R-C Thermal Model Parameters

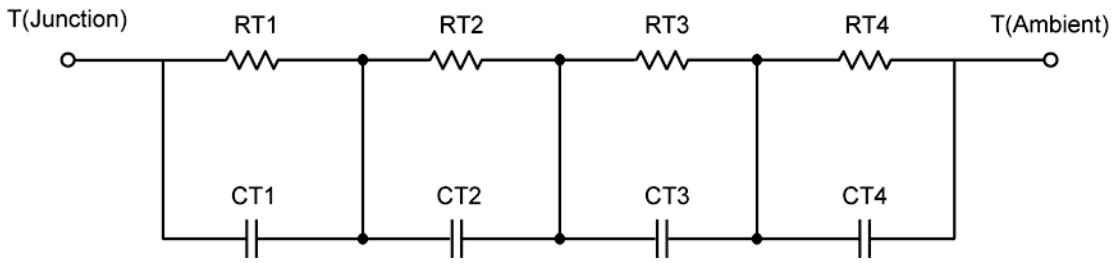
DESCRIPTION

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.

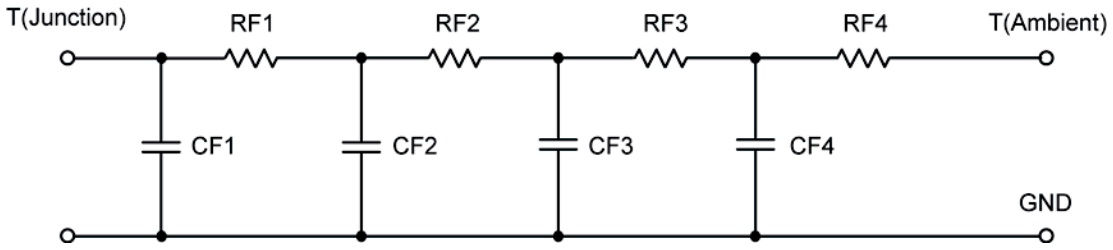
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	7.6192	N/A	8.3931
RT2	14.4919	N/A	1.2560
RT3	12.1471	N/A	5.7231
RT4	50.5078	N/A	7.6457
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	6.6102 m	N/A	57.9389 m
CT2	199.8001 m	N/A	3.3945 m
CT3	63.9275 m	N/A	6.8947 m
CT4	1.5220	N/A	265.1009 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

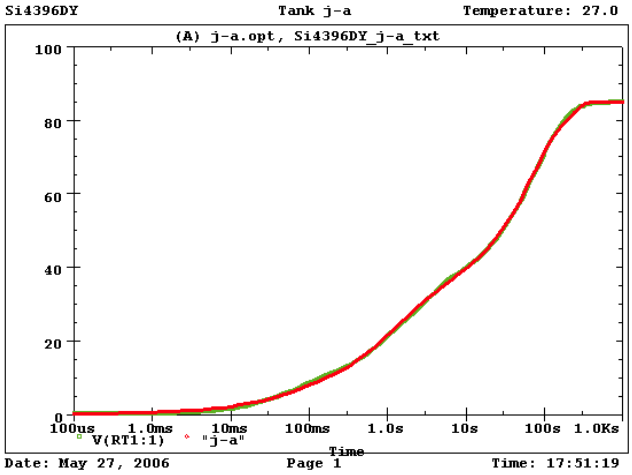


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.8315	N/A	2.1411
RF2	19.4501	N/A	5.4075
RF3	16.2347	N/A	4.6545
RF4	43.3457	N/A	10.7409
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.0020 m	N/A	1.7111 m
CF2	24.2797 m	N/A	4.6651 m
CF3	280.8158 m	N/A	15.9435 m
CF4	1.4861	N/A	93.3125 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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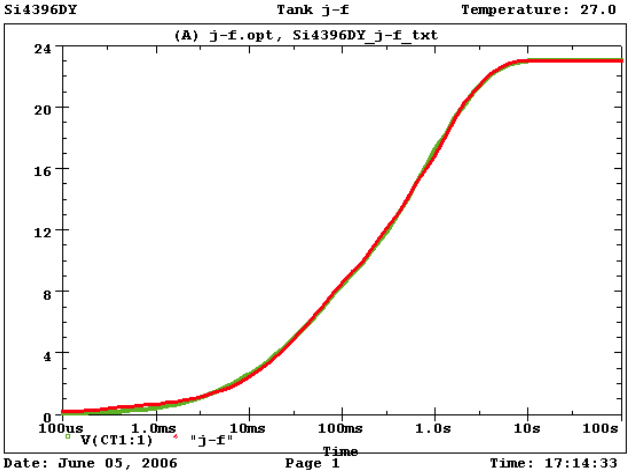
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: May 27, 2006
Page 1
Time: 17:51:19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100s
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Time
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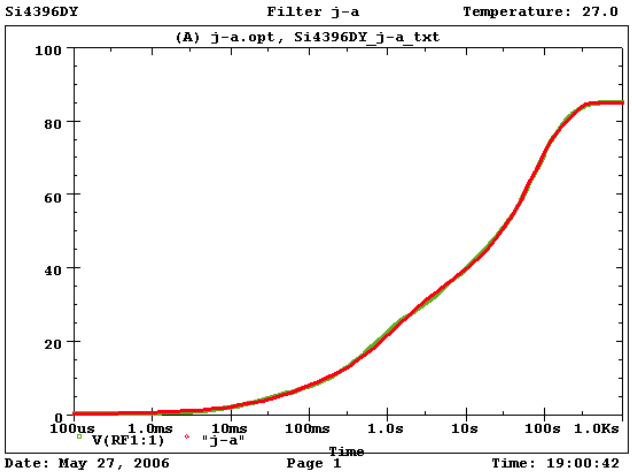
Page 1
Time: 17:14:33


Si4396DY
Filter j-a
Temperature: 27.0
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40
20
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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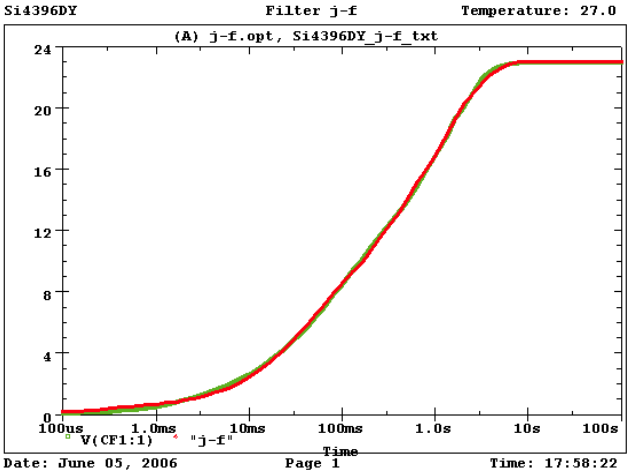
"j-a"
Time
Date: May 27, 2006
Page 1
Time: 19:00:42


Si4396DY
Filter j-f
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20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date: June 05, 2006
Page 1
Time: 17:58:22