R-C Thermal Model Parameters

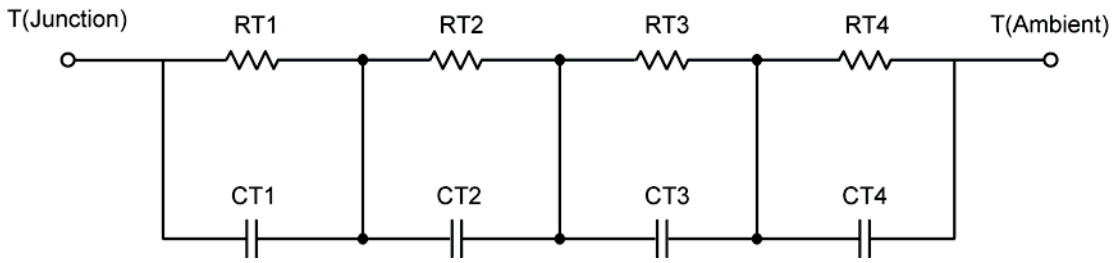
DESCRIPTION

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.

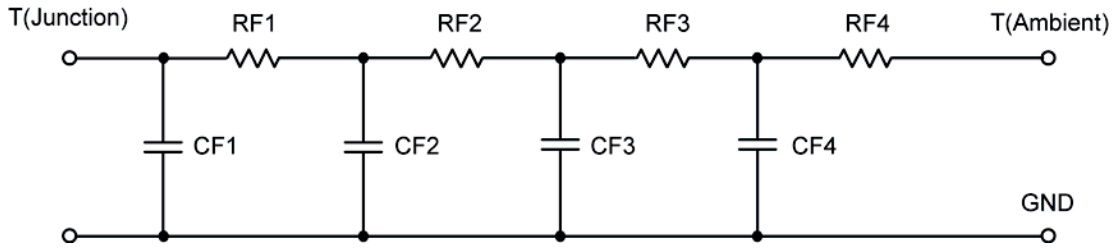
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	17.0954	N/A	8.0750
RT2	4.1009	N/A	985.2466 m
RT3	10.2582	N/A	5.8266
RT4	48.4891	N/A	6.0965
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	53.4040 m	N/A	92.2555 m
CT2	10.7343 m	N/A	11.2816 m
CT3	308.6263 m	N/A	10.7945 m
CT4	1.7312	N/A	310.4452 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

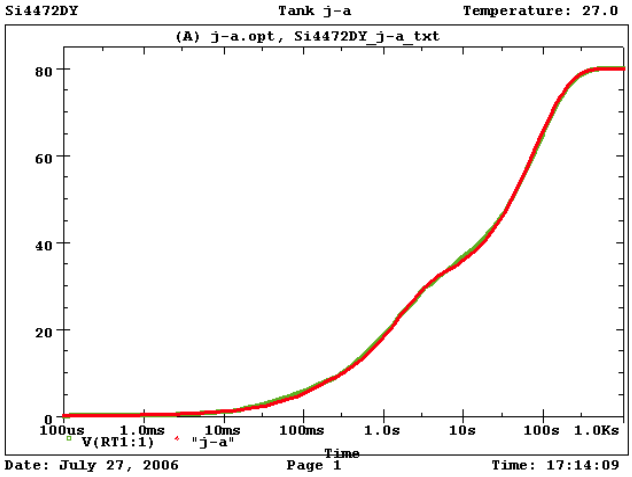


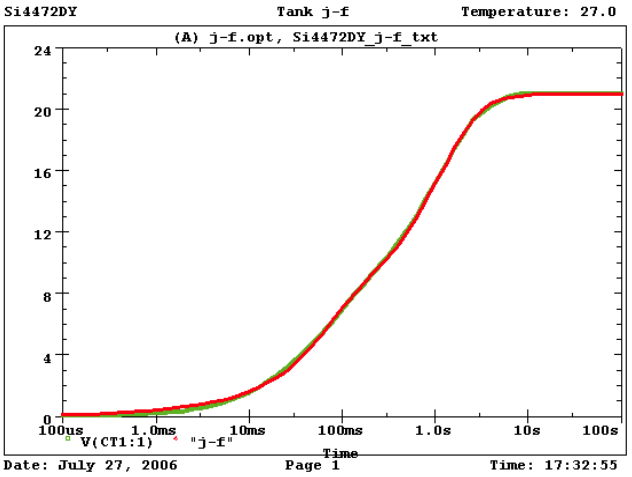
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.1635	N/A	2.6069
RF2	18.9943	N/A	7.0439
RF3	12.4492	N/A	10.0558
RF4	45.5480	N/A	1.2480
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	5.7989 m	N/A	3.9095 m
CF2	27.2559 m	N/A	8.8827 m
CF3	168.8211 m	N/A	89.4420 m
CF4	1.5593	N/A	486.4044 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


Si4472DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4472DY_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: July 27, 2006
Page 1
Time: 17:14:09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Tank j-f
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20
16
12
8
4
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
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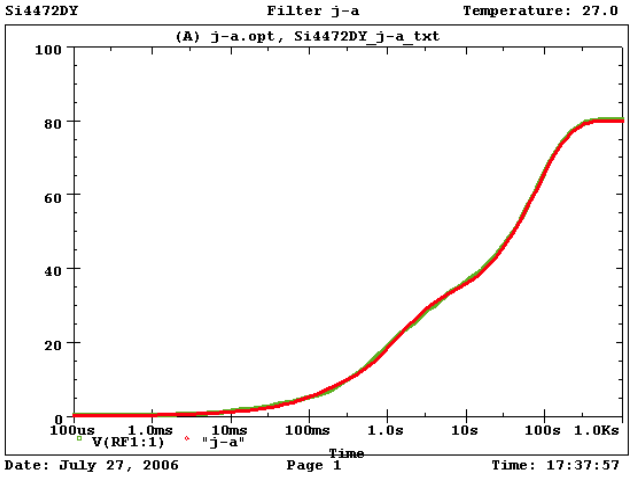
Time
Date: July 27, 2006
Page 1
Time: 17:32:55


Si4472DY
Filter j-a
Temperature: 27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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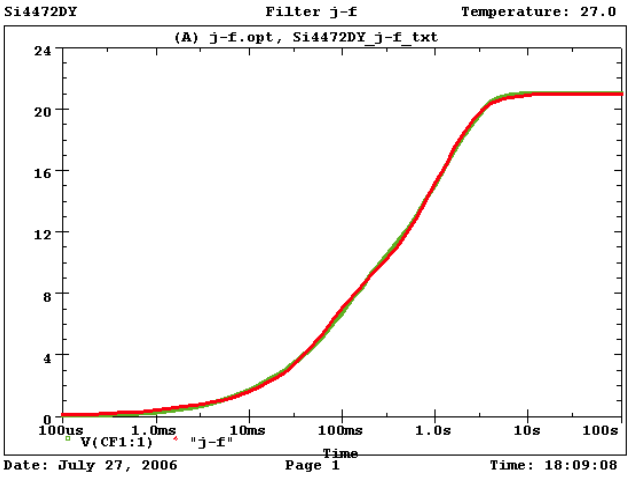
"j-a"
Time
Date: July 27, 2006
Page 1
Time: 17:37:57


Si4472DY
Filter j-f
Temperature: 27.0
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24
20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date: July 27, 2006
Page 1
Time: 18:09:08