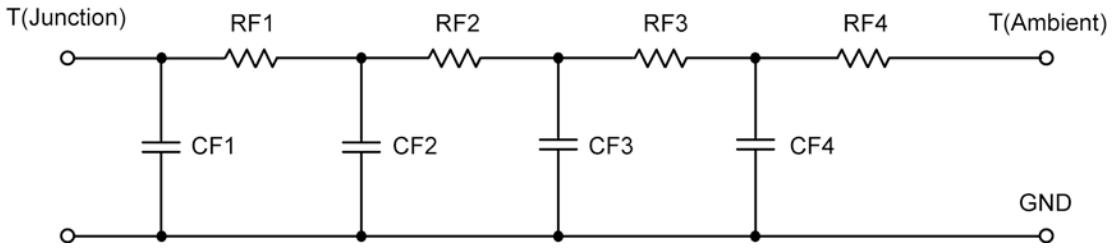
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.9420	976.8678 m	N/A
RT2	9.9325	682.8492 m	N/A
RT3	1.8410	1.6214	N/A
RT4	31.2845	918.8830 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	140.4427 m	11.7771 m	N/A
CT2	1.6022	4.0965	N/A
CT3	1.5539 m	68.1528 m	N/A
CT4	3.1588	591.3552 u	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

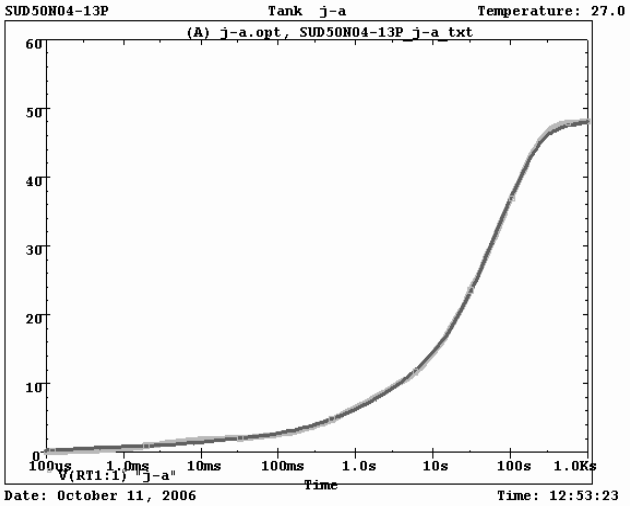


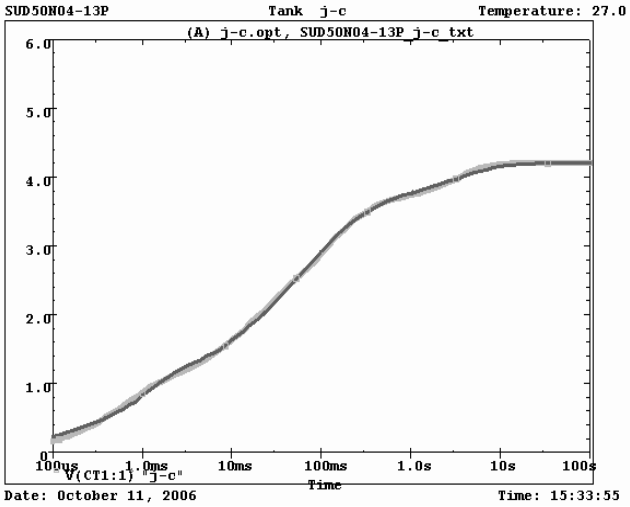
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.7831	1.1279	N/A
RF2	5.8799	1.3511	N/A
RF3	17.1385	1.1481	N/A
RF4	23.1985	572.9000 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.3806 m	608.7061 u	N/A
CF2	112.1216 m	13.9994 m	N/A
CF3	864.1544 m	94.5225 m	N/A
CF4	2.9415	5.3940	N/A

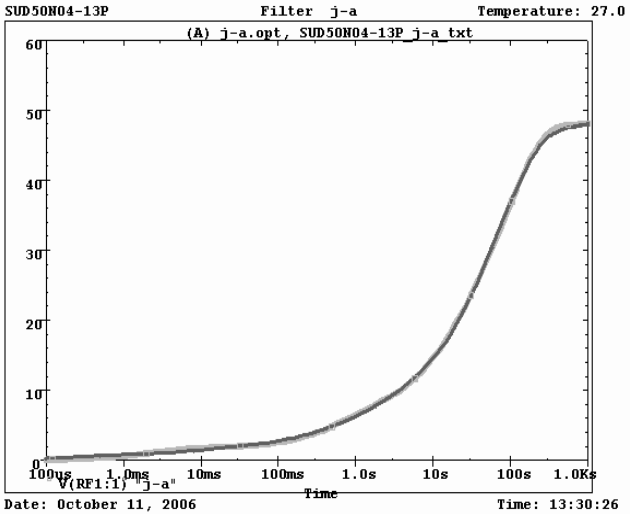
Note: NA indicates not applicable

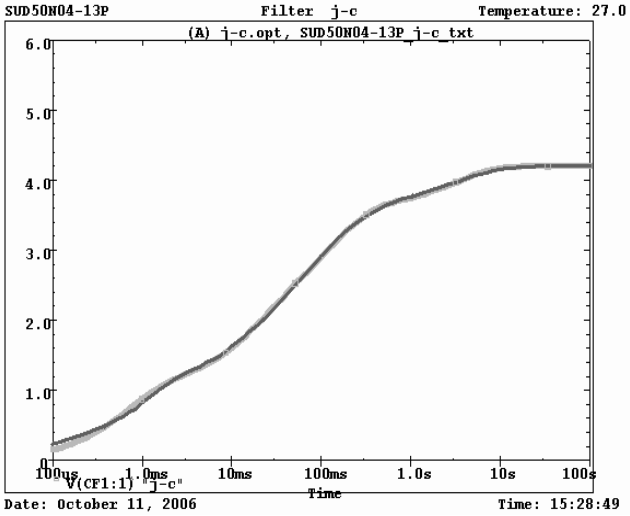
Reference:

[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya, IEEE / SEMITHERM 2002


SUD50N04-13P
Tank j-a
Temperature: 27.0
(A) j-a.opt, SUD50N04-13P_j-a_txt
60
50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: October 11, 2006
Time: 12:53:23


SUD50N04-13P
Tank j-c
Temperature: 27.0
(A) j-c.opt, SUD50N04-13P_j-c_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CT1:1) "j-c"
Time
Date: October 11, 2006
Time: 15:33:55


SUD50N04-13P
Filter j-a
Temperature: 27.0
(A) j-a.opt, SUD50N04-13P_j-a_txt
60
50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a"
Time
Date: October 11, 2006
Time: 13:30:26


SUD50N04-13P
Filter j-c
Temperature: 27.0
(A) j-c.opt, SUD50N04-13P_j-c_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CF1:1) "j-c"
Time
Date: October 11, 2006
Time: 15:28:49