R-C Thermal Model Parameters

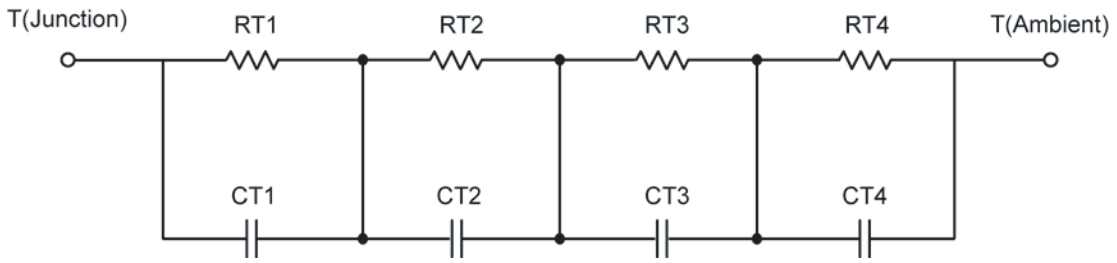
DESCRIPTION

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.

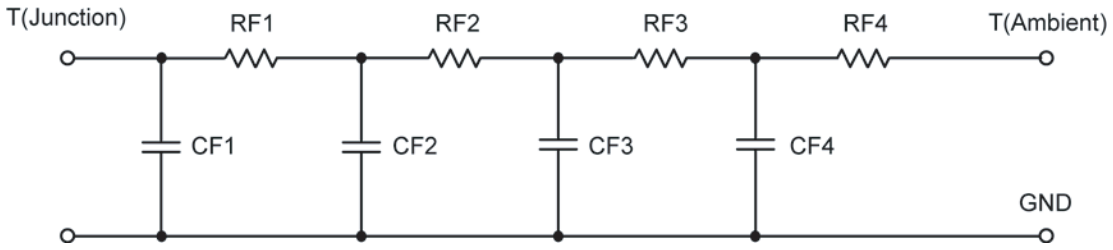
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.0948	N/A	2.9711
RT2	25.6090	N/A	947.4000 m
RT3	5.1187	N/A	12.2133
RT4	49.1775	N/A	5.8682
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	4.4326 m	N/A	18.0077 m
CT2	56.9940 m	N/A	1.4113 m
CT3	69.4006 m	N/A	105.1767 m
CT4	1.1078	N/A	18.1107 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

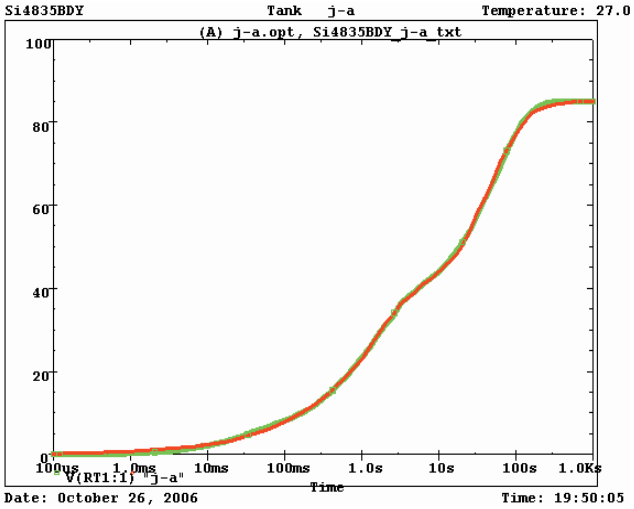


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.4107	N/A	1.9199
RF2	28.2886	N/A	9.5259
RF3	15.5024	N/A	8.5941
RF4	33.7983	N/A	1.9601
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.4021 m	N/A	1.6616 m
CF2	34.2059 m	N/A	8.4846 m
CF3	687.5230 m	N/A	109.4043 m
CF4	694.4768 m	N/A	4.0316 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


Si4835BDY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4835BDY_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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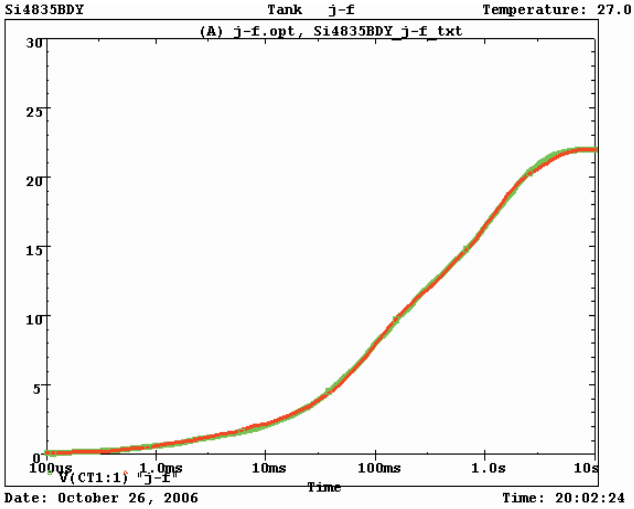
Time
Date: October 26, 2006
Time: 19:50:05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Tank j-f
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30
25
20
15
10
5
0
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Time
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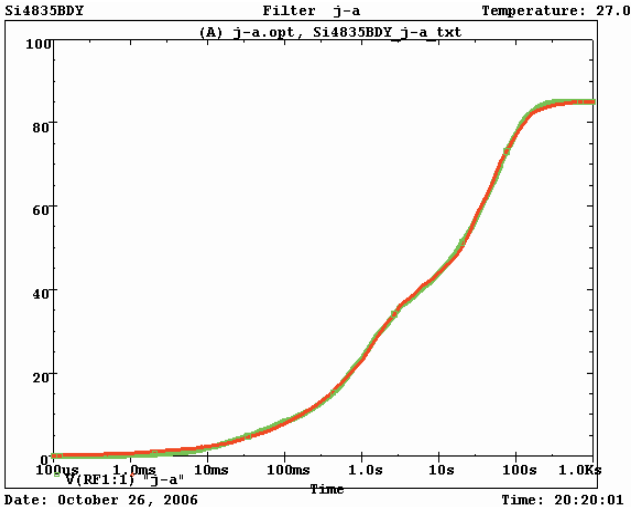
Time: 20:02:24


Si4835BDY
Filter j-a
Temperature: 27.0
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100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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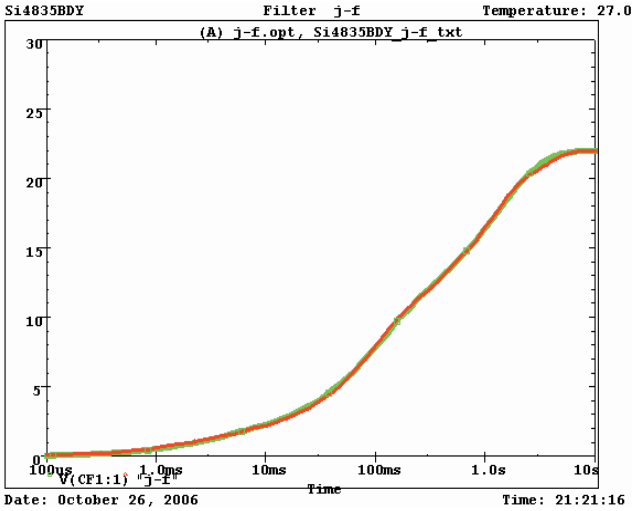
Time
Date: October 26, 2006
Time: 20:20:01


Si4835BDY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4835BDY_j-f_txt
30
25
20
15
10
5
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: October 26, 2006
Time: 21:21:16