R-C Thermal Model Parameters

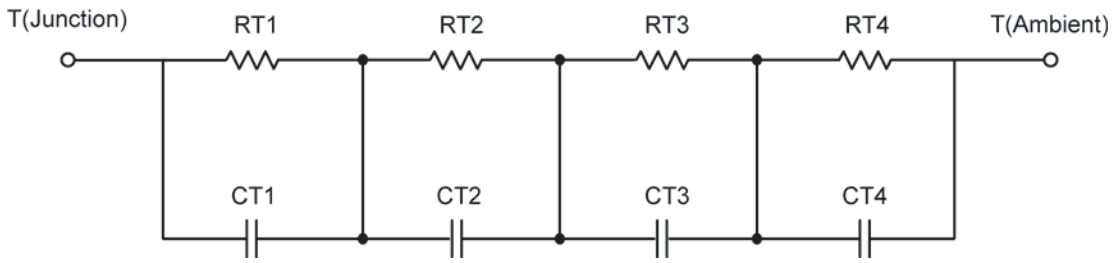
DESCRIPTION

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.

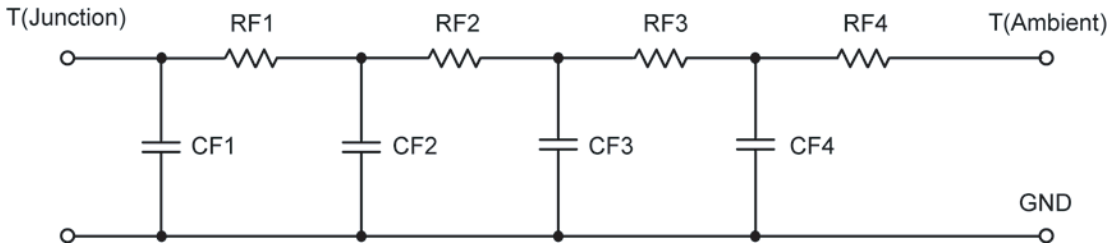
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.5431	28.8945 m	N/A
RT2	19.4536	1.1108	N/A
RT3	15.0558	1.4224	N/A
RT4	48.9104	1.4419	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.1071 m	686.5381 u	N/A
CT2	13.3151 m	190.7991 u	N/A
CT3	178.1933 m	1.3230 m	N/A
CT4	1.4793	1.2716 m	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

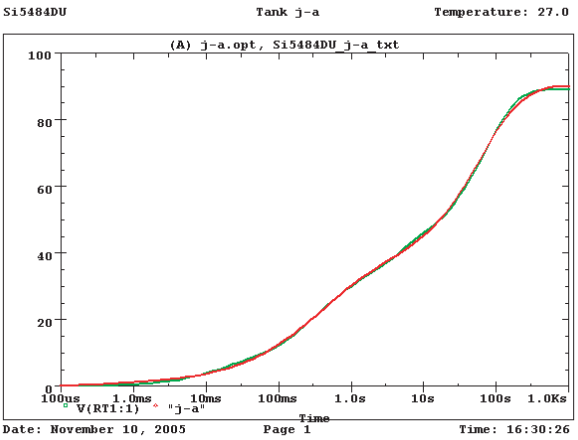


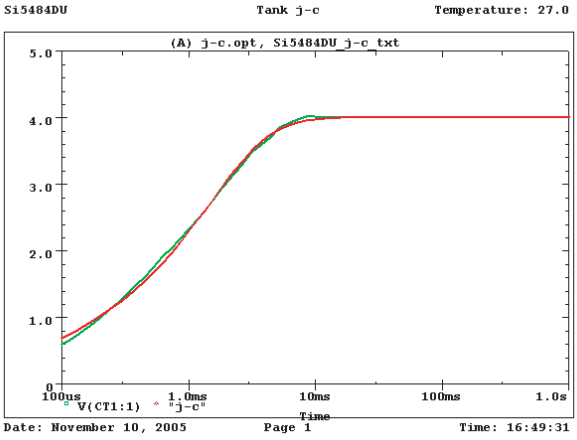
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.1642	1.7953	N/A
RF2	22.2142	1.4822	N/A
RF3	16.1658	571.1917 m	N/A
RF4	44.3978	150.0745 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.4684 m	145.1296 u	N/A
CF2	10.2828 m	578.5153 u	N/A
CF3	190.2917 m	867.6748 u	N/A
CF4	1.4192	38.2575 u	N/A

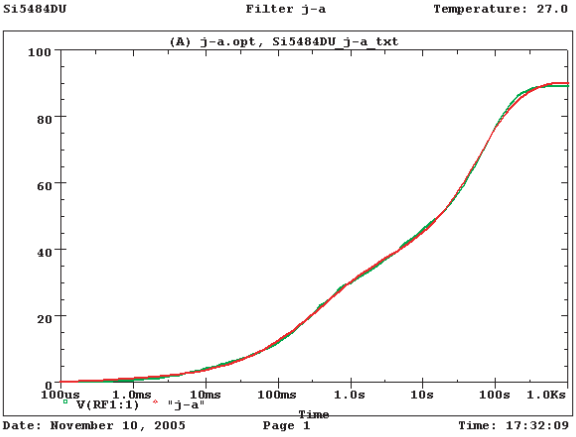
Note: NA indicates not applicable

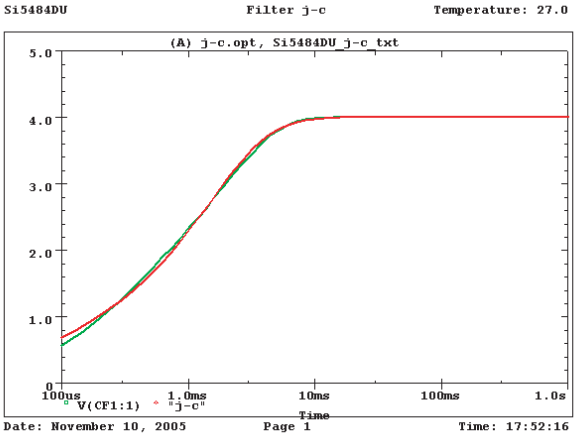
Reference:

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


Si5484DU
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si5484DU_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: November 10, 2005
Page 1
Time: 16:30:26


Si5484DU
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si5484DU_j-c_txt
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date: November 10, 2005
Page 1
Time: 16:49:31


Si5484DU
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si5484DU_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: November 10, 2005
Page 1
Time: 17:32:09


Si5484DU
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si5484DU_j-c_txt
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date: November 10, 2005
Page 1
Time: 17:52:16