R-C Thermal Model Parameters

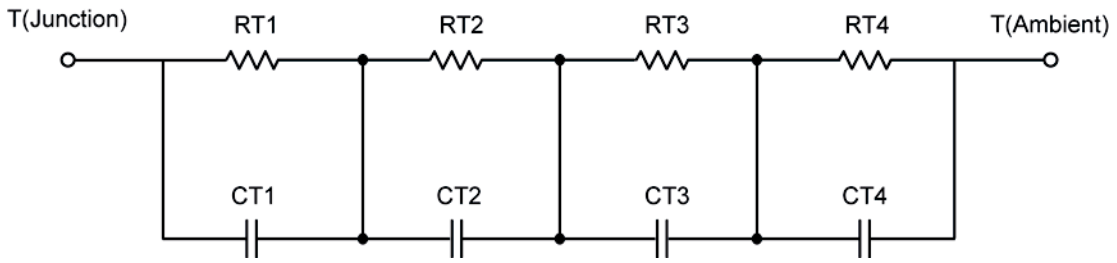
DESCRIPTION

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.

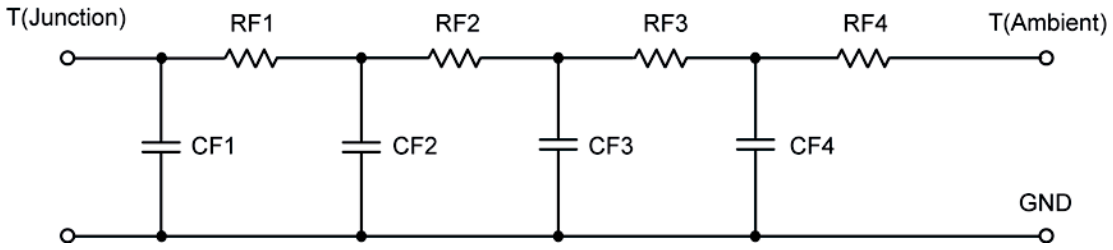
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	18.0498	N/A	22.8576
RT2	13.5465	N/A	6.8294
RT3	37.3879	N/A	6.2761
RT4	56.0158	N/A	9.0369
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	129.6988 m	N/A	1.3960 m
CT2	321.1174 u	N/A	181.6222 u
CT3	3.9039 m	N/A	273.9235 m
CT4	1.5540	N/A	11.2394 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

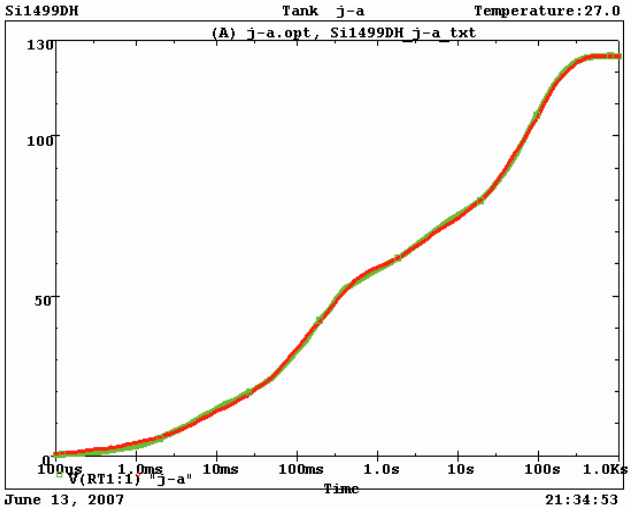


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	15.6843	N/A	5.3345
RF2	36.9662	N/A	5.7488
RF3	19.0906	N/A	26.8876
RF4	53.2589	N/A	7.0291
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	305.6295 u	N/A	110.7145 u
CF2	3.4551 m	N/A	352.3051 u
CF3	112.9520 m	N/A	1.0915 m
CF4	1.5143	N/A	168.0905 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


Si1499DH
Tank j-a
Temperature:27.0
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130
100
50
0
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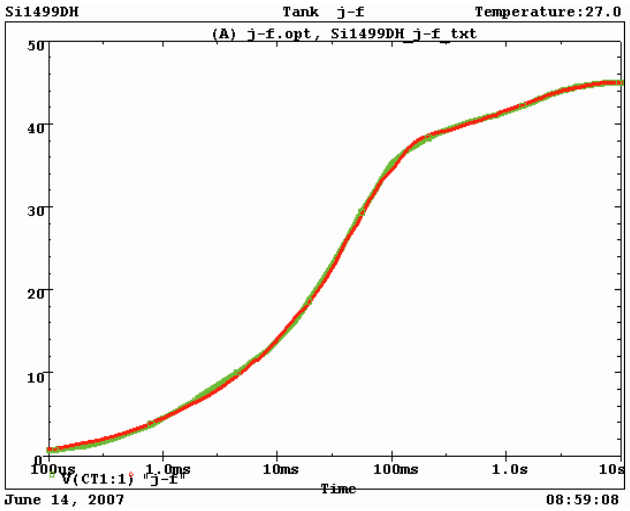
Time
June 13, 2007
21:34:53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Tank j-f
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40
30
20
10
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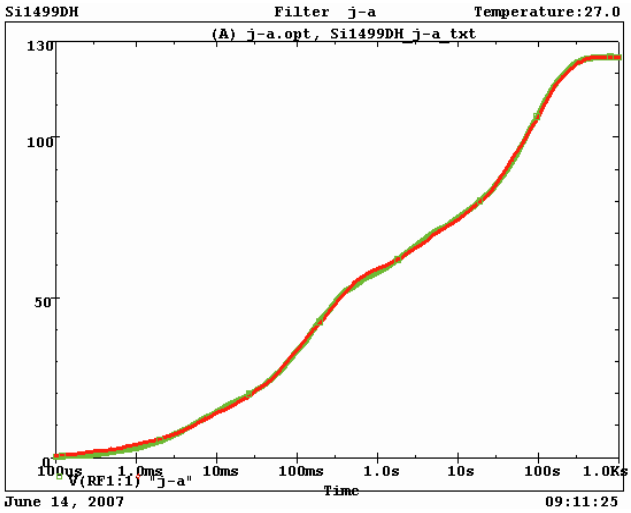
08:59:08


Si1499DH
Filter j-a
Temperature:27.0
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100
50
0
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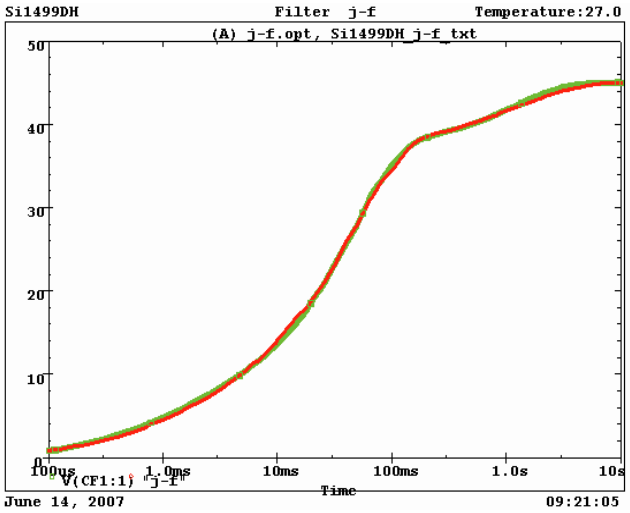
Si1499DH
Filter j-f
Temperature:27.0
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40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
June 14, 2007
09:21:05