R-C Thermal Model Parameters

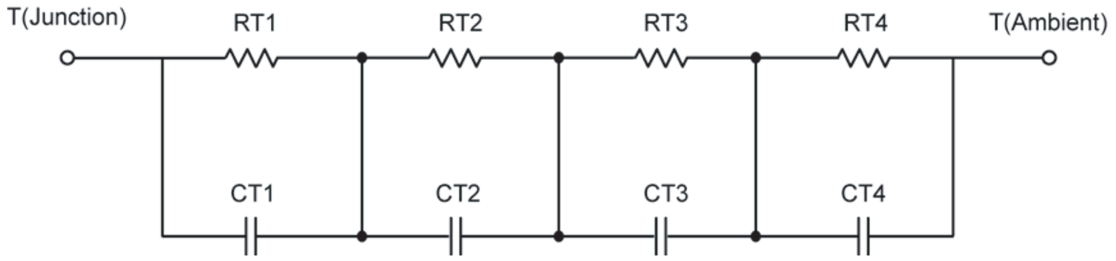
DESCRIPTION

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.

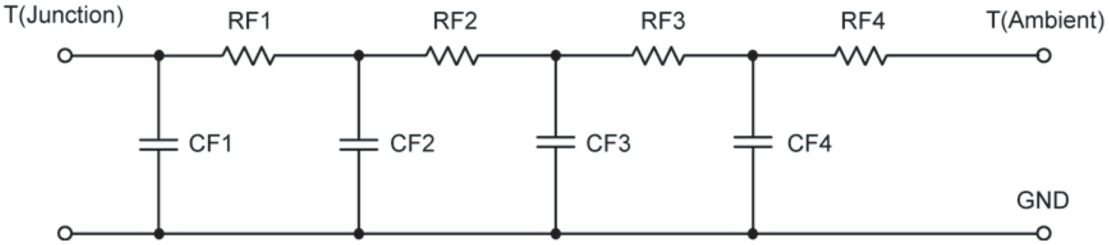
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	Ambient	Case	Foot
RT1	13.0656	N/A	9.3617
RT2	20.5465	N/A	2.3284
RT3	22.5226	N/A	10.2063
RT4	53.8653	N/A	18.1036
Thermal Capacitance (Joules/°C)			
Junction to	Ambient	Case	Foot
CT1	3.3420 m	N/A	22.2638 m
CT2	33.6337 m	N/A	489.6651 u
CT3	96.9086 m	N/A	5.9249 m
CT4	1.6915	N/A	96.5142 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

