R-C Thermal Model Parameters

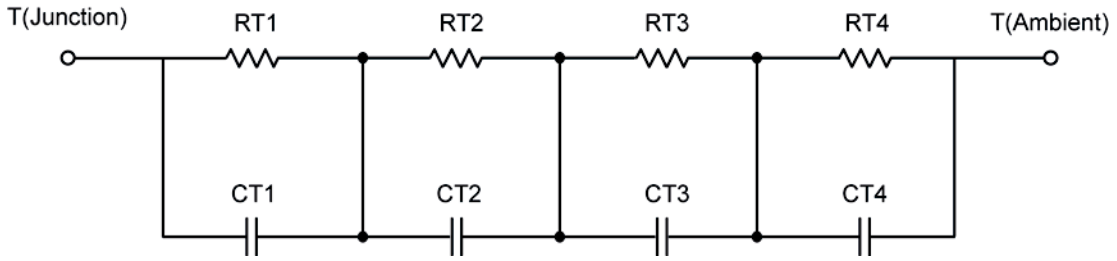
DESCRIPTION

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.

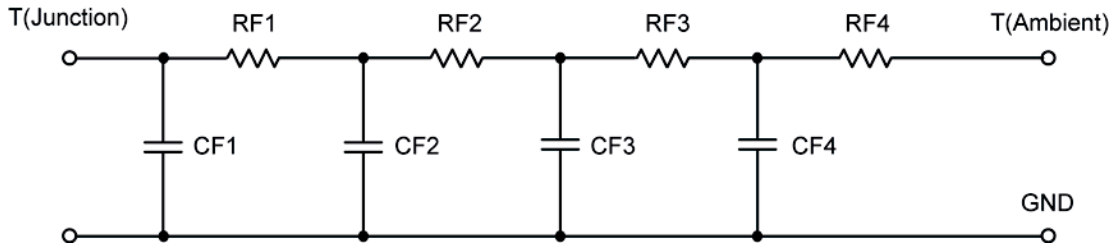
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	14.7939	N/A	6.4409
RT2	7.8835	N/A	3.0698
RT3	13.8975	N/A	5.3505
RT4	43.4251	N/A	5.1388
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	125.7656 m	N/A	2.7022 m
CT2	942.0717 u	N/A	1.1359 m
CT3	8.5351 m	N/A	54.0274 m
CT4	1.8844	N/A	6.9331 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

