R-C Thermal Model Parameters

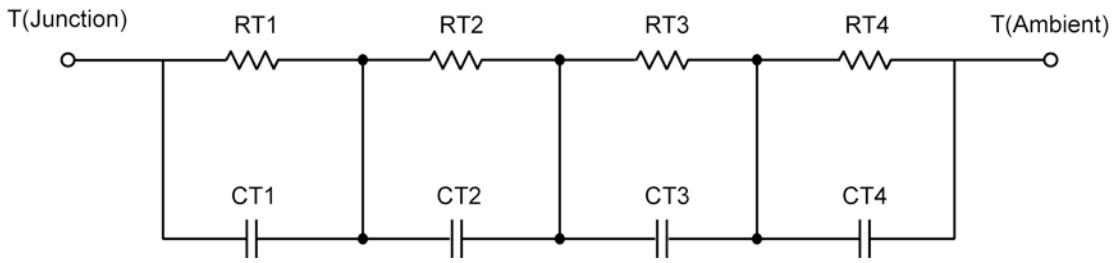
DESCRIPTION

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.

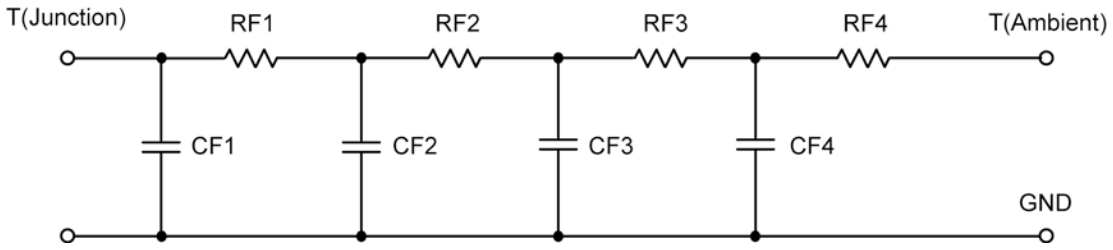
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	20.8369	N/A	4.0258
RT2	6.2505	N/A	9.8468
RT3	16.9980	N/A	6.3637
RT4	40.9146	N/A	4.7637
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	349.7413 m	N/A	249.2939 m
CT2	471.3850 u	N/A	13.2421 m
CT3	20.7626 m	N/A	1.7311 m
CT4	2.6297	N/A	138.5637 u

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

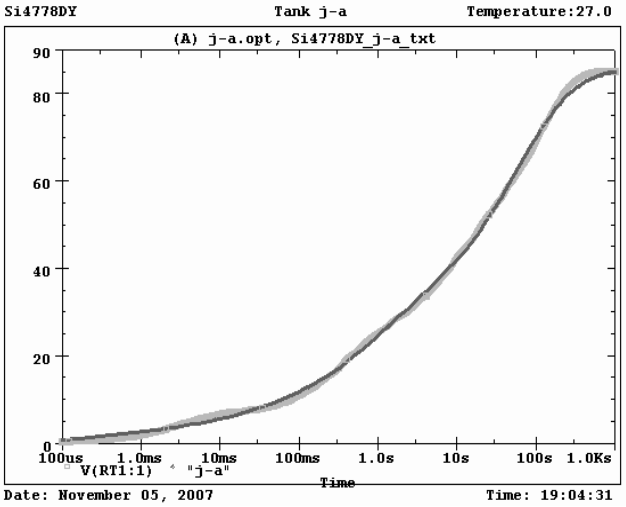


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.4674	N/A	5.8106
RF2	17.7225	N/A	6.5174
RF3	22.8037	N/A	7.9891
RF4	38.0064	N/A	4.6829
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	445.9950 u	N/A	132.2512 u
CF2	17.6947 m	N/A	1.5505 m
CF3	244.3088 m	N/A	9.2501 m
CF4	2.3330	N/A	117.6707 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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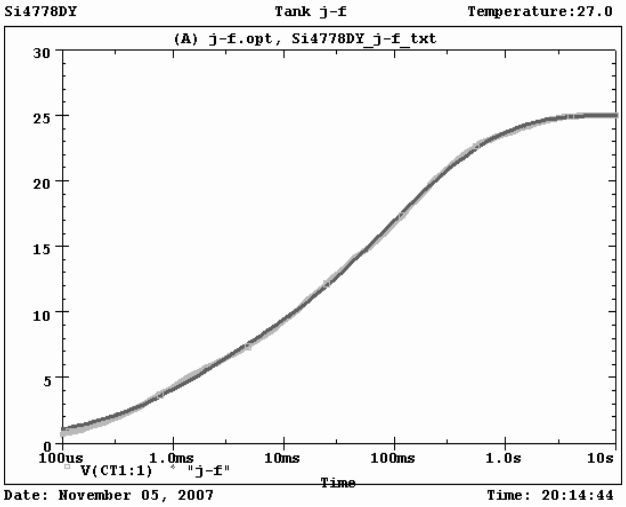
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4778DY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: November 05, 2007
Time: 19:04:31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20
15
10
5
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100ms
1.0s
10s
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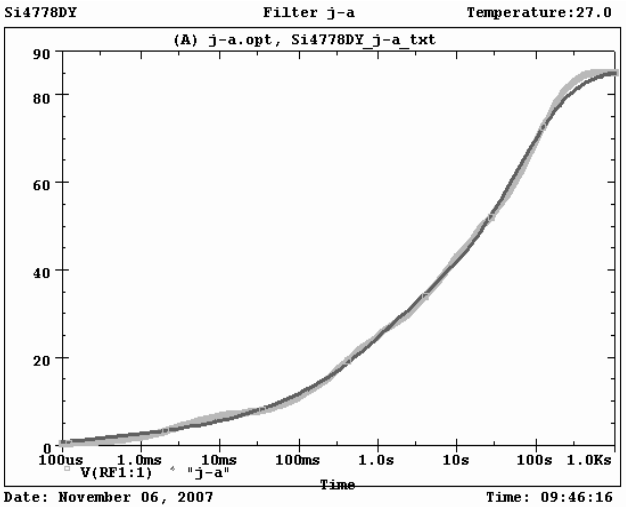
Si4778DY
Filter j-a
Temperature:27.0
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90
80
60
40
20
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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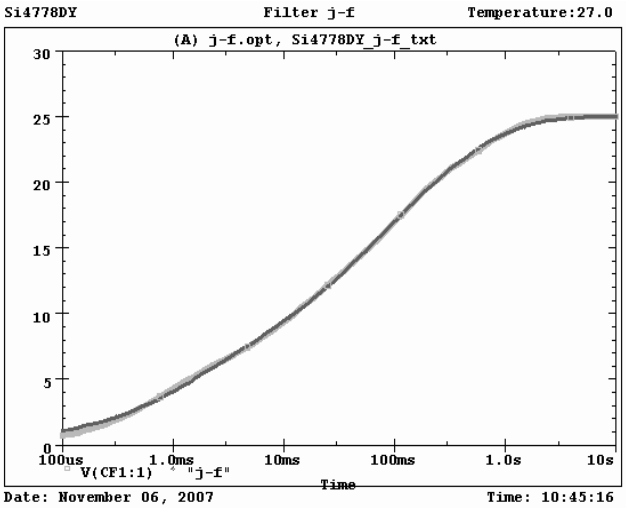
Time
Date: November 06, 2007
Time: 09:46:16


Si4778DY
Filter j-f
Temperature:27.0
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25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: November 06, 2007
Time: 10:45:16