R-C Thermal Model Parameters

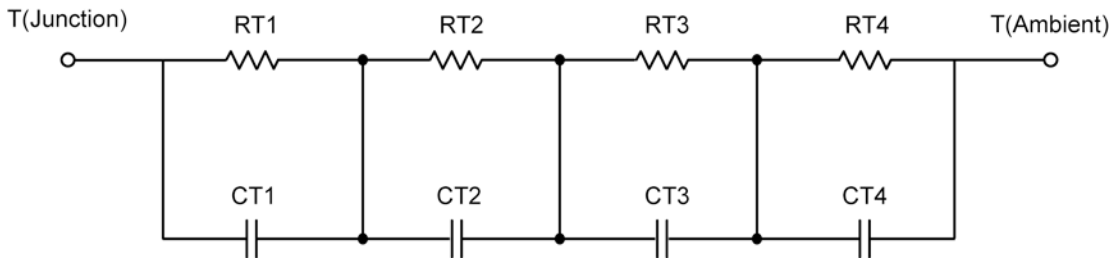
DESCRIPTION

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.

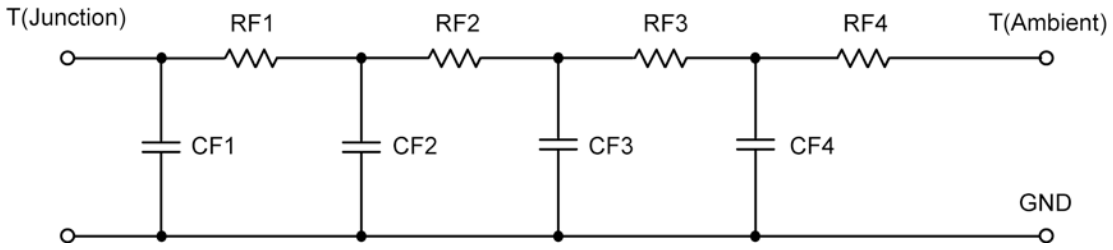
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.0279	N/A	9.3940
RT2	29.4231	N/A	7.7056
RT3	20.2495	N/A	16.9141
RT4	49.2995	N/A	6.9863
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	139.8574 u	N/A	14.9754 m
CT2	3.3349 m	N/A	91.6172 u
CT3	68.1608 m	N/A	1.0504 m
CT4	1.3809	N/A	8.7858 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

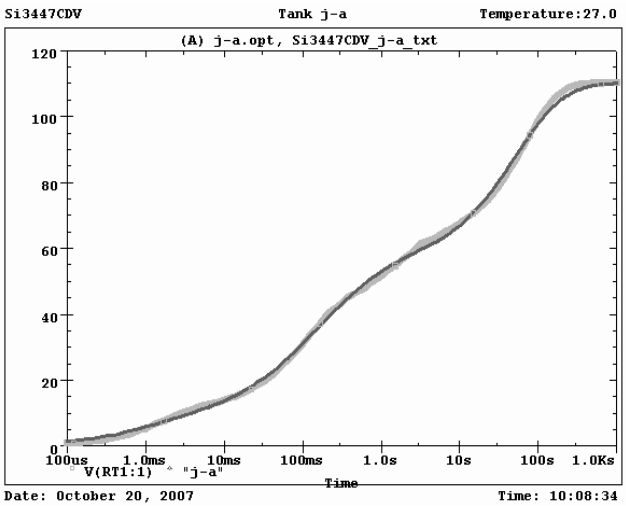


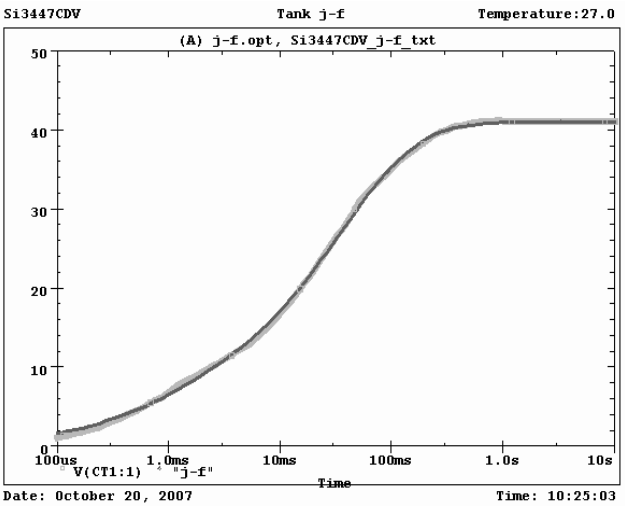
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	11.7124	N/A	8.5616
RF2	29.4589	N/A	18.3709
RF3	20.4530	N/A	9.1212
RF4	48.3757	N/A	4.9463
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	129.7258 u	N/A	77.6511 u
CF2	2.8173 m	N/A	710.1186 u
CF3	48.4485 m	N/A	3.4455 m
CF4	1.3360	N/A	16.2609 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


Si3447CDV
Tank j-a
Temperature:27.0
(A) j-a.opt, Si3447CDV_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: October 20, 2007
Time: 10:08:34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Tank j-f
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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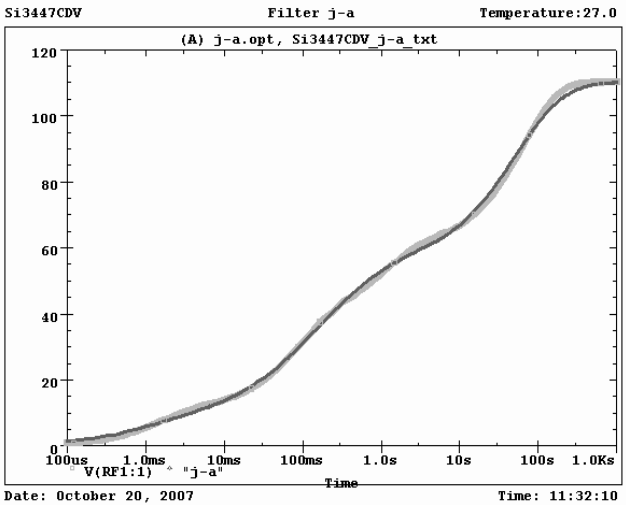
Time
Date: October 20, 2007
Time: 10:25:03


Si3447CDV
Filter j-a
Temperature:27.0
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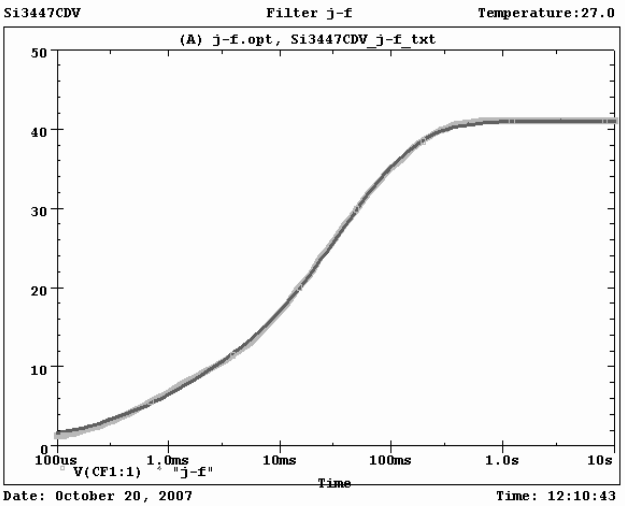
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: October 20, 2007
Time: 11:32:10


Si3447CDV
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: October 20, 2007
Time: 12:10:43