R-C Thermal Model Parameters

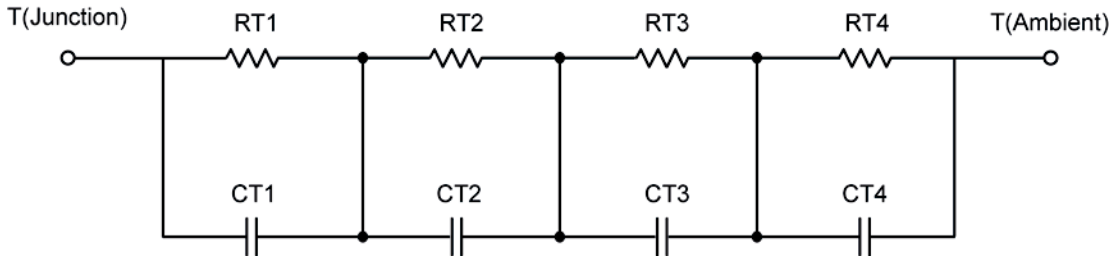
DESCRIPTION

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.

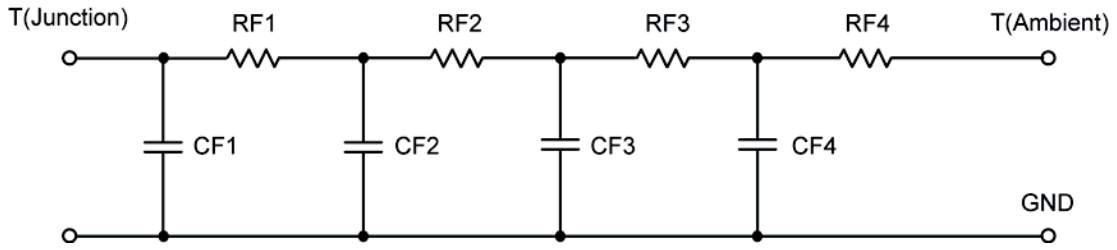
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.5197	2.7815 m	N/A
RT2	7.4284	330.5400 m	N/A
RT3	11.8825	285.5552 m	N/A
RT4	56.6379	1.7767	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	6.7430 m	615.4872 u	N/A
CT2	32.7582 m	4.2681 m	N/A
CT3	109.4727 m	973.9459 u	N/A
CT4	1.1804	7.4706 m	N/A

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

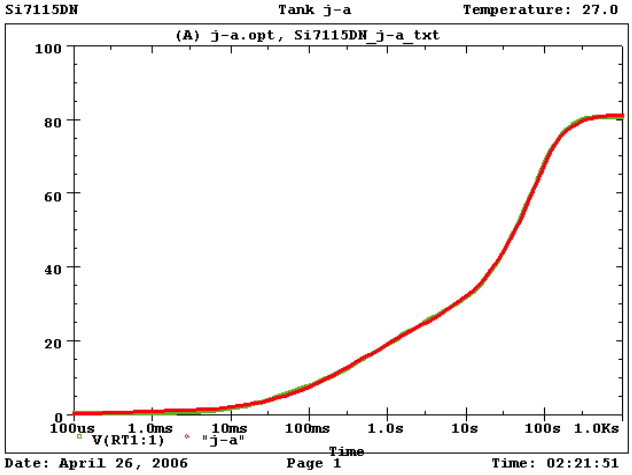


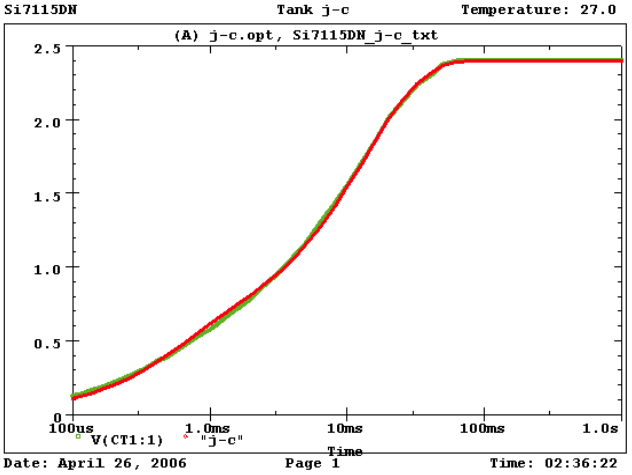
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.8647	17.7949 u	N/A
RF2	9.3907	683.7085 m	N/A
RF3	10.7274	1.0711	N/A
RF4	52.6417	650.8253 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	6.1206 m	748.9159 u	N/A
CF2	24.0557 m	1.3753 u	N/A
CF3	148.5836 m	6.6702 m	N/A
CF4	1.1181	612.5602 u	N/A

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


Si7115DN
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7115DN_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: April 26, 2006
Page 1
Time: 02:21:51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1.5
1.0
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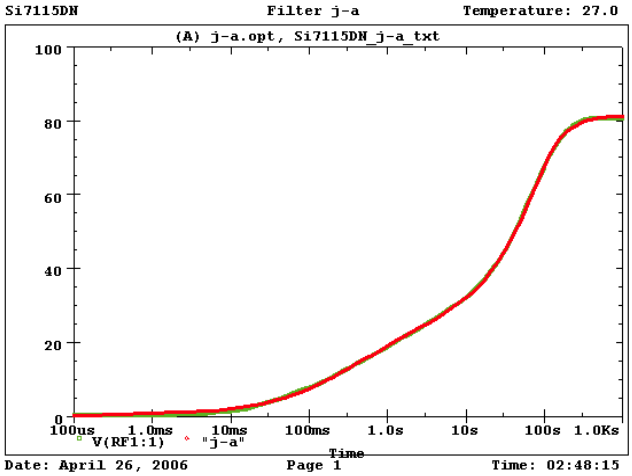
Time
Date: April 26, 2006
Page 1
Time: 02:36:22


Si7115DN
Filter j-a
Temperature: 27.0
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80
60
40
20
0
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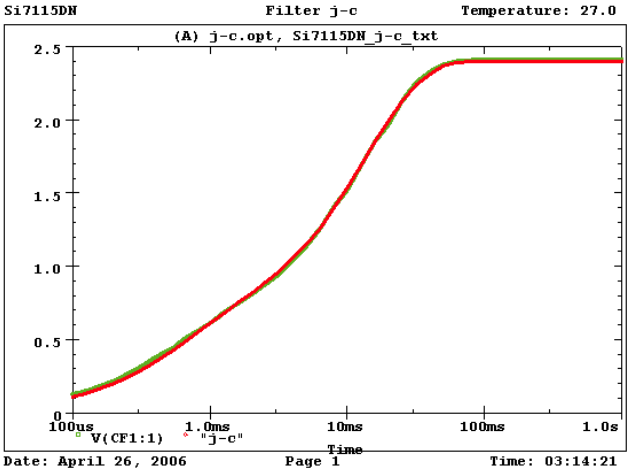
Time
Date: April 26, 2006
Page 1
Time: 02:48:15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Filter j-c
Temperature: 27.0
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2.0
1.5
1.0
0.5
0
100us 1.0ms 10ms 100ms 1.0s
V(CF1:1)
"j-c"
Time
Date: April 26, 2006
Page 1
Time: 03:14:21