R-C Thermal Model Parameters

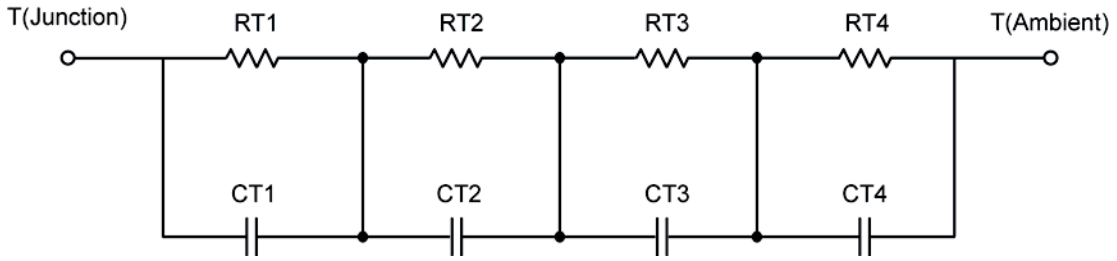
DESCRIPTION

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.

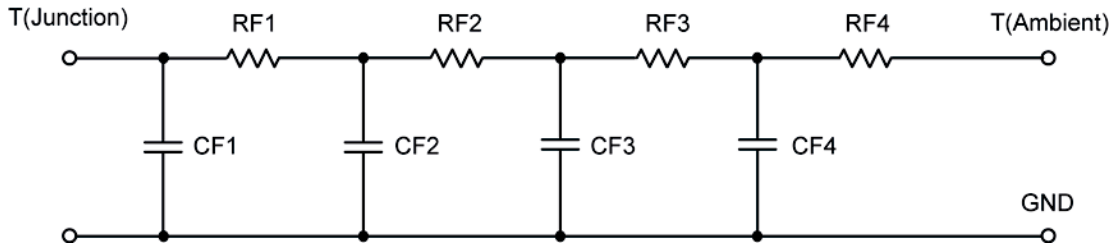
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	57.3385	N/A	23.3961
RT2	11.3186	N/A	5.5170
RT3	22.2496	N/A	1.5526
RT4	29.0933	N/A	9.5343
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.2687	N/A	972.4869 u
CT2	256.3405 u	N/A	171.7280 u
CT3	31.6376 m	N/A	1.3394
CT4	1.7862 m	N/A	13.1827 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

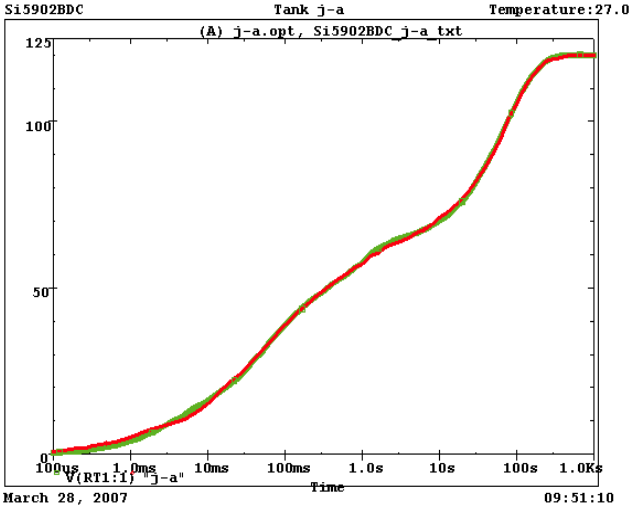


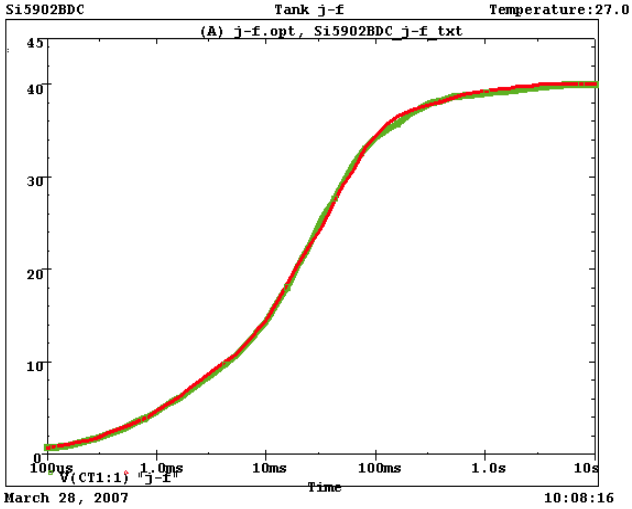
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	11.3931	N/A	9.1707
RF2	33.3620	N/A	18.3070
RF3	19.5536	N/A	10.3585
RF4	55.6913	N/A	2.1638
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	158.9536 u	N/A	162.5999 u
CF2	1.3866 m	N/A	822.9837 u
CF3	42.9674 m	N/A	4.4936 m
CF4	1.2573	N/A	543.2878 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


Si5902BDC
Tank j-a
Temperature:27.0
(A) j-a.opt, Si5902BDC_j-a_txt
125
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
March 28, 2007
09:51:10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Tank j-f
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40
30
20
10
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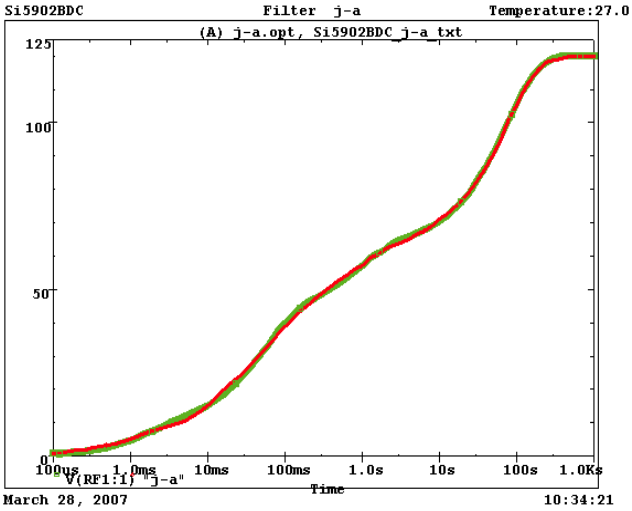
10:08:16


Si5902BDC
Filter j-a
Temperature:27.0
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100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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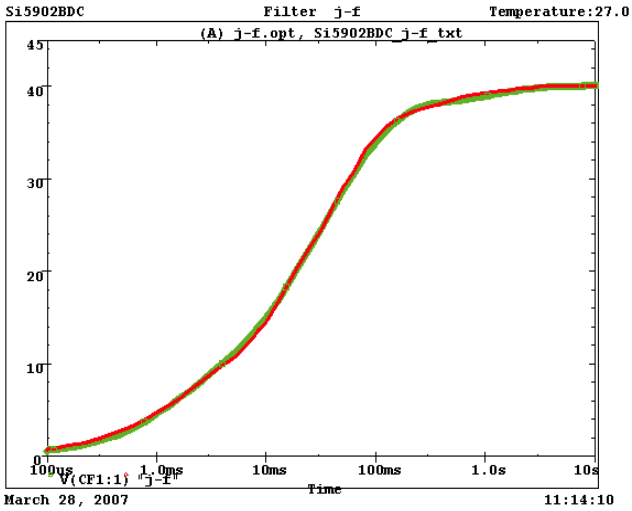
10:34:21


Si5902BDC
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
March 28, 2007
11:14:10