R-C Thermal Model Parameters

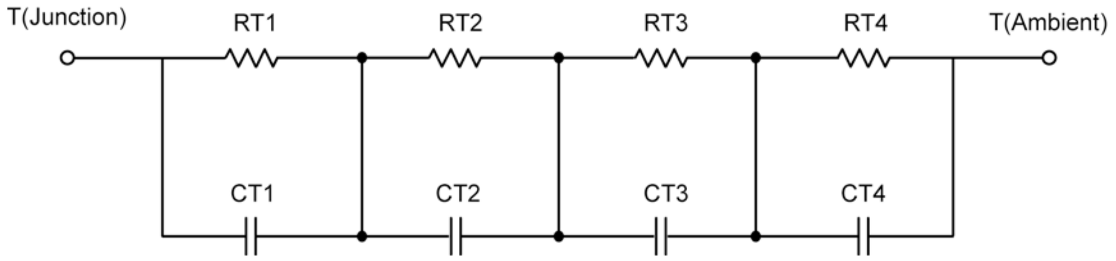
DESCRIPTION

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.

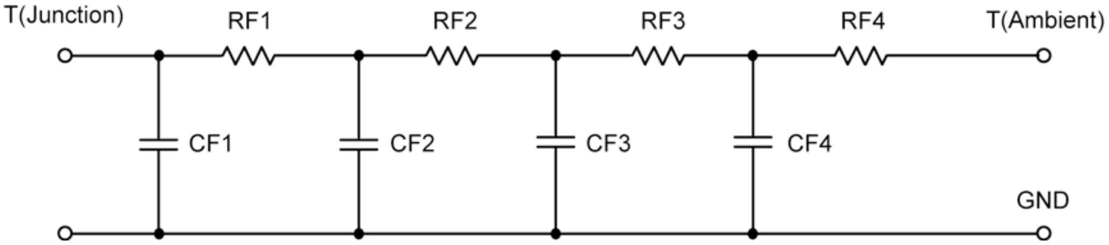
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.2636	N/A	11.2331
RT2	32.2775	N/A	7.2014
RT3	18.4920	N/A	502.7000 m
RT4	48.9669	N/A	19.0628
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.4191 m	N/A	9.2099 m
CT2	56.5003 m	N/A	1.3529 m
CT3	11.9074 m	N/A	8.2212
CT4	1.7733	N/A	54.6991 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

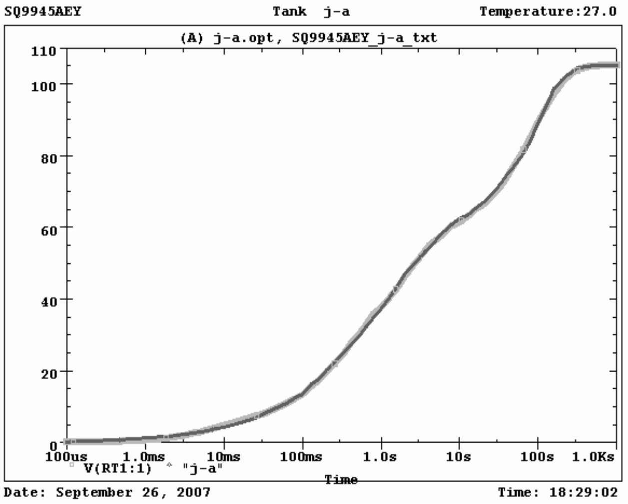


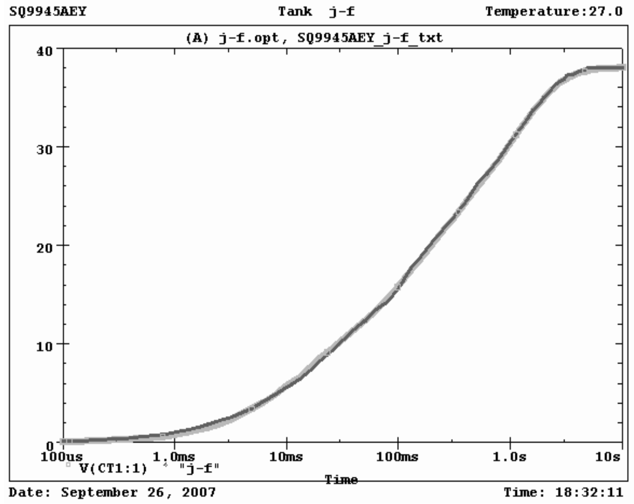
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.2231	N/A	8.7939
RF2	23.6271	N/A	12.3196
RF3	30.8934	N/A	9.5891
RF4	46.2564	N/A	7.2974
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	791.1520 u	N/A	1.1401 m
CF2	6.6067 m	N/A	5.9885 m
CF3	49.0098 m	N/A	48.9471 m
CF4	1.8673	N/A	8.1118 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


SQ9945AEY
Tank j-a
Temperature:27.0
(A) j-a.opt, SQ9945AEY_j-a_txt
110
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 26, 2007
Time: 18:29:02


SQ9945AEY
Tank j-f
Temperature:27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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Time
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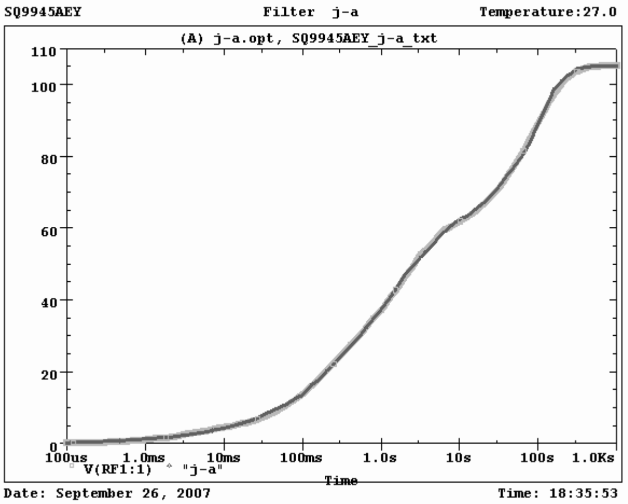
Time: 18:32:11


SQ9945AEY
Filter j-a
Temperature:27.0
(A) j-a.opt, SQ9945AEY_j-a_txt
110
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
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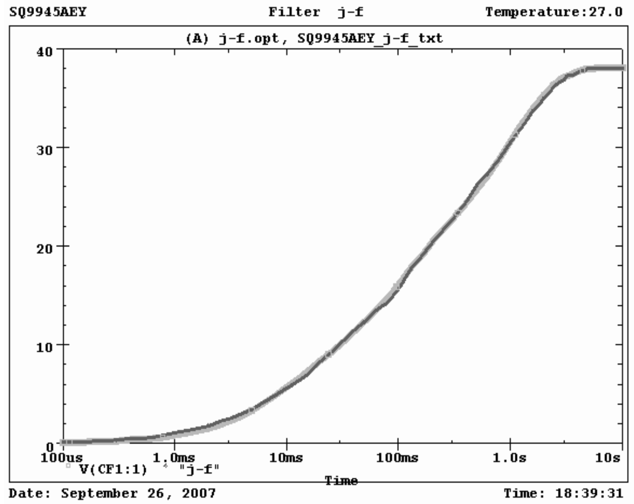
Time: 18:35:53


SQ9945AEY
Filter j-f
Temperature:27.0
(A) j-f.opt, SQ9945AEY_j-f_txt
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: September 26, 2007
Time: 18:39:31