R-C Thermal Model Parameters

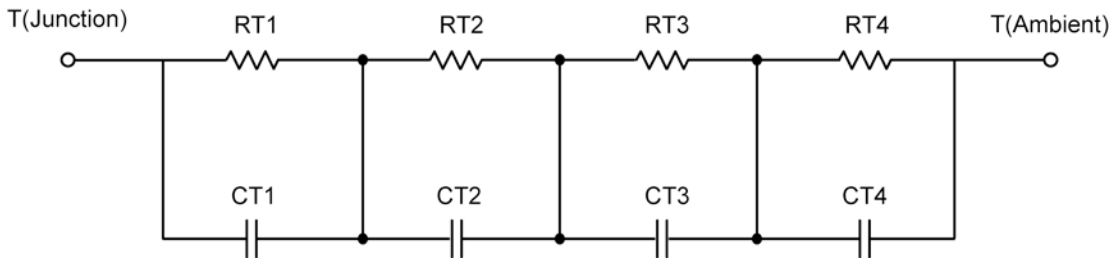
DESCRIPTION

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.

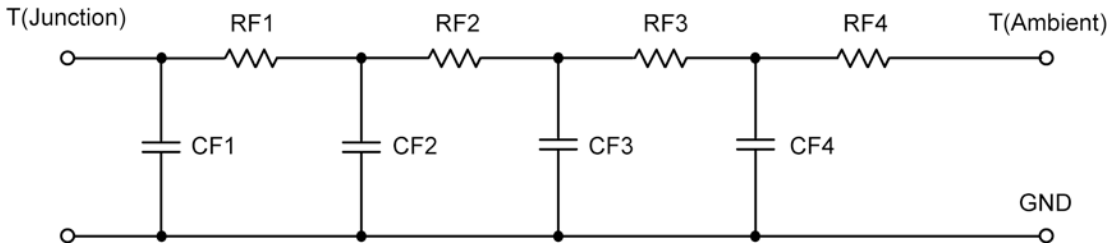
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.5184	N/A	2.8857
RT2	16.2404	N/A	10.0216
RT3	19.9854	N/A	7.1811
RT4	42.2558	N/A	4.9116
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	836.8388 u	N/A	287.4216 u
CT2	21.3638 m	N/A	12.0686 m
CT3	261.7478 m	N/A	178.4418 m
CT4	1.9472	N/A	2.9403 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

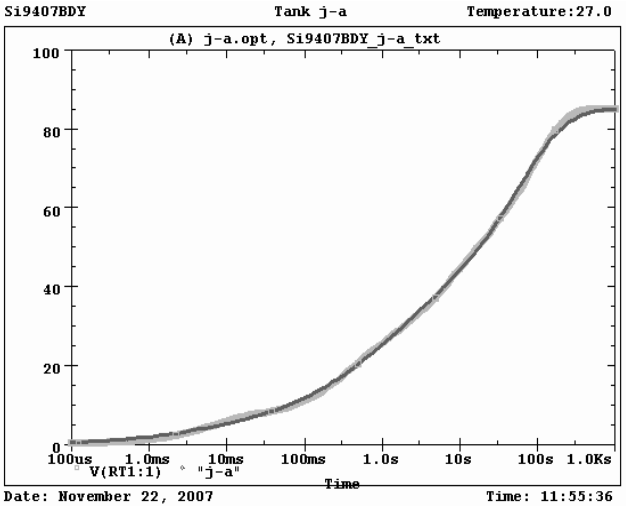


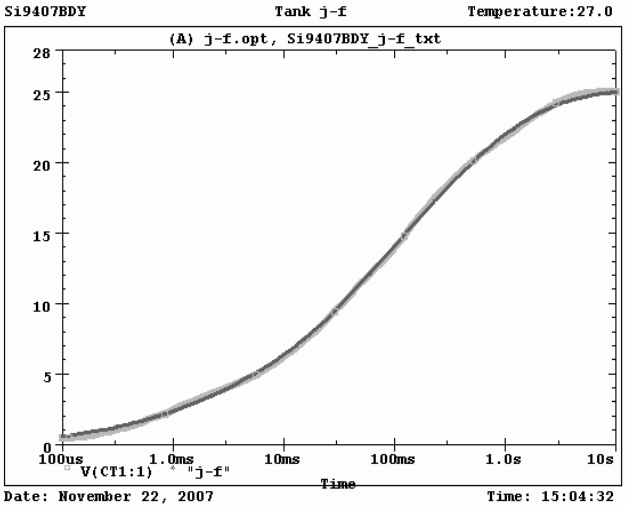
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.9911	N/A	3.3048
RF2	18.0935	N/A	8.5179
RF3	22.5713	N/A	8.9650
RF4	36.3441	N/A	4.2123
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	944.8440 u	N/A	221.9511 u
CF2	21.6792 m	N/A	2.2687 m
CF3	232.9034 m	N/A	20.2984 m
CF4	1.9964	N/A	340.2701 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


Si9407BDY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si9407BDY_j-a_txt
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 22, 2007
Time: 11:55:36


Si9407BDY
Tank j-f
Temperature:27.0
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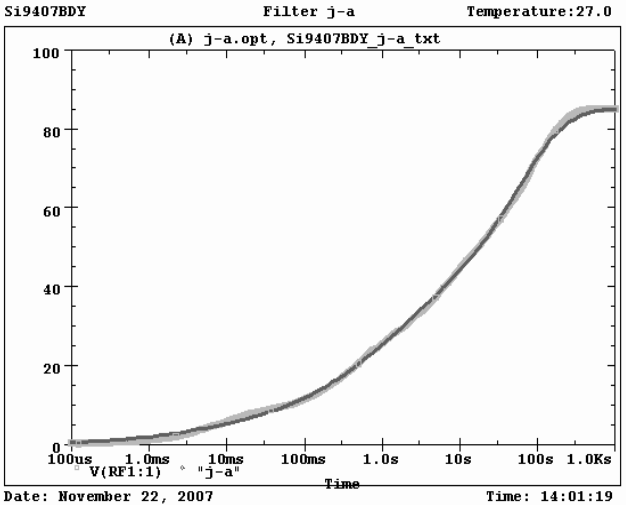
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"j-f"
Time
Date: November 22, 2007
Time: 15:04:32


Si9407BDY
Filter j-a
Temperature:27.0
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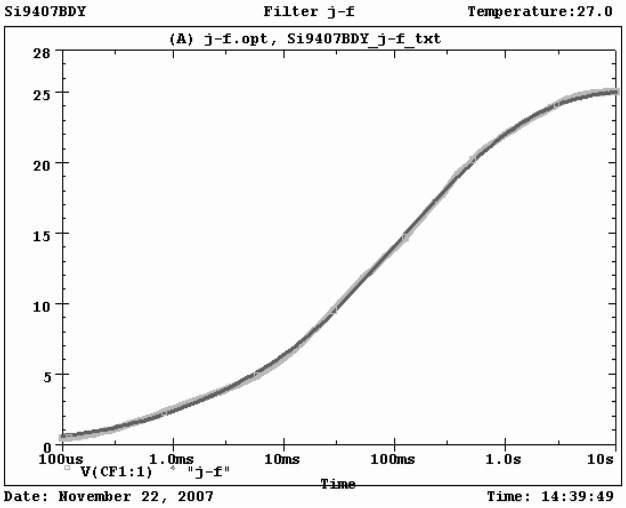
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: November 22, 2007
Time: 14:01:19


Si9407BDY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si9407BDY_j-f_txt
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: November 22, 2007
Time: 14:39:49