R-C Thermal Model Parameters

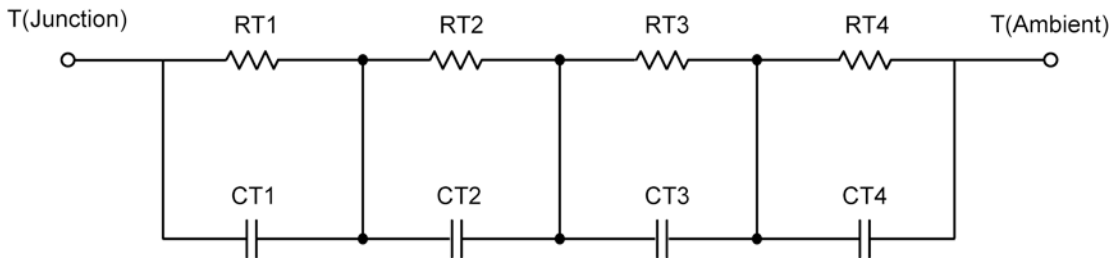
DESCRIPTION

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.

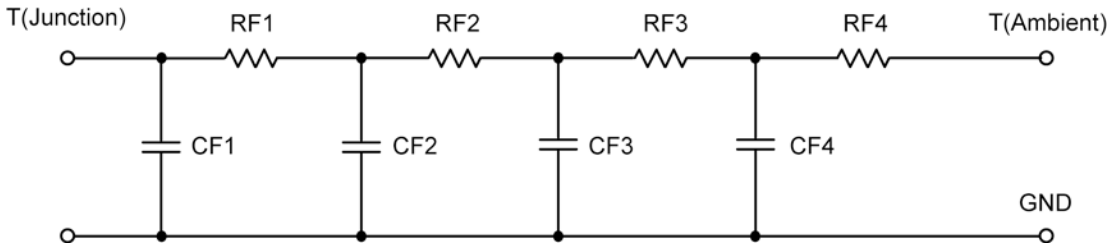
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	14.1987	N/A	1.4338
RT2	15.6302	N/A	7.7779
RT3	7.2391	N/A	2.0581
RT4	37.0637	N/A	8.7302
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	9.1933 m	N/A	879.1230 u
CT2	1.3008 m	N/A	3.4305 m
CT3	1.1522	N/A	66.0593 m
CT4	1.8243	N/A	2.6871 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

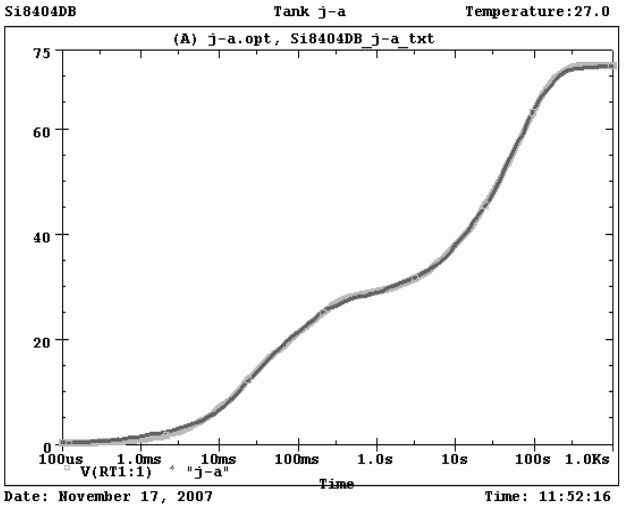


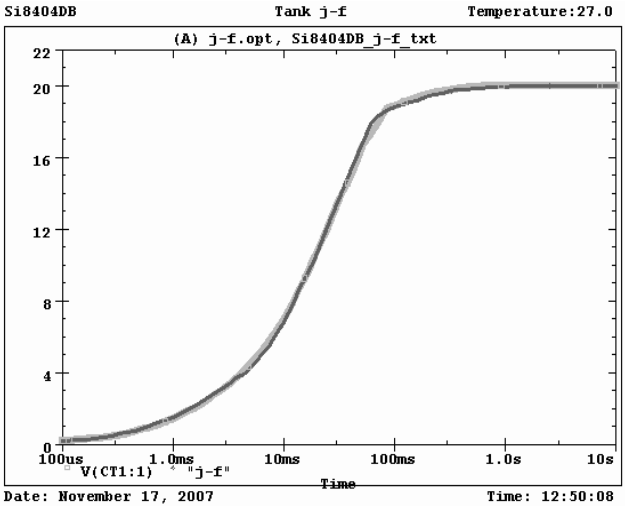
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.4487	N/A	4.4270
RF2	13.0397	N/A	9.2285
RF3	14.2175	N/A	5.2678
RF4	30.2941	N/A	1.0767
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.0284 m	N/A	645.9204 u
CF2	6.0241 m	N/A	999.2337 u
CF3	580.7078 m	N/A	404.2747 u
CF4	1.4614	N/A	188.9370 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


Si8404DB
Tank j-a
Temperature:27.0
(A) j-a.opt, Si8404DB_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: November 17, 2007
Time: 11:52:16


Si8404DB
Tank j-f
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20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
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Time
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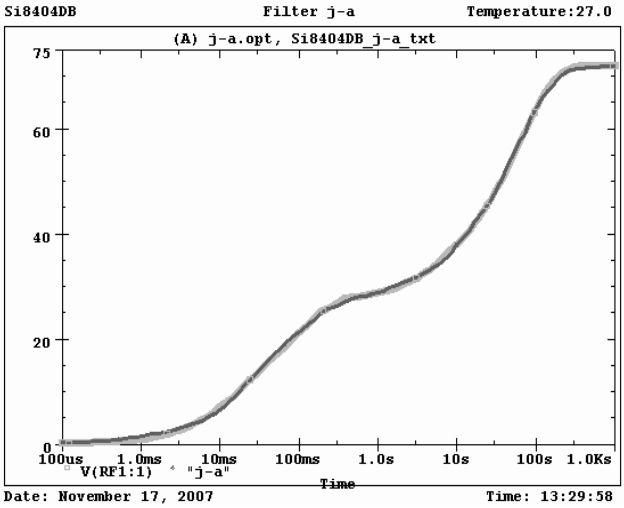
Si8404DB
Filter j-a
Temperature:27.0
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75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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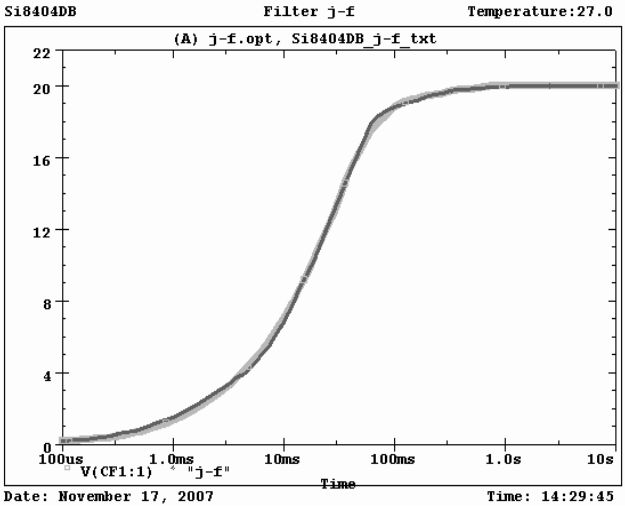
"j-a"
Time
Date: November 17, 2007
Time: 13:29:58


Si8404DB
Filter j-f
Temperature:27.0
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22
20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: November 17, 2007
Time: 14:29:45