R-C Thermal Model Parameters

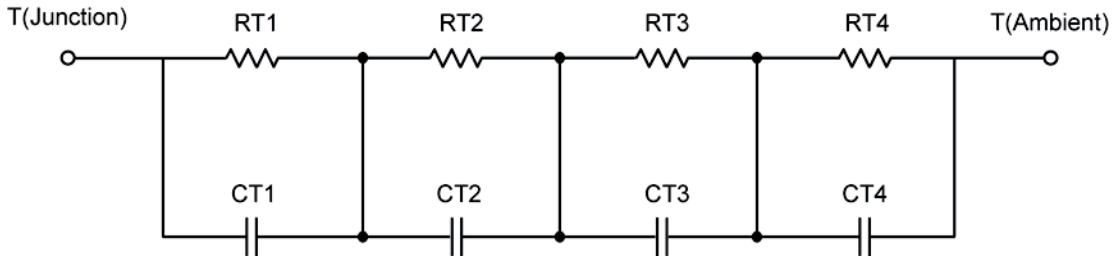
DESCRIPTION

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.

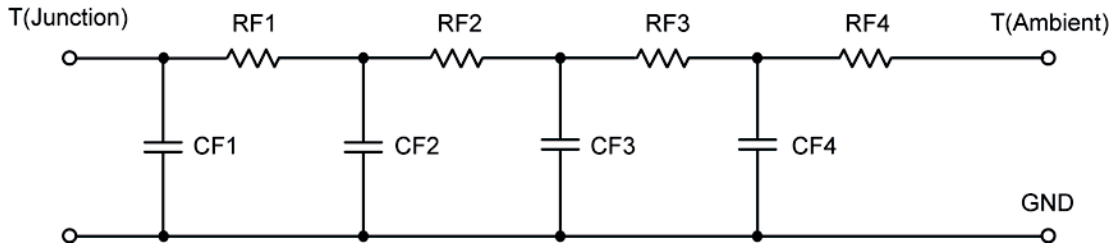
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	18.5848	N/A	13.0481
RT2	7.4064	N/A	11.2706
RT3	20.4057	N/A	9.0038
RT4	73.2996	N/A	4.7028
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	31.4157 m	N/A	38.5072 m
CT2	2.2120 m	N/A	4.3348 m
CT3	150.3018 m	N/A	256.6742 m
CT4	1.2225	N/A	123.2009 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

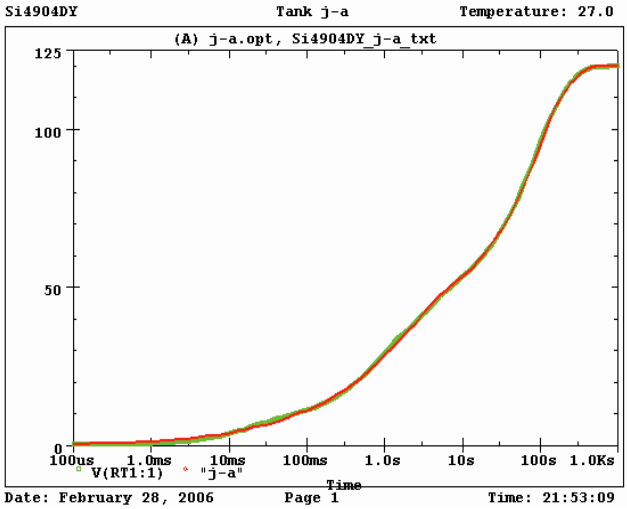


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.6346	N/A	4.9247
RF2	17.6426	N/A	16.4513
RF3	28.4869	N/A	15.6115
RF4	69.7394	N/A	1.0504
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	490.1778 u	N/A	2.1669 m
CF2	10.5969 m	N/A	5.6969 m
CF3	62.9692 m	N/A	58.9766 m
CF4	1.1937	N/A	7.4953

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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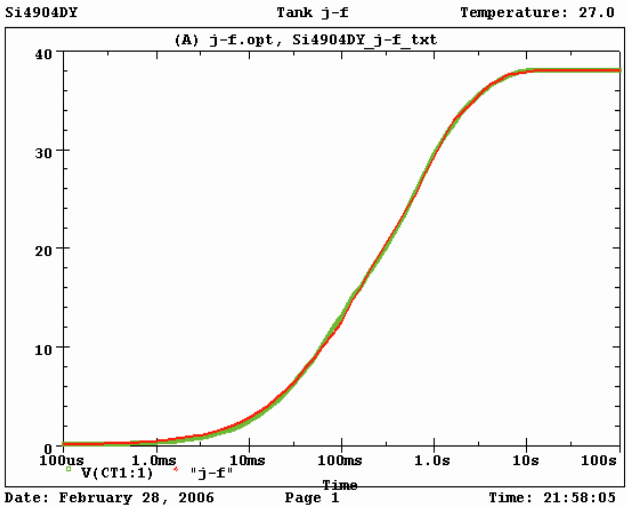
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: February 28, 2006
Page 1
Time: 21:53:09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20
10
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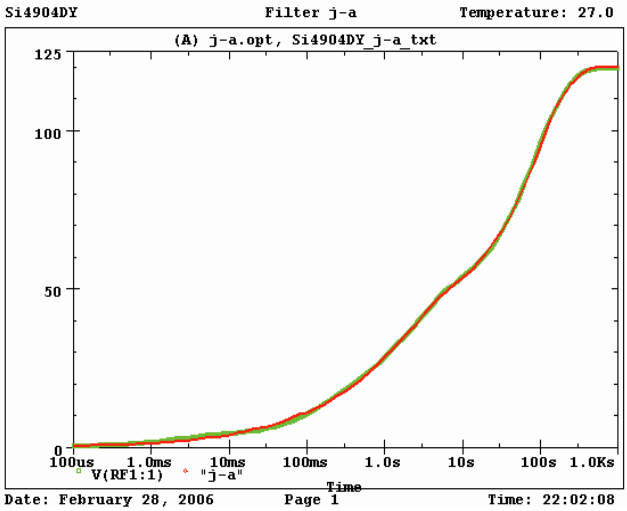
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Filter j-a
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100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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Page 1
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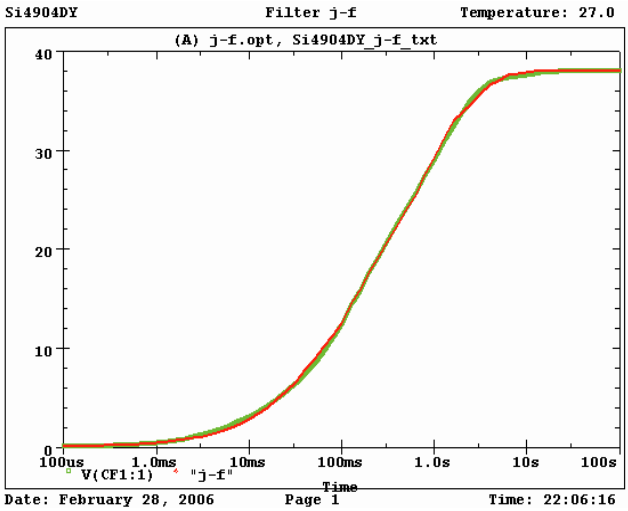
Si4904DY
Filter j-f
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30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
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Time
Date: February 28, 2006
Page 1
Time: 22:06:16