R-C Thermal Model Parameters

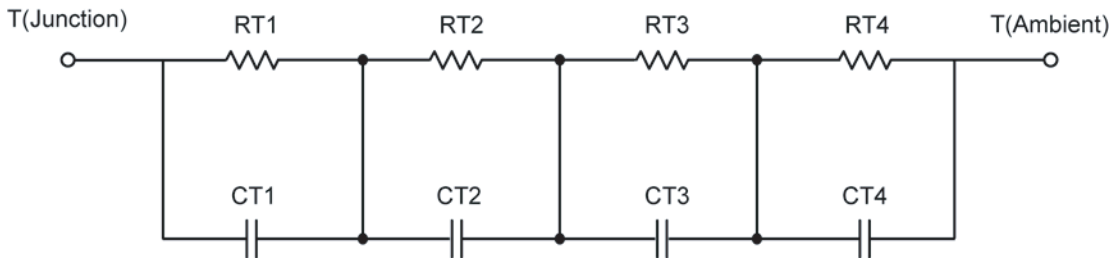
DESCRIPTION

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.

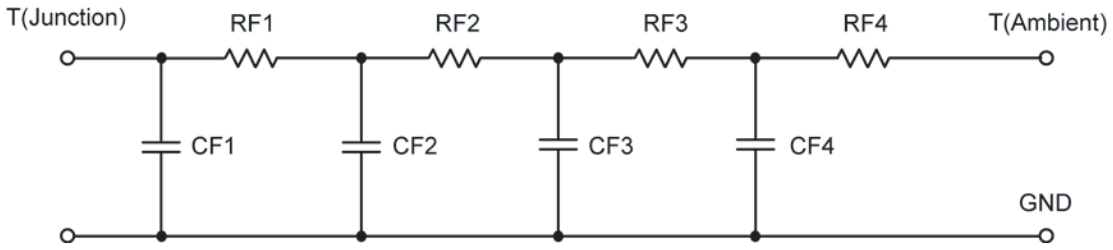
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.6978	N/A	12.8328
RT2	32.0141	N/A	3.7210
RT3	23.6912	N/A	6.5904
RT4	47.5969	N/A	13.8558
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	409.8501 u	N/A	4.2079 m
CT2	58.1899 m	N/A	387.0973 u
CT3	9.1217 m	N/A	298.2415 m
CT4	1.4430	N/A	38.6071 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

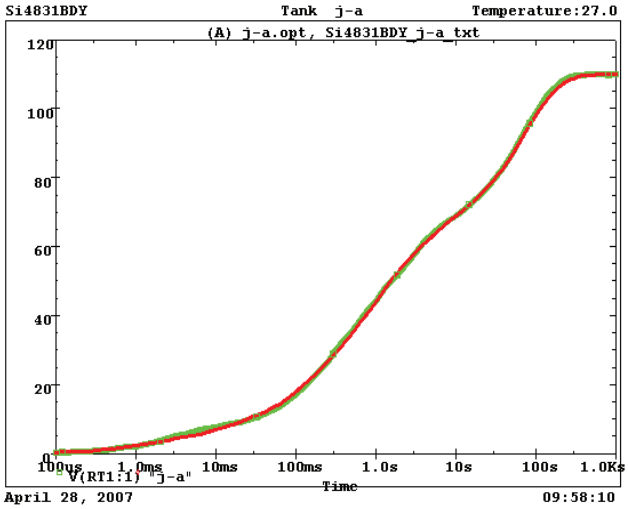


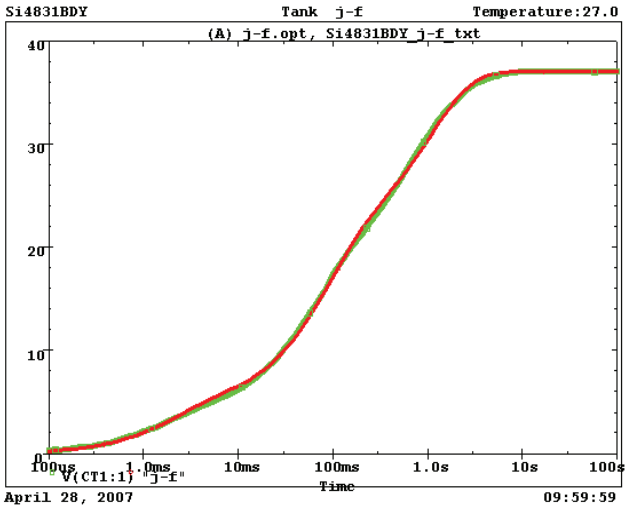
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.8743	N/A	4.3216
RF2	31.1731	N/A	16.3836
RF3	24.7323	N/A	13.6479
RF4	44.2203	N/A	2.6469
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	703.3799 u	N/A	302.8478 u
CF2	9.5548 m	N/A	3.6648 m
CF3	71.2050 m	N/A	45.9113 m
CF4	1.5320	N/A	269.4461 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


Si4831BDY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4831BDY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
April 28, 2007
09:58:10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Tank j-f
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30
20
10
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1.0ms
10ms
100ms
1.0s
10s
100s
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Time
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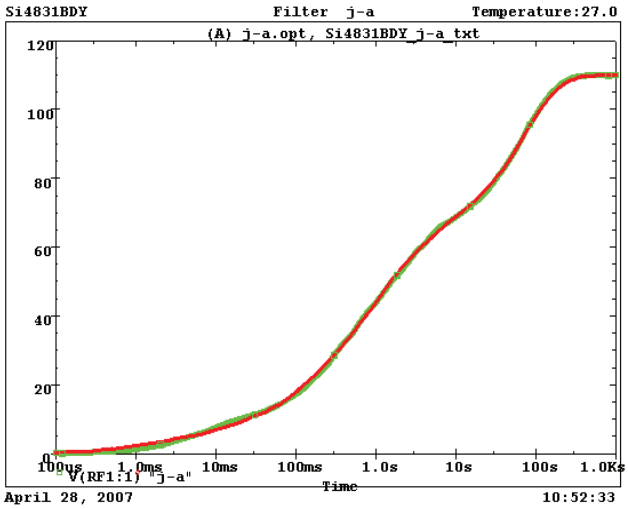
Si4831BDY
Filter j-a
Temperature:27.0
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100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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Time
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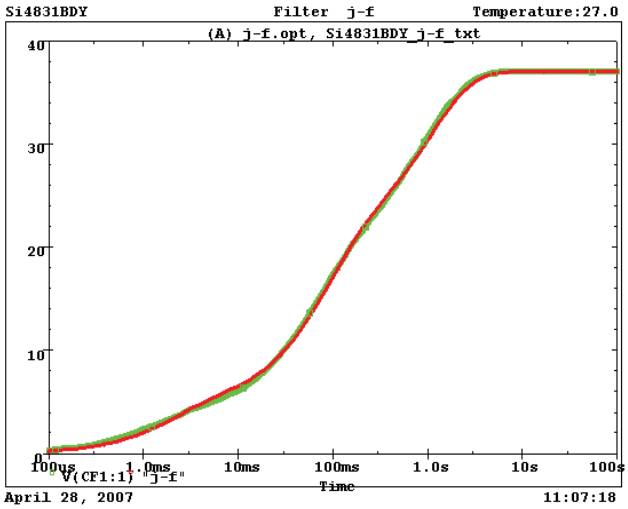
10:52:33


Si4831BDY
Filter j-f
Temperature:27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
April 28, 2007
11:07:18