R-C Thermal Model Parameters

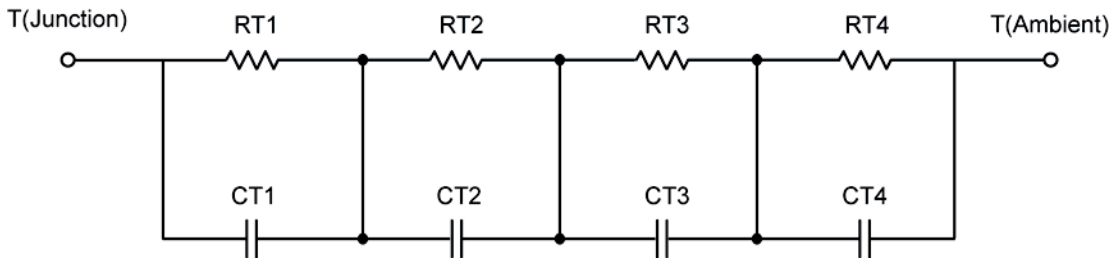
DESCRIPTION

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.

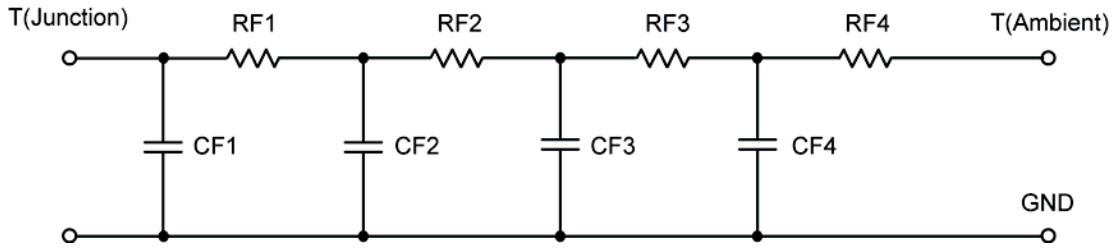
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	12.4145	N/A	6.9005
RT2	5.5325	N/A	1.7114
RT3	17.9828	N/A	5.2205
RT4	47.9591	N/A	7.1734
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	51.6626 m	N/A	9.9576 m
CT2	3.8480 m	N/A	1.6896 m
CT3	95.4066 m	N/A	590.0730 m
CT4	1.2945	N/A	103.8321 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

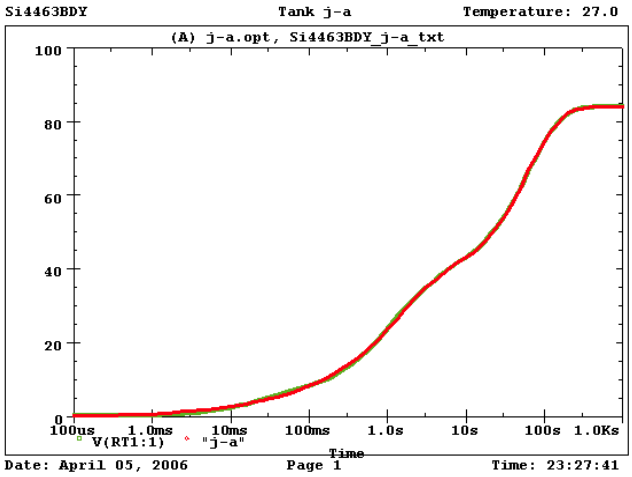


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.1123	N/A	1.7297
RF2	21.6802	N/A	8.3335
RF3	11.9787	N/A	7.8025
RF4	43.3749	N/A	3.1510
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	3.9704 m	N/A	1.0495 m
CF2	27.4275 m	N/A	7.2549 m
CF3	182.3145 m	N/A	100.9652 m
CF4	1.2432	N/A	595.1445 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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80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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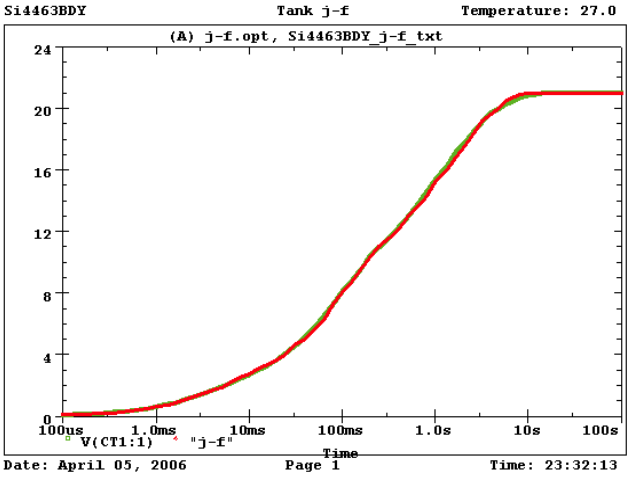
Time
Date: April 05, 2006
Page 1
Time: 23:27:41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16
12
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4
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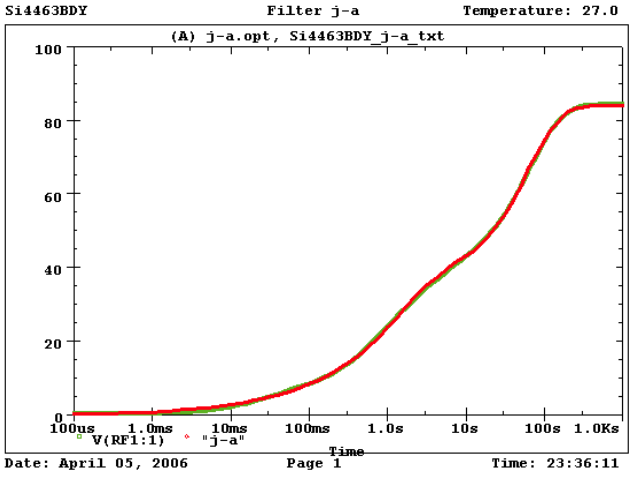
Si4463BDY
Filter j-a
Temperature: 27.0
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80
60
40
20
0
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Page 1
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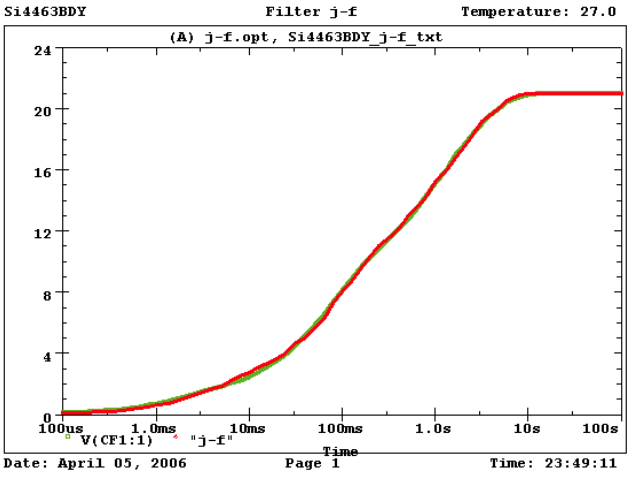
Si4463BDY
Filter j-f
Temperature: 27.0
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24
20
16
12
8
4
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CF1:1) "j-f"
Time
Date: April 05, 2006
Page 1
Time: 23:49:11