R-C Thermal Model Parameters

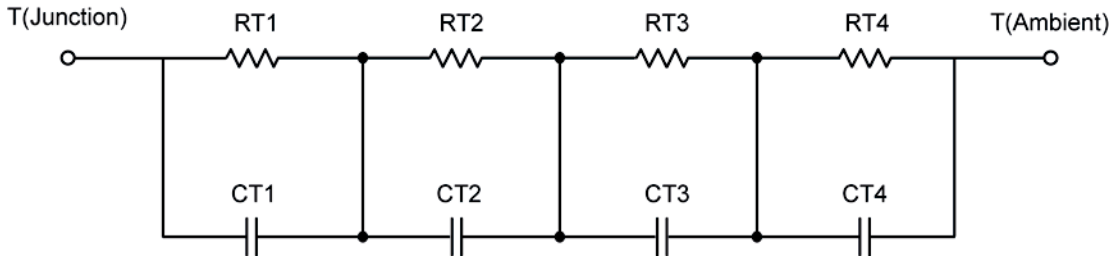
DESCRIPTION

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.

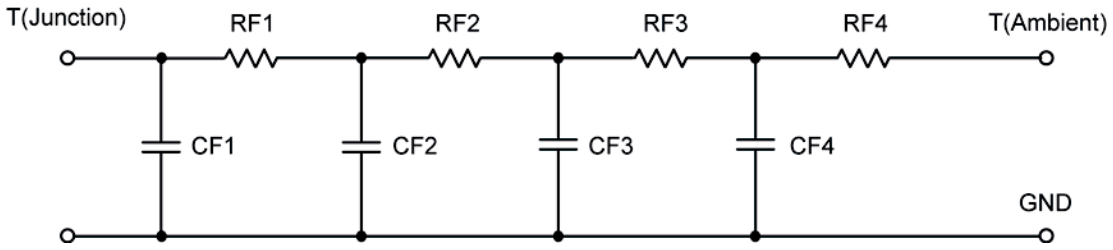
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.1285	N/A	4.7504
RT2	19.6022	N/A	9.4737
RT3	25.6250	N/A	11.3879
RT4	53.1517	N/A	13.3164
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	507.1005 u	N/A	356.2158 u
CT2	5.8061 m	N/A	4.0396 m
CT3	64.1719 m	N/A	5.2041 m
CT4	1.4501	N/A	24.4955 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

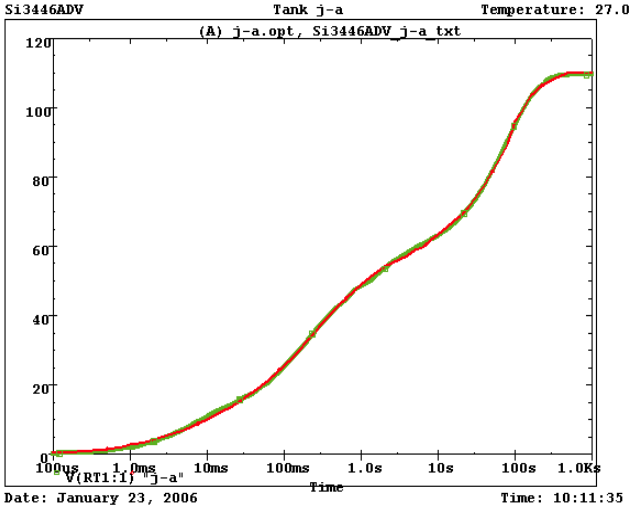


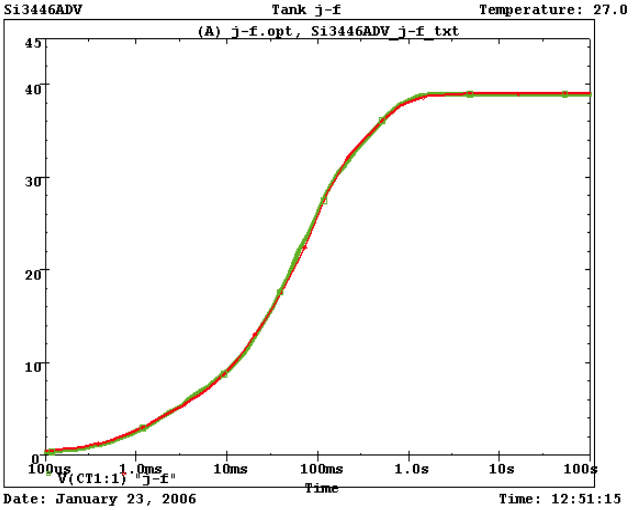
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.3378	N/A	5.9031
RF2	18.7066	N/A	12.3609
RF3	26.9107	N/A	16.2990
RF4	51.6439	N/A	4.7656
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	463.1397 u	N/A	296.2166 u
CF2	4.2772 m	N/A	1.4053 m
CF3	54.6810 m	N/A	4.0533 m
CF4	1.4345	N/A	139.1675 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


Si3446ADV
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si3446ADV_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: January 23, 2006
Time: 10:11:35


Si3446ADV
Tank j-f
Temperature: 27.0
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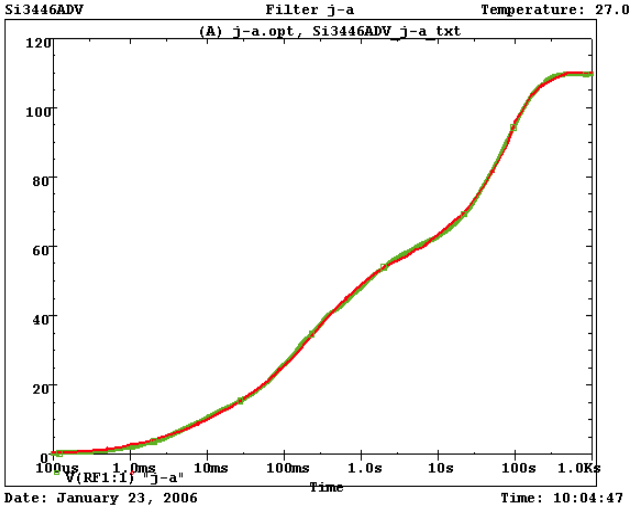
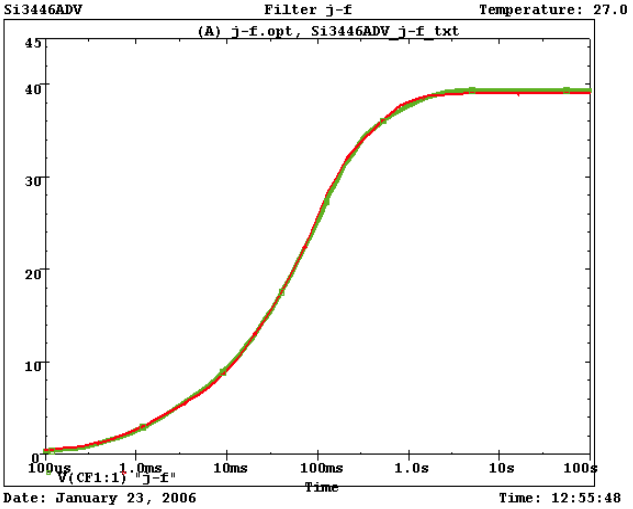
45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1) "j-f"
Time
Date: January 23, 2006
Time: 12:51:15


Si3446ADV
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si3446ADV_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: January 23, 2006
Time: 10:04:47


Si3446ADV
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si3446ADV_j-f_txt
45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: January 23, 2006
Time: 12:55:48