R-C Thermal Model Parameters

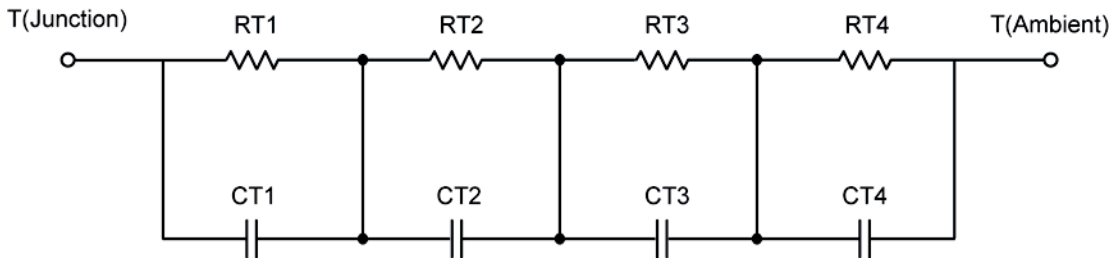
DESCRIPTION

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.

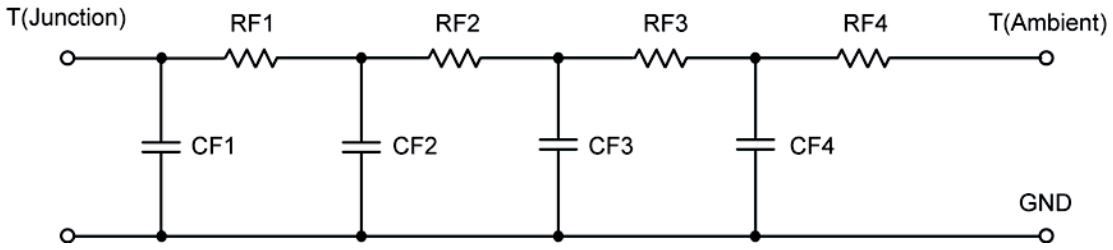
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	56.6299	N/A	16.3442
RT2	9.6987	N/A	5.8412
RT3	27.5497	N/A	6.1172
RT4	30.7656	N/A	16.6502
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.2585	N/A	1.4474 m
CT2	292.8755 u	N/A	165.7211 u
CT3	28.8786 m	N/A	159.1680 m
CT4	2.4901 m	N/A	4.0724 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

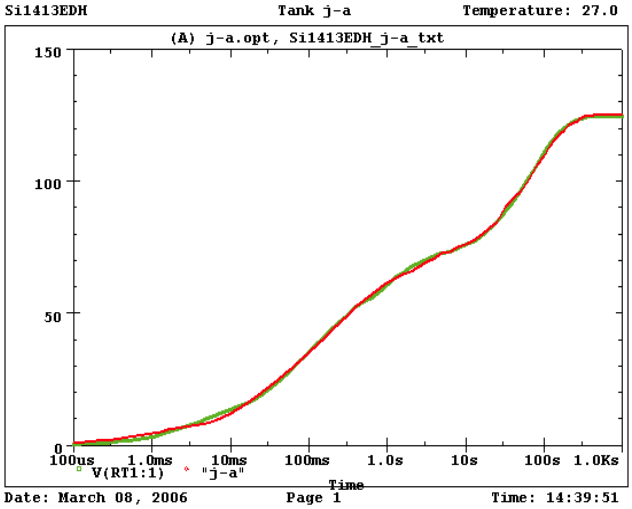


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	11.7482	N/A	9.3126
RF2	33.4099	N/A	21.7163
RF3	24.3359	N/A	8.4387
RF4	55.0458	N/A	5.5442
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	264.9457 u	N/A	170.4864 u
CF2	1.9901 m	N/A	1.1574 m
CF3	29.4999 m	N/A	1.9990 m
CF4	1.2617	N/A	191.7478 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
(A) j-a.opt, Si1413EDH_j-a_txt
150
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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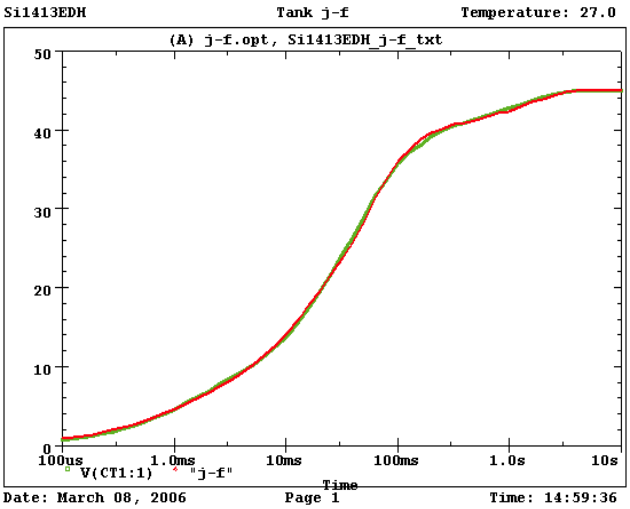
Time
Date: March 08, 2006
Page 1
Time: 14:39:51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40
30
20
10
0
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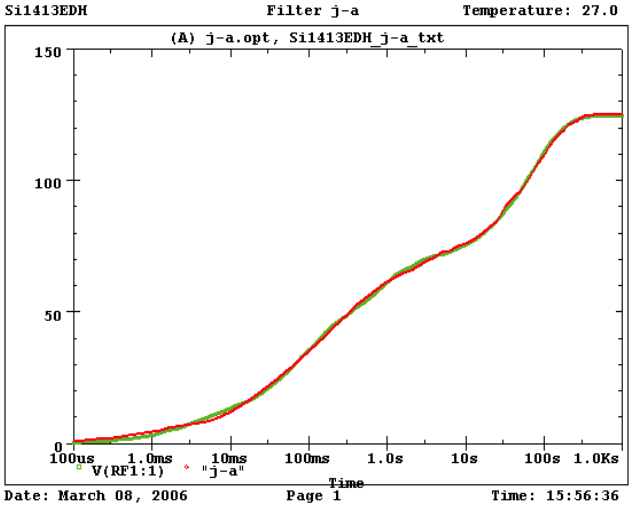
Page 1
Time: 14:59:36


Si1413EDH
Filter j-a
Temperature: 27.0
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100
50
0
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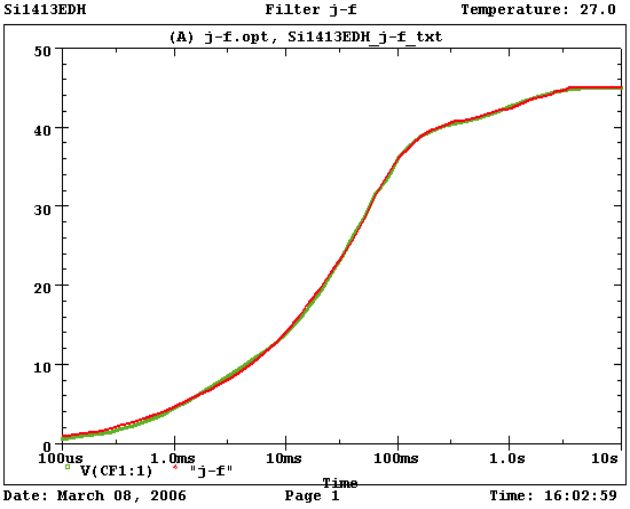
Time
Date: March 08, 2006
Page 1
Time: 15:56:36


Si1413EDH
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: March 08, 2006
Page 1
Time: 16:02:59