R-C Thermal Model Parameters

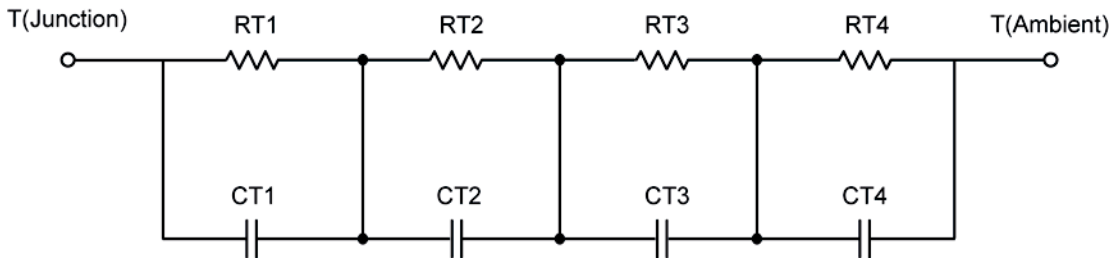
DESCRIPTION

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.

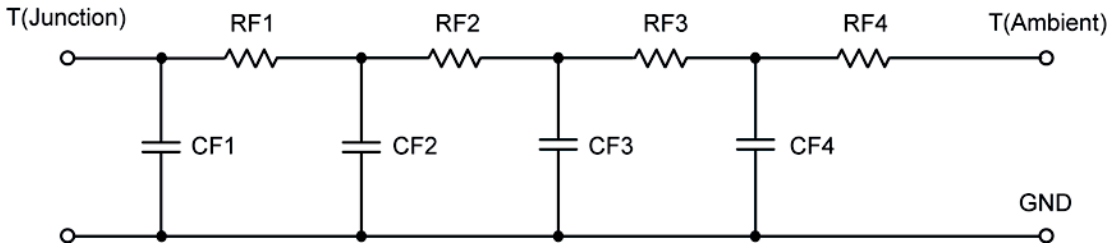
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	55.6413	N/A	28.3883
RT2	30.9887	N/A	4.9646
RT3	40.7212	N/A	32.4345
RT4	17.1737	N/A	19.0283
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.2066	N/A	3.2011 m
CT2	106.5145 m	N/A	187.9158 u
CT3	7.0362 m	N/A	8.6104 m
CT4	1.0161 m	N/A	1.1302 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

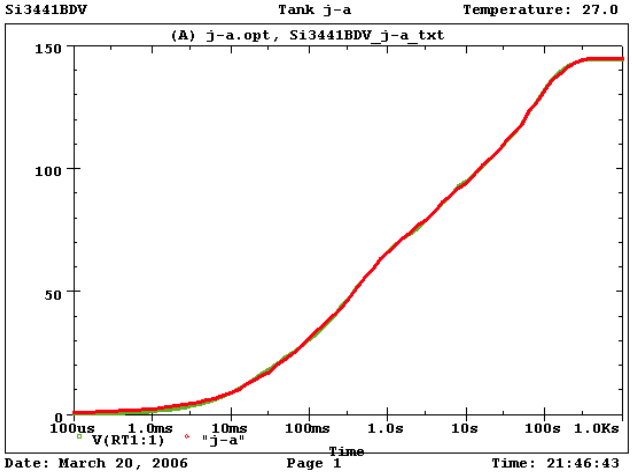


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	23.3238	N/A	14.8964
RF2	39.9346	N/A	43.8024
RF3	31.3820	N/A	14.1733
RF4	50.2764	N/A	11.8627
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	914.3375 u	N/A	263.3136 u
CF2	6.4120 m	N/A	1.0199 m
CF3	99.8010 m	N/A	5.9506 m
CF4	1.2623	N/A	4.1288 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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Tank j-a
Temperature: 27.0
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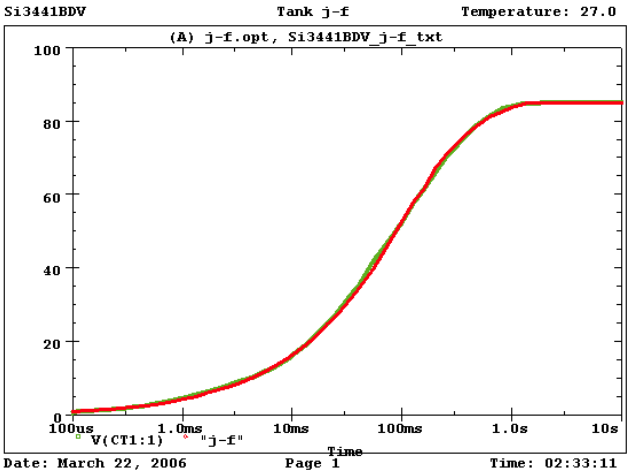
150
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: March 20, 2006
Page 1
Time: 21:46:43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Tank j-f
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60
40
20
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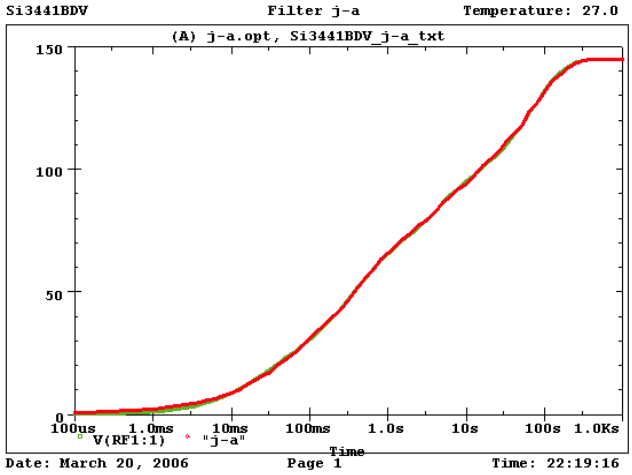
Page 1
Time: 02:33:11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Filter j-a
Temperature: 27.0
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100
50
0
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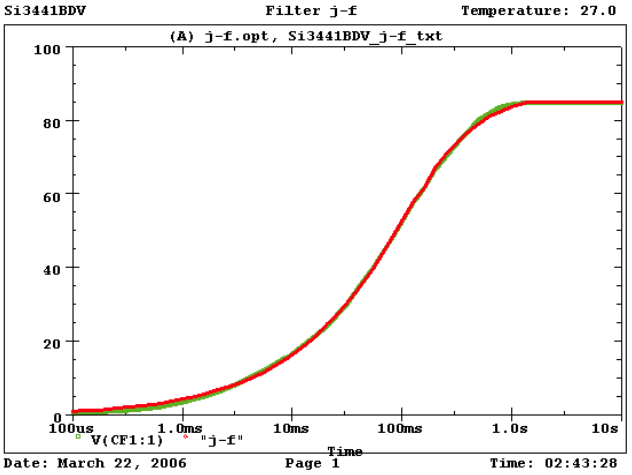
Page 1
Time: 22:19:16


Si3441BDV
Filter j-f
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80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s
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Time
Date: March 22, 2006
Page 1
Time: 02:43:28