R-C Thermal Model Parameters

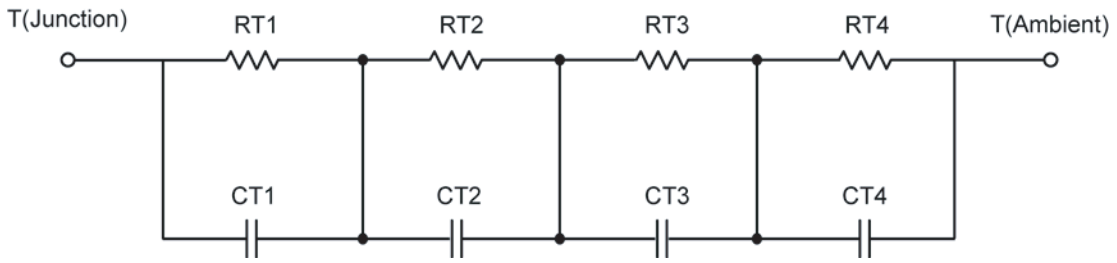
DESCRIPTION

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.

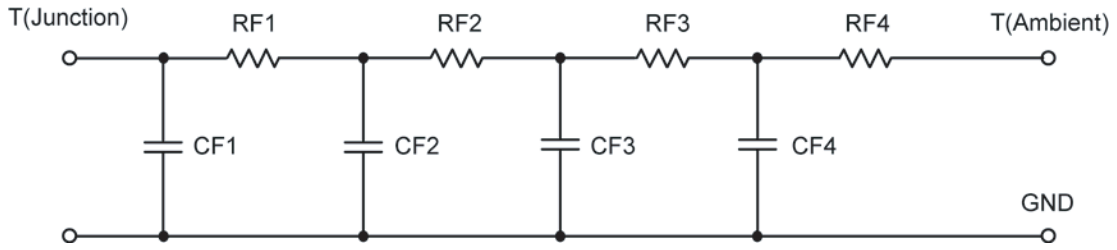
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.0431	N/A	20.8198
RT2	36.2823	N/A	8.7303
RT3	40.9801	N/A	13.5777
RT4	42.6945	N/A	36.8722
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	344.7325 u	N/A	1.5906 m
CT2	1.6867 m	N/A	256.0200 u
CT3	12.2042 m	N/A	105.2334 m
CT4	1.7808	N/A	3.7438 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

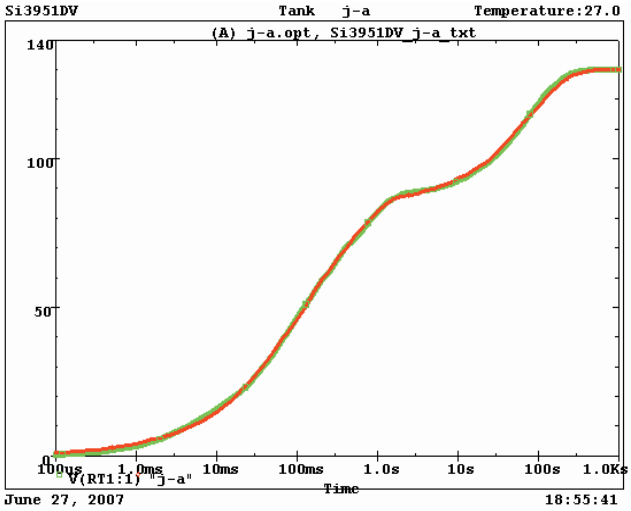


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.1179	N/A	15.1088
RF2	42.6402	N/A	38.3119
RF3	31.7098	N/A	17.3525
RF4	41.5321	N/A	9.2268
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	298.1541 u	N/A	228.1893 u
CF2	1.1656 m	N/A	1.2042 m
CF3	15.1240 m	N/A	7.5005 m
CF4	1.8297	N/A	181.0134 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


Si3951DV
Tank j-a
Temperature:27.0
(A) j-a.opt, Si3951DV_j-a_txt
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100
50
0
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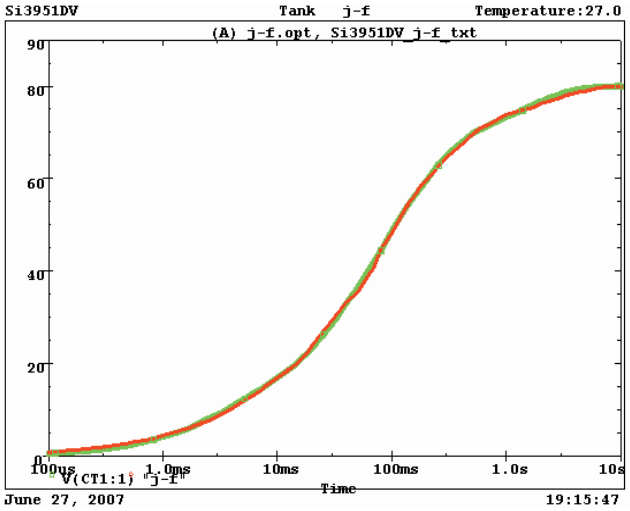
Time
June 27, 2007
18:55:41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Tank j-f
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60
40
20
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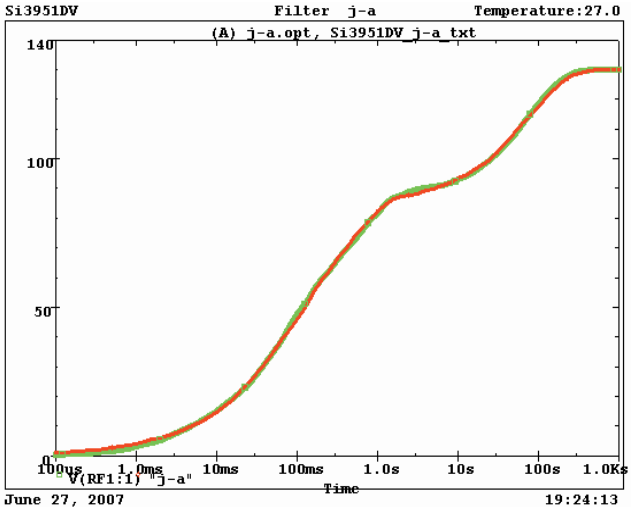
19:15:47


Si3951DV
Filter j-a
Temperature:27.0
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100
50
0
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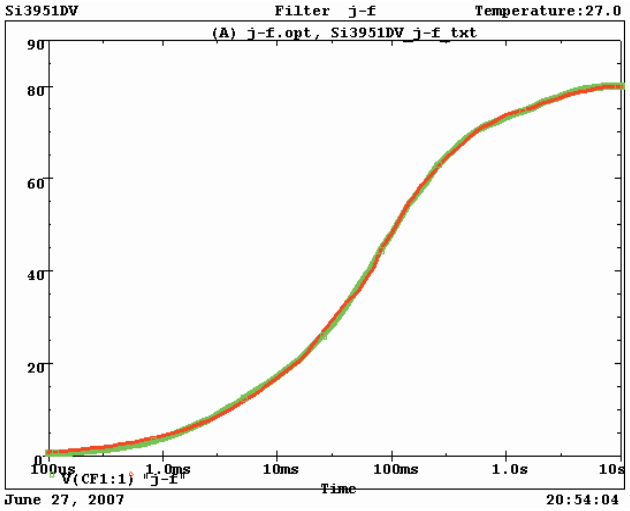
Si3951DV
Filter j-f
Temperature:27.0
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80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
June 27, 2007
20:54:04