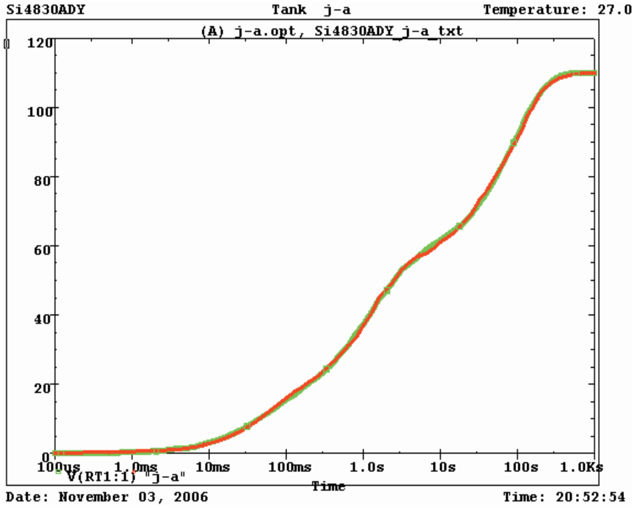


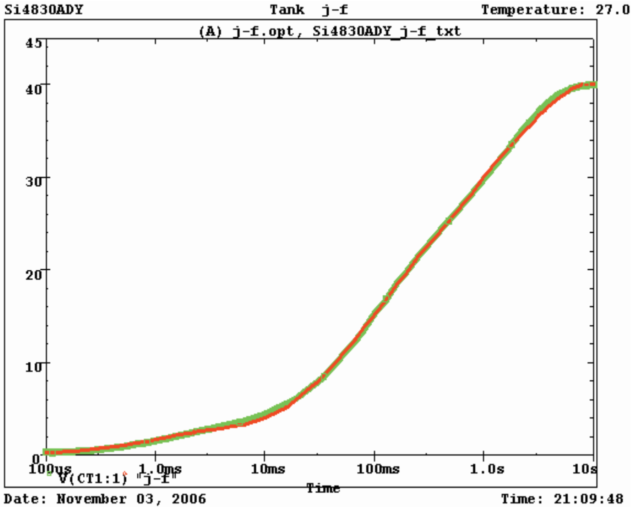
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	Ambient	Case	Foot
RF1	14.8607	N/A	2.6845
RF2	25.5258	N/A	16.8421
RF3	18.1142	N/A	14.1159
RF4	51.4993	N/A	6.3575
Thermal Capacitance (Joules/°C)			
Junction to	Ambient	Case	Foot
CF1	2.8276 m	N/A	466.0878 u
CF2	17.8677 m	N/A	3.9497 m
CF3	75.1793 m	N/A	42.3410 m
CF4	1.6685	N/A	337.6181 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


Si4830ADY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4830ADY_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: November 03, 2006
Time: 20:52:54


Si4830ADY
Tank j-f
Temperature: 27.0
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45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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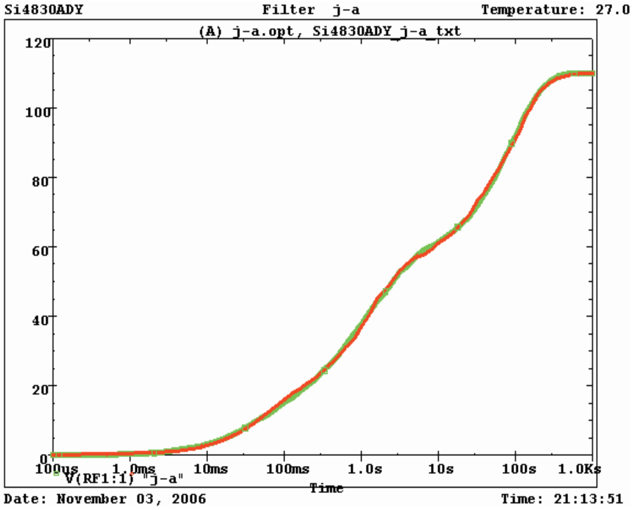
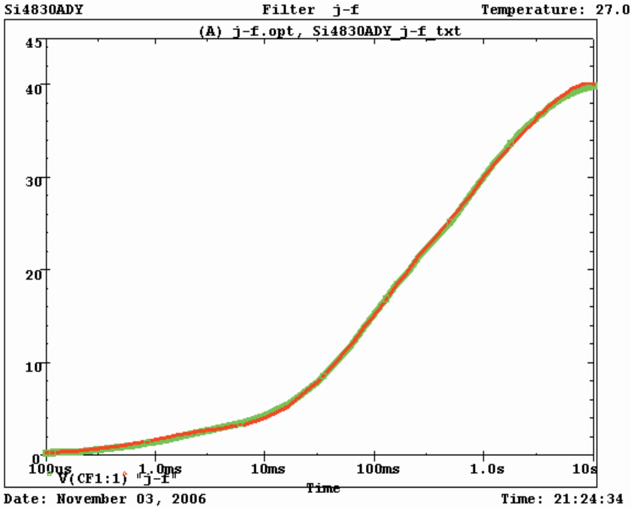
Time
Date: November 03, 2006
Time: 21:09:48


Si4830ADY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4830ADY_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: November 03, 2006
Time: 21:13:51


Si4830ADY
Filter j-f
Temperature: 27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-f"
Time
Date: November 03, 2006
Time: 21:24:34