R-C Thermal Model Parameters

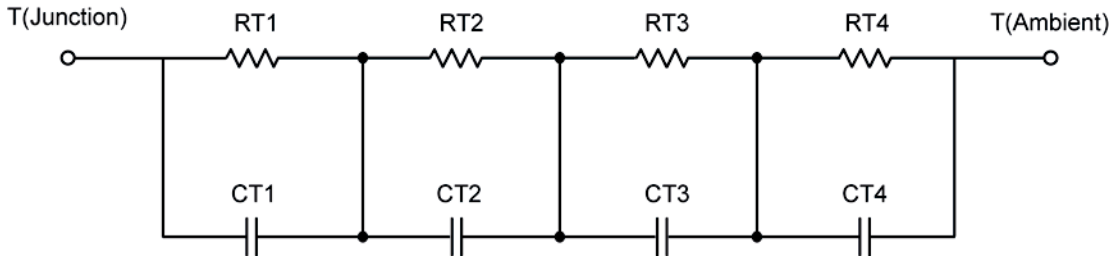
DESCRIPTION

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.

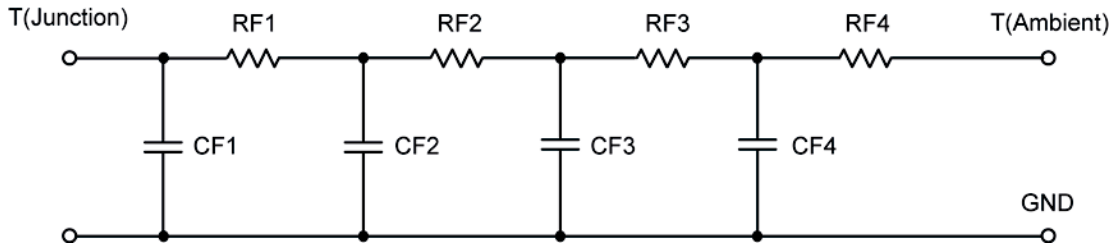
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	31.3037	N/A	1.5595
RT2	7.2452	N/A	13.3375
RT3	14.8649	N/A	2.8692
RT4	41.5862	N/A	2.2338
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	7.0168 m	N/A	5.2279 m
CT2	605.3506 u	N/A	2.3994 m
CT3	608.6586 m	N/A	707.1591 u
CT4	1.9167	N/A	402.0757 u

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

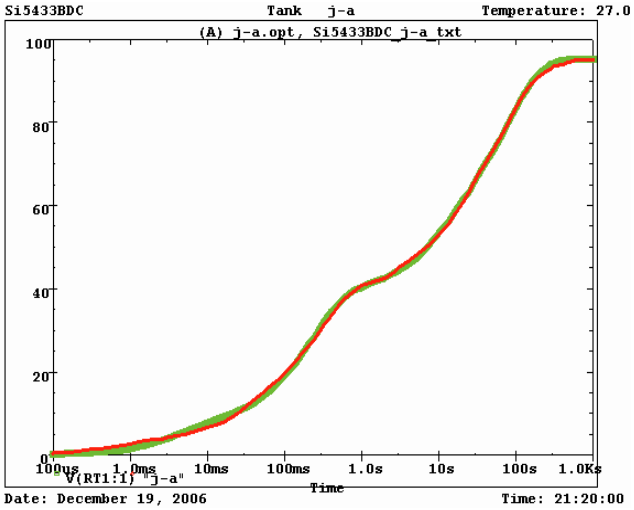


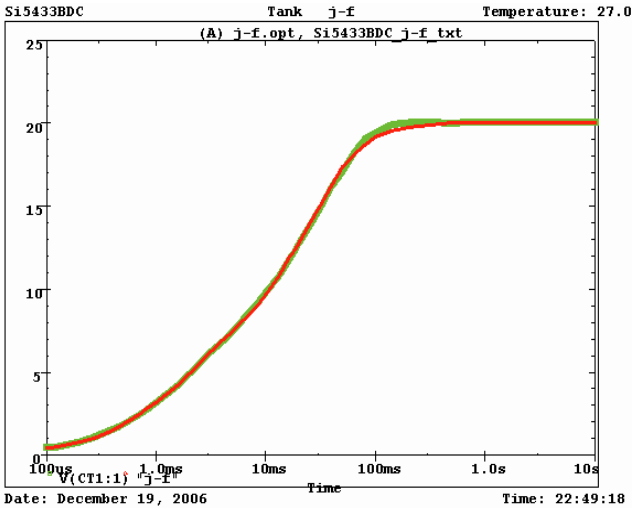
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.2525	N/A	5.4794
RF2	31.3666	N/A	10.8326
RF3	18.1152	N/A	1.3472
RF4	38.2657	N/A	2.3408
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	434.0024 u	N/A	217.9399 u
CF2	5.8795 m	N/A	1.2158 m
CF3	349.3162 m	N/A	7.2726 m
CF4	1.4747	N/A	14.2732 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


Si5433BDC
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si5433BDC_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: December 19, 2006
Time: 21:20:00


Si5433BDC
Tank j-f
Temperature: 27.0
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20
15
10
5
0
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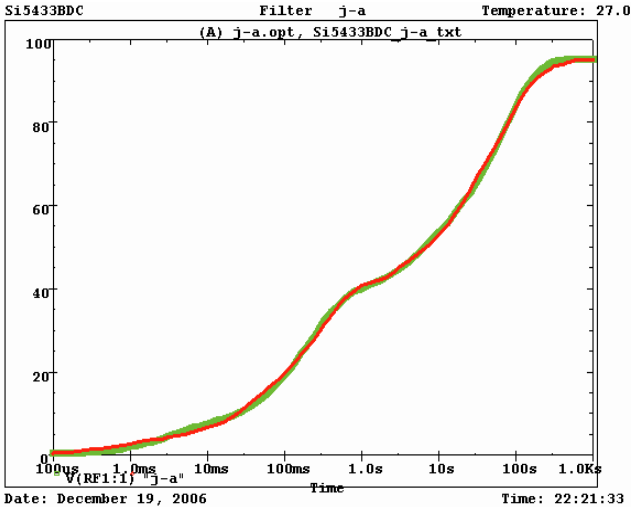
Time: 22:49:18


Si5433BDC
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si5433BDC_j-a_txt
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80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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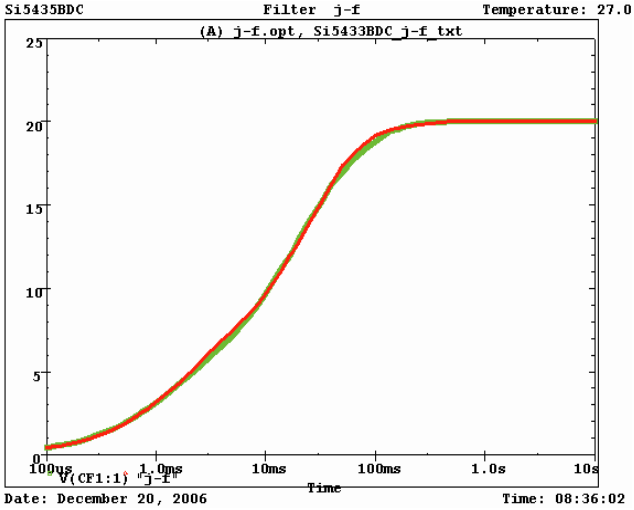
Time
Date: December 19, 2006
Time: 22:21:33


Si5435BDC
Filter j-f
Temperature: 27.0
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20
15
10
5
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: December 20, 2006
Time: 08:36:02