R-C Thermal Model Parameters

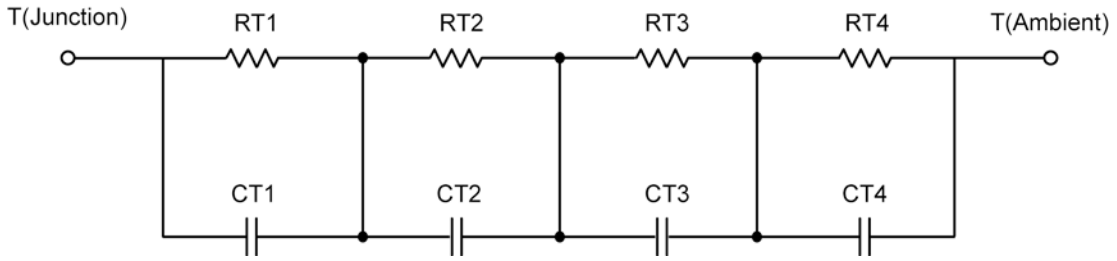
DESCRIPTION

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.

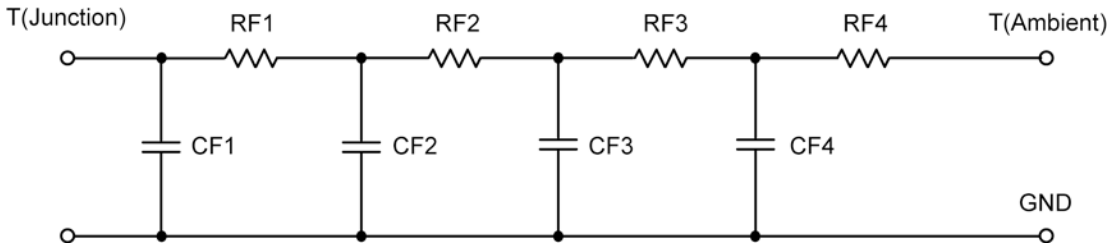
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	27.3321	N/A	5.9888
RT2	33.7861	N/A	22.2008
RT3	5.1992	N/A	4.8192
RT4	58.6826	N/A	11.9912
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.5578 m	N/A	275.9981 m
CT2	15.5673 m	N/A	3.0278 m
CT3	134.3328 u	N/A	157.2160 u
CT4	1.2909	N/A	1.2711 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

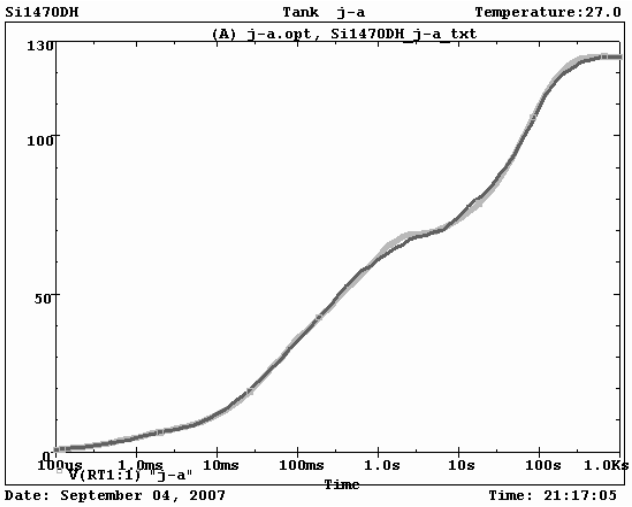


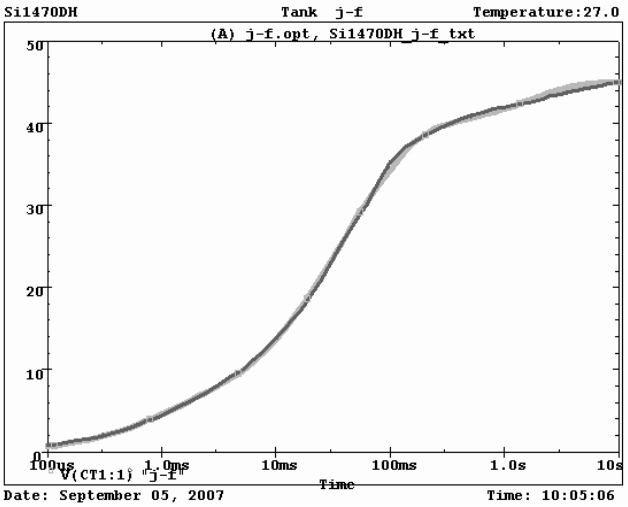
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.6775	N/A	9.2904
RF2	34.3901	N/A	23.1352
RF3	25.1235	N/A	7.6691
RF4	57.8089	N/A	4.9053
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	145.5501 u	N/A	178.4103 u
CF2	1.6120 m	N/A	1.1396 m
CF3	22.1179 m	N/A	8.5941 m
CF4	1.2737	N/A	403.3337 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


Si1470DH
Tank j-a
Temperature:27.0
(A) j-a.opt, Si1470DH_j-a_txt
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: September 04, 2007
Time: 21:17:05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Tank j-f
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40
30
20
10
0
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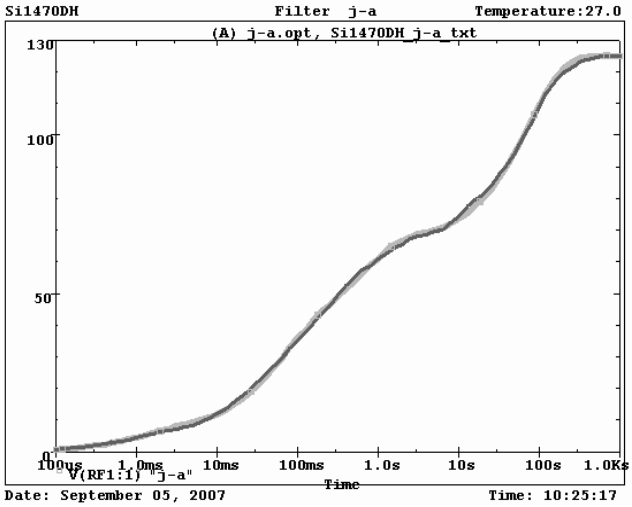
Time
Date: September 05, 2007
Time: 10:05:06


Si1470DH
Filter j-a
Temperature:27.0
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130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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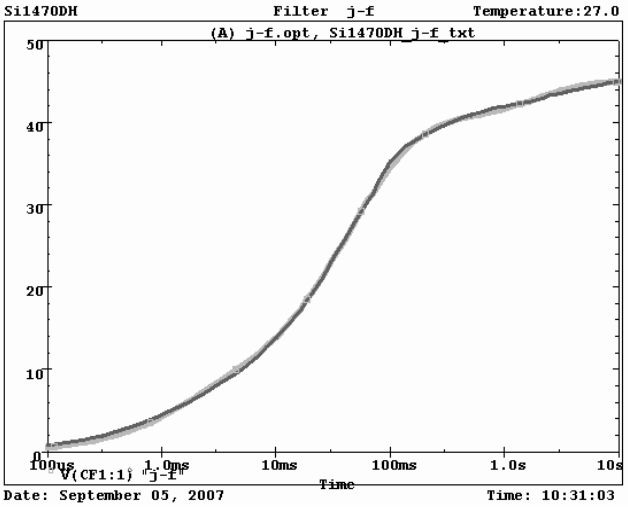
Time: 10:25:17


Si1470DH
Filter j-f
Temperature:27.0
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50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: September 05, 2007
Time: 10:31:03