R-C Thermal Model Parameters

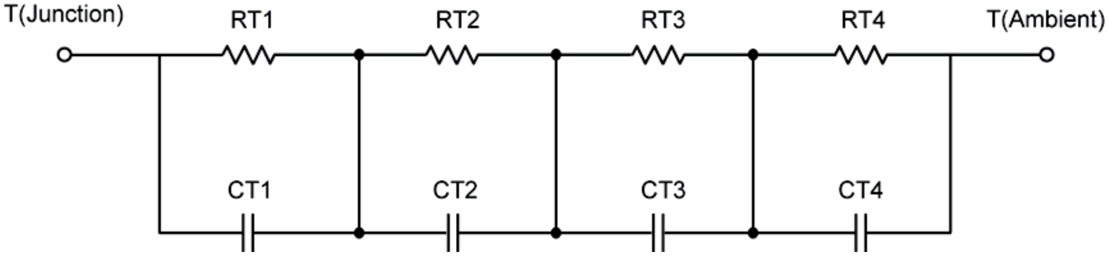
DESCRIPTION

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.

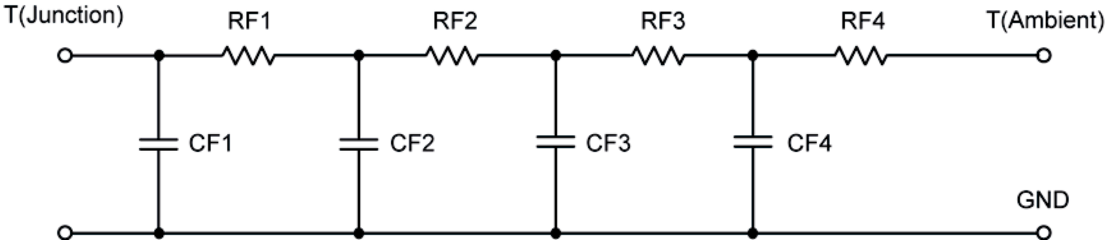
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	Ambient	Case	Foot
RT1	10.0716	N/A	3.3586
RT2	51.4944	N/A	6.8857
RT3	28.1610	N/A	13.8280
RT4	20.2729	N/A	14.9276
Thermal Capacitance (Joules/°C)			
Junction to	Ambient	Case	Foot
CT1	575.0072 u	N/A	2.6463 m
CT2	1.4928	N/A	10.6768 m
CT3	5.6500 m	N/A	111.1074 m
CT4	61.3812 m	N/A	19.9657 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



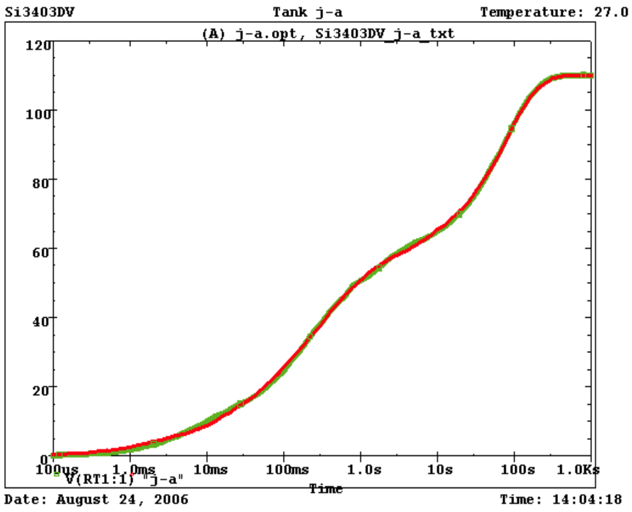
R-C VALUES FOR FILTER CONFIGURATION

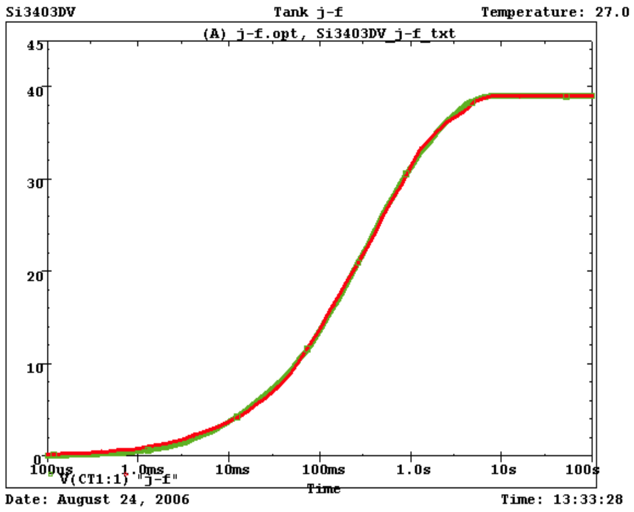
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.7742	N/A	2.0332
RF2	32.2488	N/A	14.2341
RF3	15.8106	N/A	13.3227
RF4	49.1665	N/A	9.4100
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	553.8800 u	N/A	580.1698 u
CF2	5.1500 m	N/A	4.0831 m
CF3	85.5422 m	N/A	15.8535 m
CF4	1.4886	N/A	130.2977 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


Si3403DV
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si3403DV_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: August 24, 2006
Time: 14:04:18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Tank j-f
Temperature: 27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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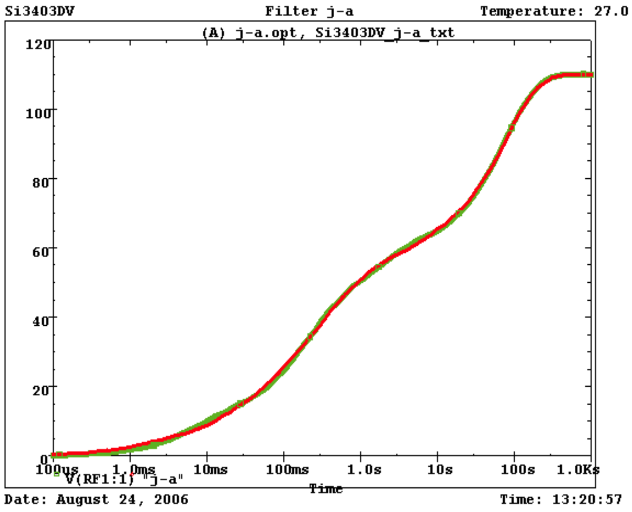
Si3403DV
Filter j-a
Temperature: 27.0
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100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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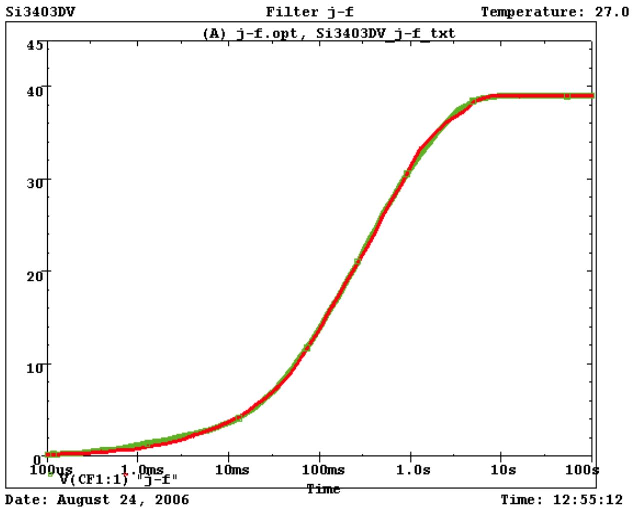
Time
Date: August 24, 2006
Time: 13:20:57


Si3403DV
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: August 24, 2006
Time: 12:55:12