R-C Thermal Model Parameters

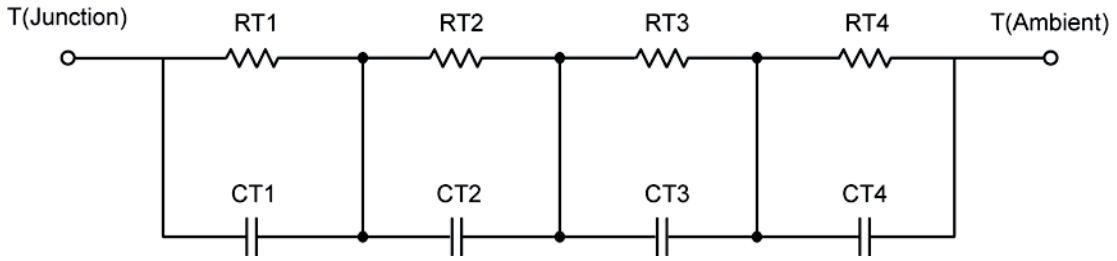
DESCRIPTION

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.

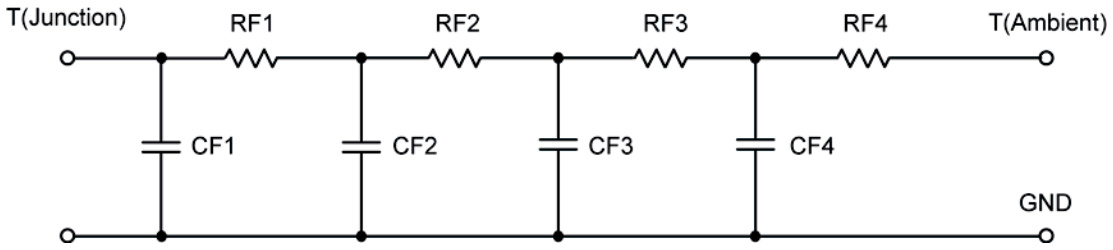
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.7899	N/A	1.2262
RT2	29.1296	N/A	27.2251
RT3	23.5780	N/A	8.9546
RT4	62.5025	N/A	7.5941
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	19.0382 m	N/A	3.1271 m
CT2	62.5773 m	N/A	26.5913 m
CT3	17.7534 m	N/A	261.4064 m
CT4	1.3155	N/A	12.8334 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

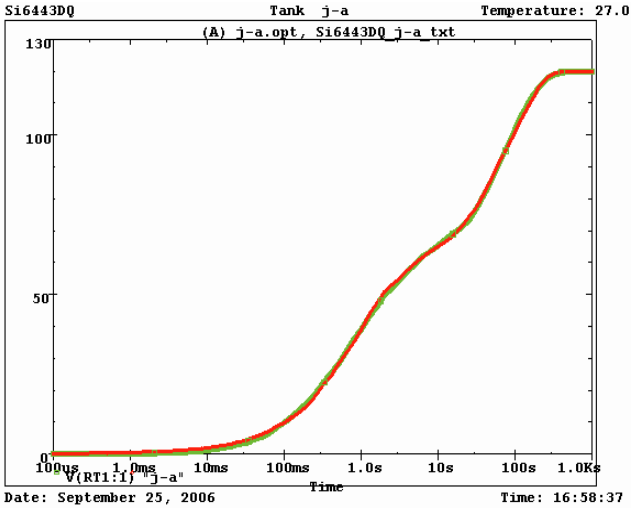


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.7836	N/A	2.4659
RF2	30.2241	N/A	13.4231
RF3	21.8202	N/A	18.2549
RF4	58.1721	N/A	10.8562
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.1095 m	N/A	2.7247 m
CF2	5.5597 m	N/A	6.2318 m
CF3	75.4003 m	N/A	12.3432 m
CF4	1.3626	N/A	125.2120 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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Tank j-a
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130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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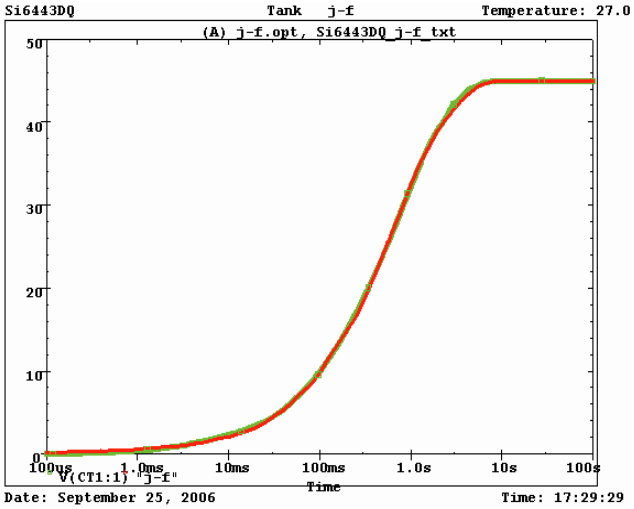
Time
Date: September 25, 2006
Time: 16:58:37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Tank j-f
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40
30
20
10
0
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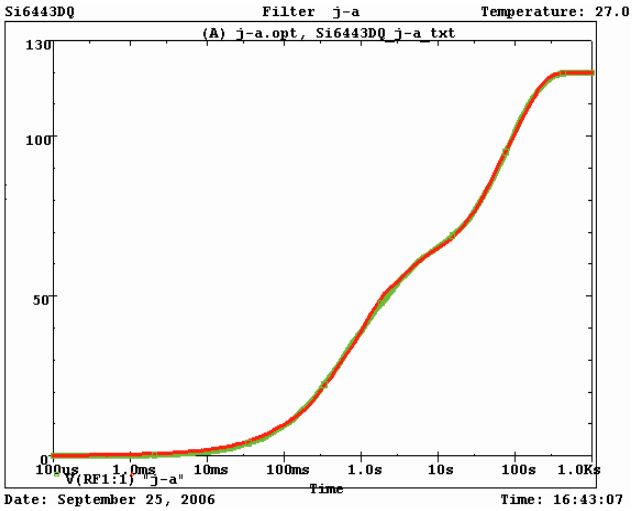
Si6443DQ
Filter j-a
Temperature: 27.0
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100
50
0
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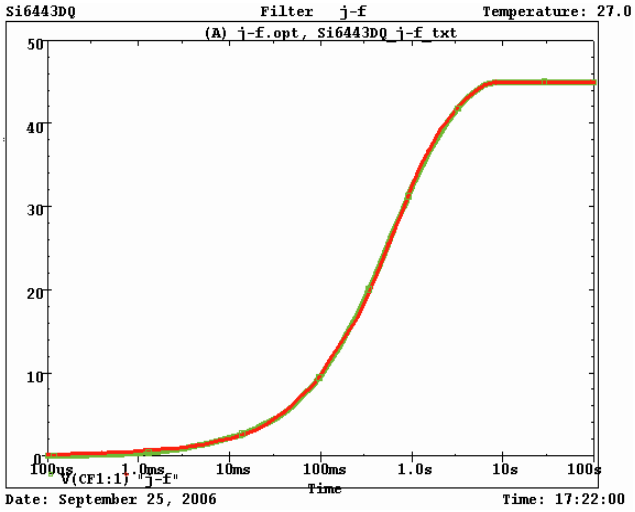
Si6443DQ
Filter j-f
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40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CF1:1) "j-f"
Time
Date: September 25, 2006
Time: 17:22:00