R-C Thermal Model Parameters

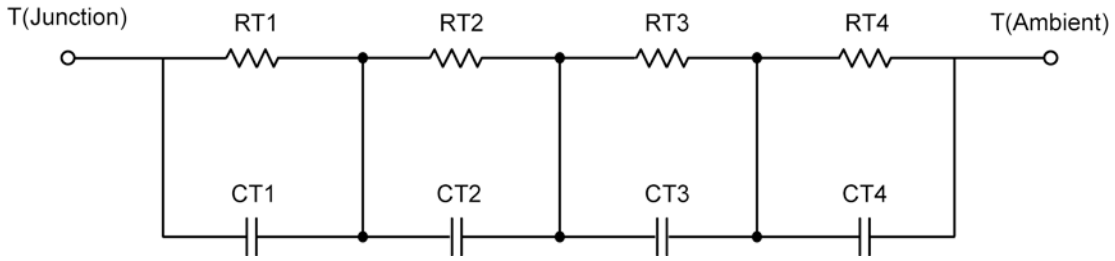
DESCRIPTION

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.

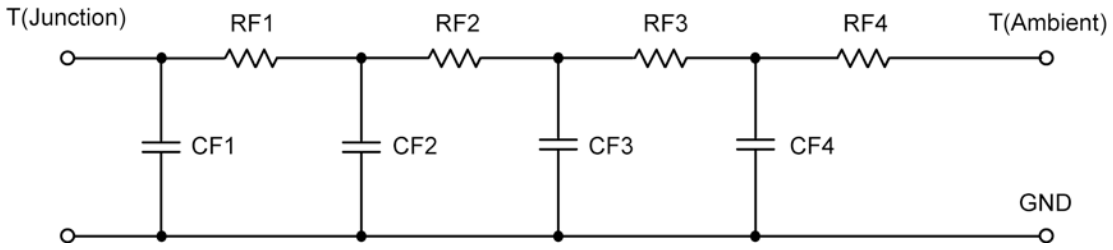
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	19.1036	N/A	25.3798
RT2	25.5205	N/A	2.5489
RT3	47.7695	N/A	22.3544
RT4	57.6064	N/A	14.7169
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	4.3465 m	N/A	51.9284 m
CT2	73.6456 m	N/A	709.3105 u
CT3	13.4212 m	N/A	13.6243 m
CT4	1.8430	N/A	6.5796 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

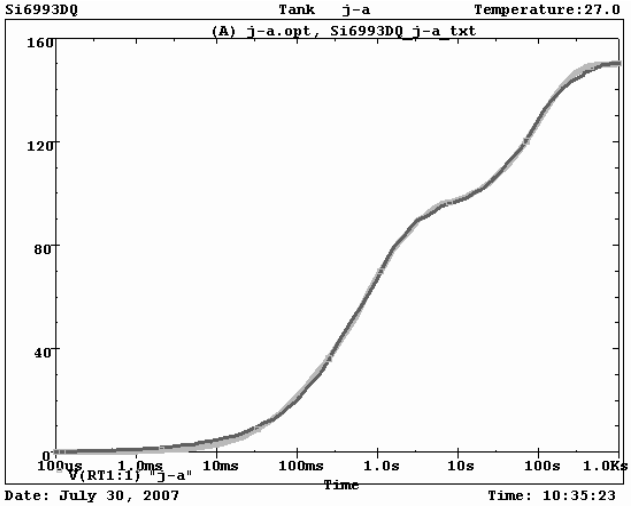


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.2189	N/A	7.1047
RF2	43.3463	N/A	24.8253
RF3	36.2532	N/A	26.8763
RF4	56.1816	N/A	6.1937
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.2763 m	N/A	1.3291 m
CF2	3.9764 m	N/A	3.1493 m
CF3	23.0874 m	N/A	13.8658 m
CF4	1.8550	N/A	318.6923 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


Si6993DQ
Tank j-a
Temperature:27.0
(A) j-a.opt, Si6993DQ_j-a_txt
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120
80
40
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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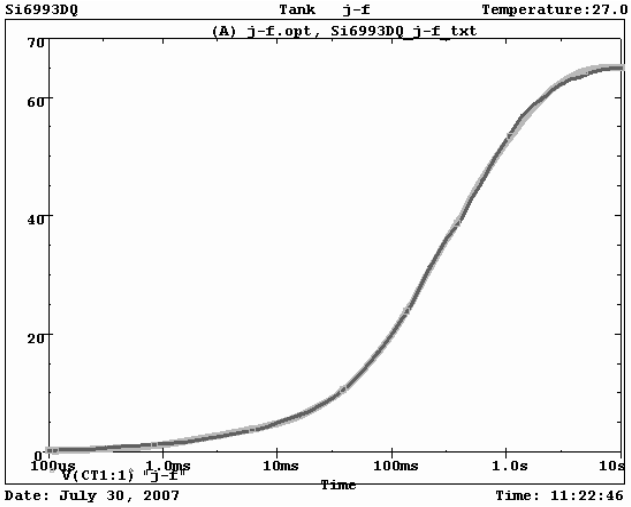
Time
Date: July 30, 2007
Time: 10:35:23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Tank j-f
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60
40
20
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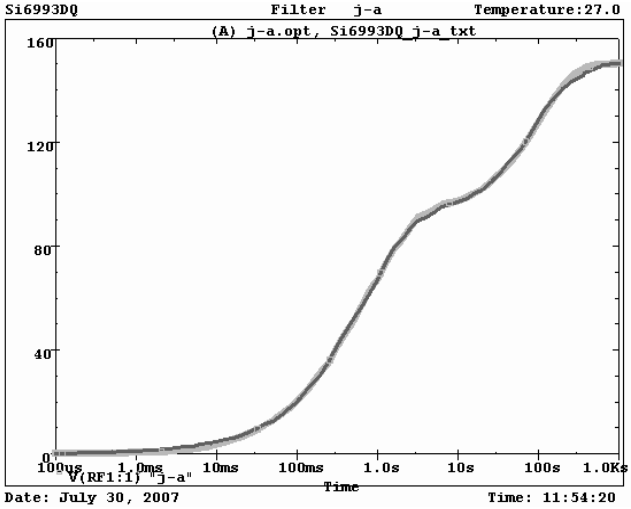
Si6993DQ
Filter j-a
Temperature:27.0
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120
80
40
0
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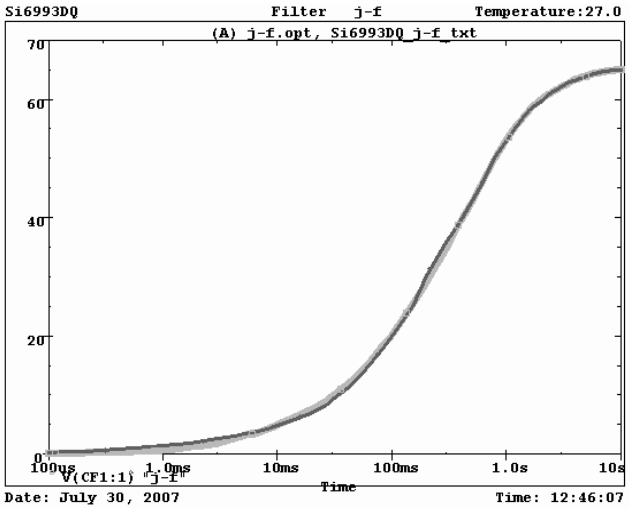
Time: 11:54:20


Si6993DQ
Filter j-f
Temperature:27.0
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60
40
20
0
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V(CF1:1) "j-f"
Time
Date: July 30, 2007
Time: 12:46:07