R-C Thermal Model Parameters

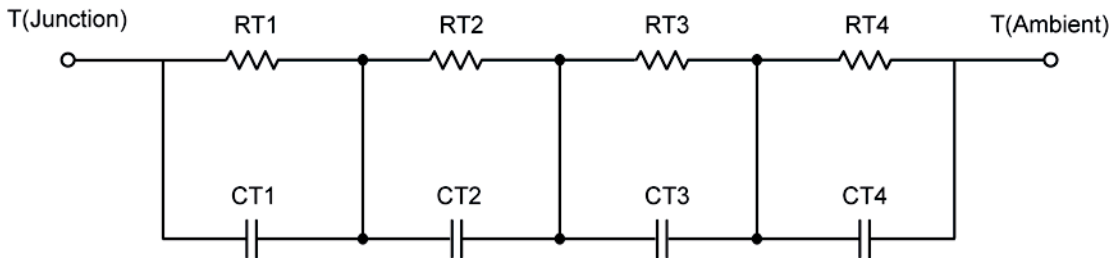
DESCRIPTION

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.

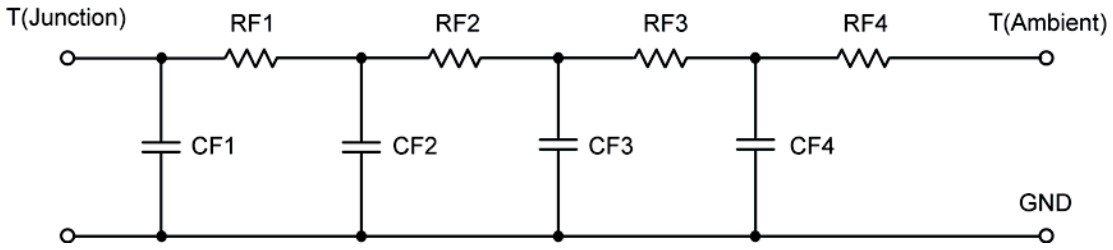
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.0272	N/A	5.9778
RT2	27.5316	N/A	18.4421
RT3	22.2039	N/A	3.4747
RT4	50.2373	N/A	2.1054
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.6932 m	N/A	61.2556 m
CT2	27.2422 m	N/A	3.3348 m
CT3	13.0575 m	N/A	139.9357 m
CT4	1.3042	N/A	446.6554 u

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

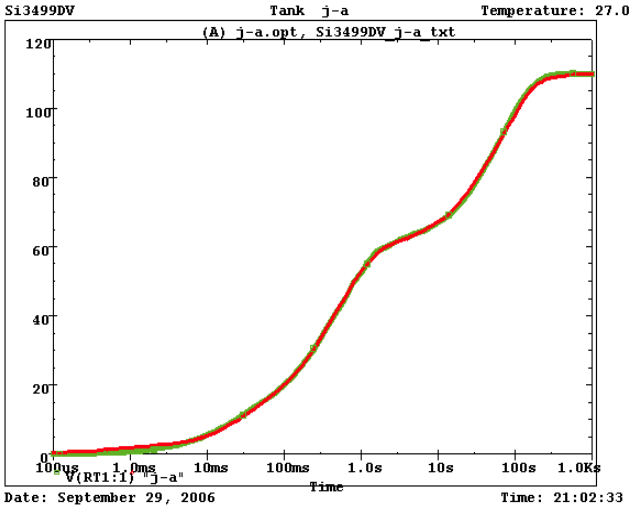


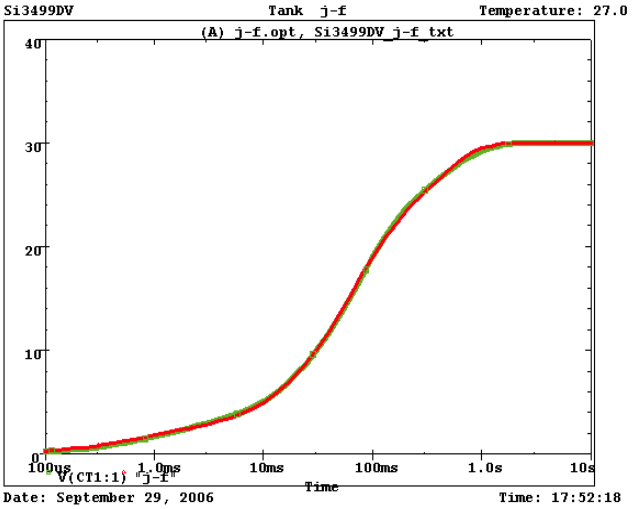
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	10.1772	N/A	2.6841
RF2	22.8751	N/A	17.3830
RF3	27.6067	N/A	4.1732
RF4	49.3410	N/A	5.7597
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.1687 m	N/A	434.8686 u
CF2	4.9289 m	N/A	2.4125 m
CF3	12.3825 m	N/A	15.6296 m
CF4	1.3252	N/A	33.5417 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


Si3499DV
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si3499DV_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
Date: September 29, 2006
Time: 21:02:33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Tank j-f
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30
20
10
0
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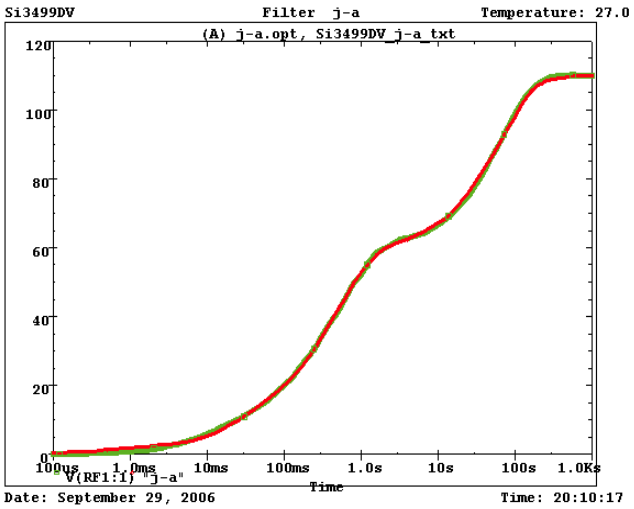
Time: 17:52:18


Si3499DV
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si3499DV_j-a_txt
120
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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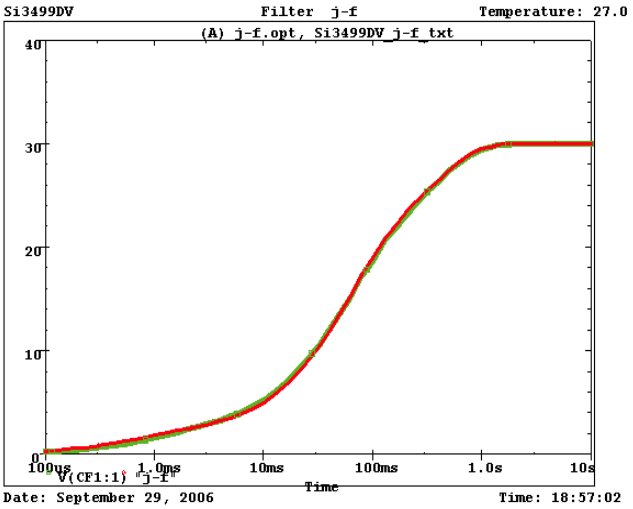
Time
Date: September 29, 2006
Time: 20:10:17


Si3499DV
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si3499DV_j-f_txt
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: September 29, 2006
Time: 18:57:02