R-C Thermal Model Parameters

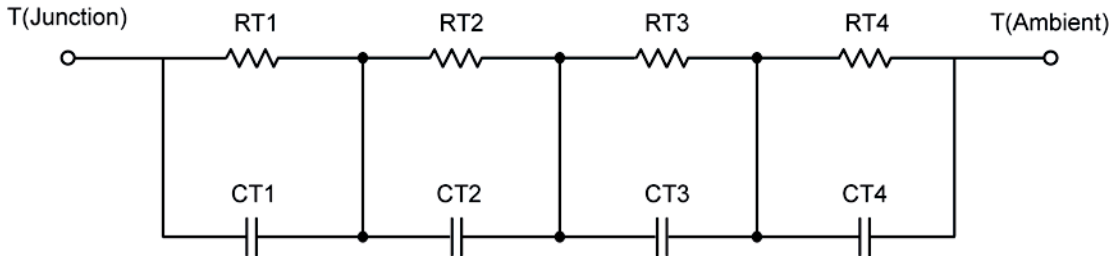
DESCRIPTION

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.

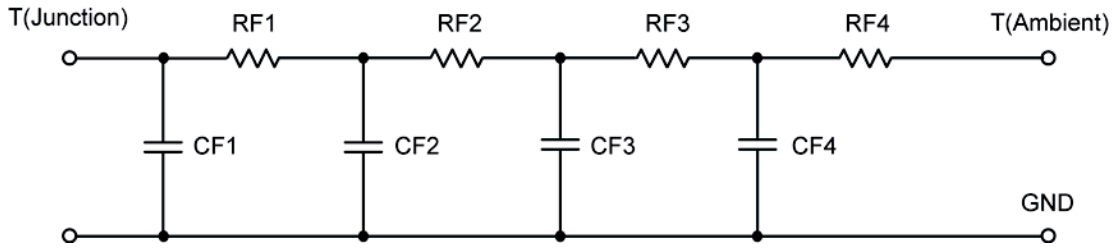
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.2913	N/A	11.8569
RT2	24.3855	N/A	1.5467
RT3	21.6440	N/A	13.3672
RT4	54.1972	N/A	8.1168
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	6.1908 m	N/A	5.8935 m
CT2	94.9300 m	N/A	868.9811 u
CT3	23.9265 m	N/A	50.6851 m
CT4	1.5542	N/A	207.5273 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

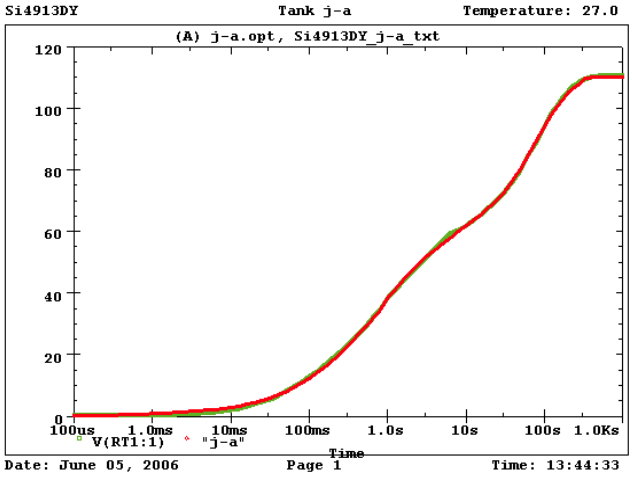


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.0272	N/A	2.8948
RF2	19.2083	N/A	15.1042
RF3	30.5929	N/A	9.0359
RF4	52.9680	N/A	7.8293
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.9330 m	N/A	1.3771 m
CF2	6.4425 m	N/A	4.4732 m
CF3	34.8211 m	N/A	42.9820 m
CF4	1.4294	N/A	65.0020 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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100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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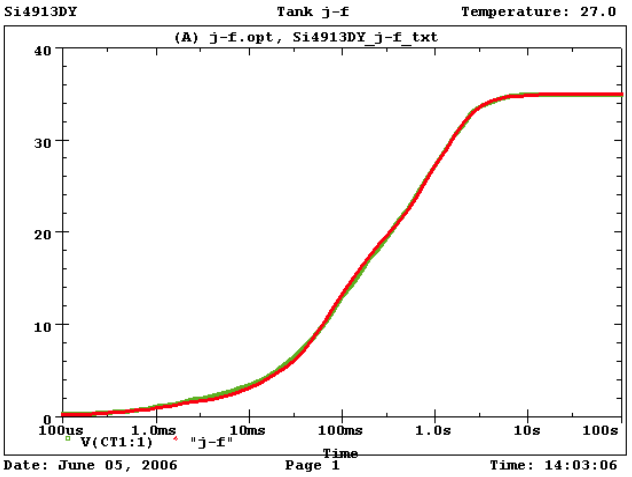
"j-a"
Time
Date: June 05, 2006
Page 1
Time: 13:44:33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10ms
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10s
100s
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Time
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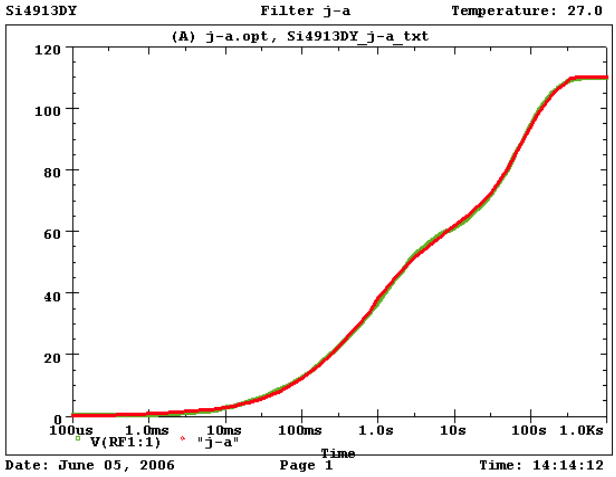
Page 1
Time: 14:03:06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Filter j-a
Temperature: 27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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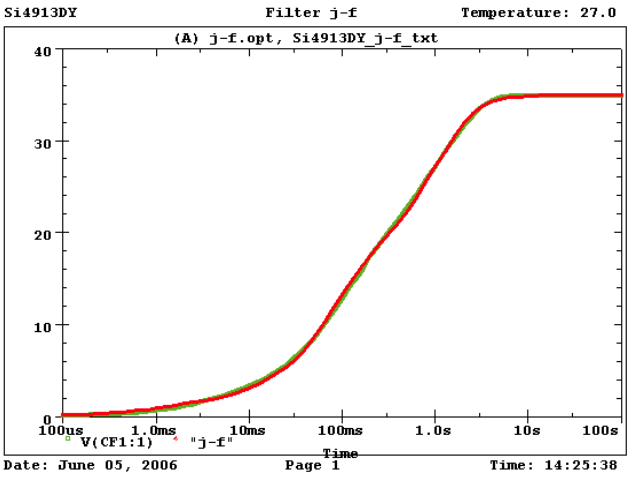
Time
Date: June 05, 2006
Page 1
Time: 14:14:12


Si4913DY
Filter j-f
Temperature: 27.0
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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date: June 05, 2006
Page 1
Time: 14:25:38