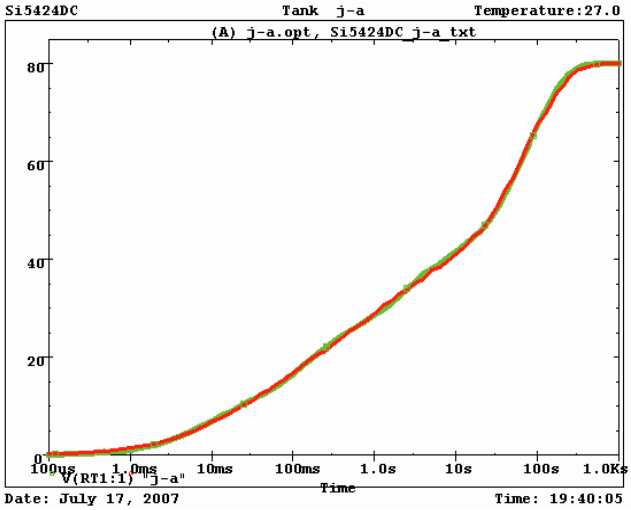


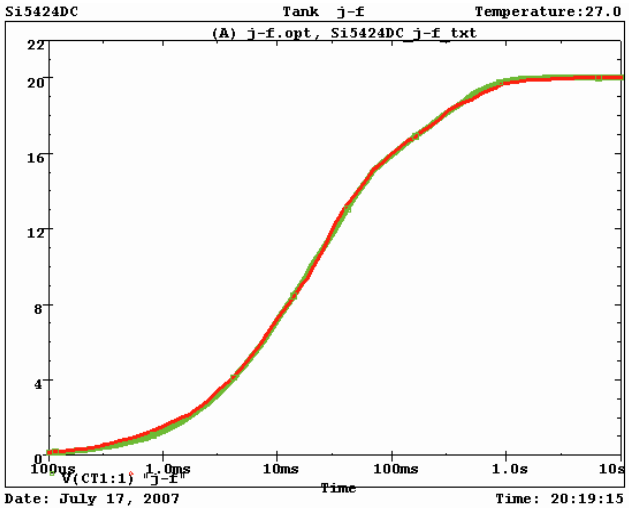
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.7945	N/A	5.9172
RF2	13.3731	N/A	6.7076
RF3	14.6959	N/A	4.5910
RF4	42.1365	N/A	2.7842
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	857.7081 u	N/A	638.9359 u
CF2	7.4884 m	N/A	1.3017 m
CF3	104.2277 m	N/A	7.8118 m
CF4	1.7905	N/A	141.4114 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


Si5424DC
Tank j-a
Temperature:27.0
(A) j-a.opt, Si5424DC_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: July 17, 2007
Time: 19:40:05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Tank j-f
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20
16
12
8
4
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10ms
100ms
1.0s
10s
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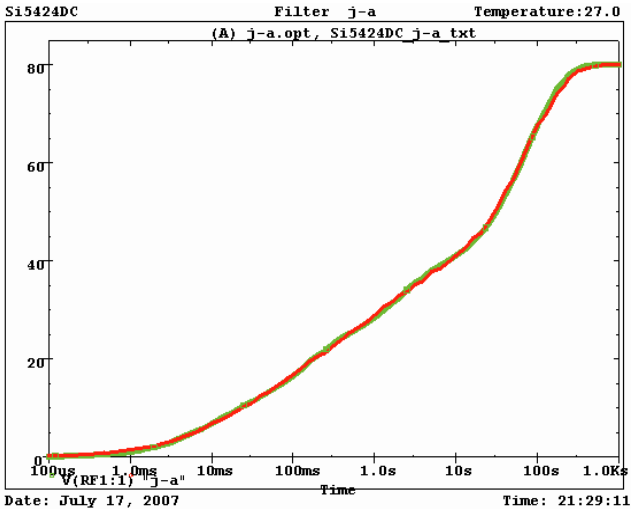
Time
Date: July 17, 2007
Time: 20:19:15


Si5424DC
Filter j-a
Temperature:27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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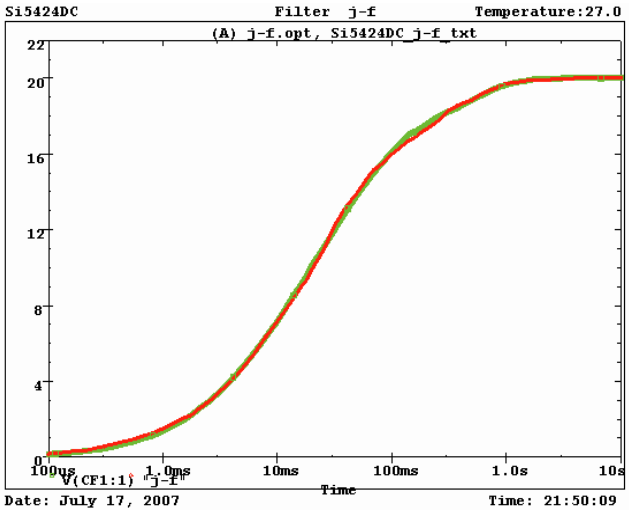
Time
Date: July 17, 2007
Time: 21:29:11


Si5424DC
Filter j-f
Temperature:27.0
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22
20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-f"
Time
Date: July 17, 2007
Time: 21:50:09