R-C Thermal Model Parameters

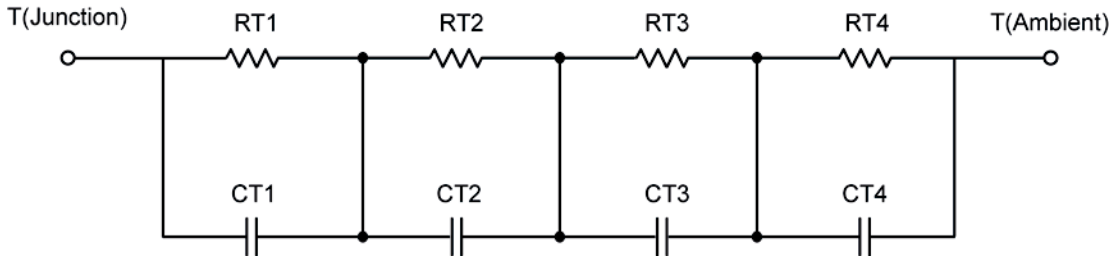
DESCRIPTION

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.

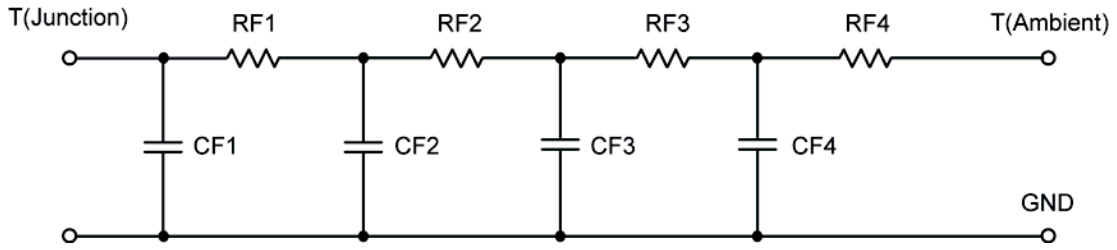
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	188.2538	N/A	98.6067
RT2	32.8812	N/A	193.1619
RT3	109.7194	N/A	102.1149
RT4	394.1456	N/A	176.1165
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	543.0109 u	N/A	4.3742 m
CT2	86.5338 u	N/A	741.8607 u
CT3	424.7724 m	N/A	12.8222 m
CT4	2.7530 m	N/A	141.5704 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

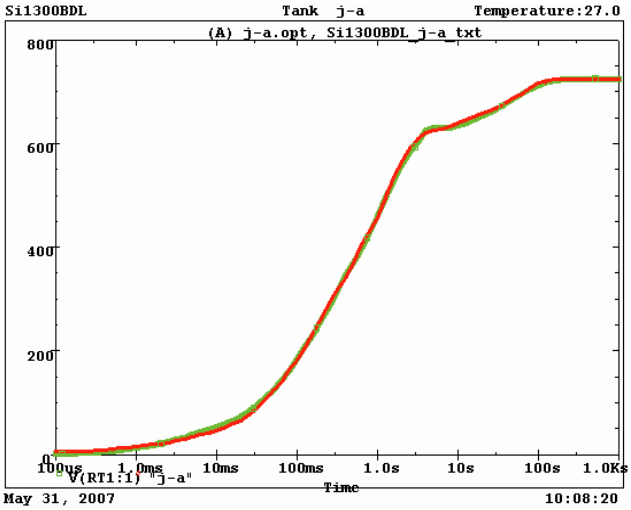


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	66.8268	N/A	187.0703
RF2	248.3816	N/A	188.5591
RF3	300.9595	N/A	162.0852
RF4	108.8321	N/A	32.2854
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	124.9472 u	N/A	102.9461 u
CF2	418.7308 u	N/A	253.7893 u
CF3	2.6668 m	N/A	2.3003 m
CF4	349.5837 m	N/A	51.7627 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


Si1300BDL
Tank j-a
Temperature:27.0
(A) j-a.opt, Si1300BDL_j-a_txt
800
600
400
200
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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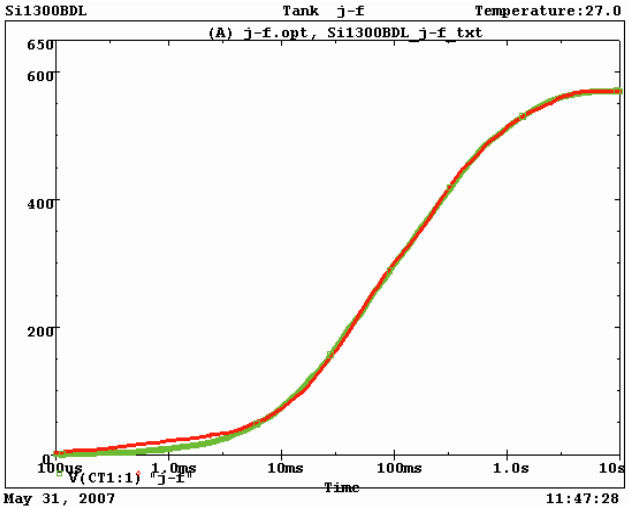
Time
May 31, 2007
10:08:20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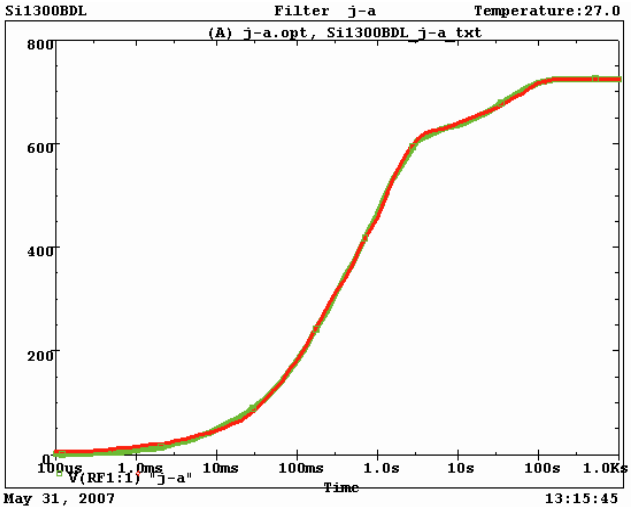
Si1300BDL
Filter j-a
Temperature:27.0
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600
400
200
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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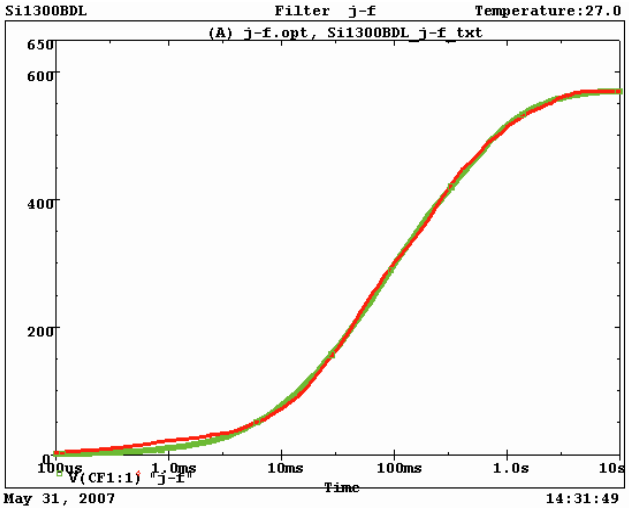
13:15:45


Si1300BDL
Filter j-f
Temperature:27.0
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650
600
400
200
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-f"
Time
May 31, 2007
14:31:49