R-C Thermal Model Parameters

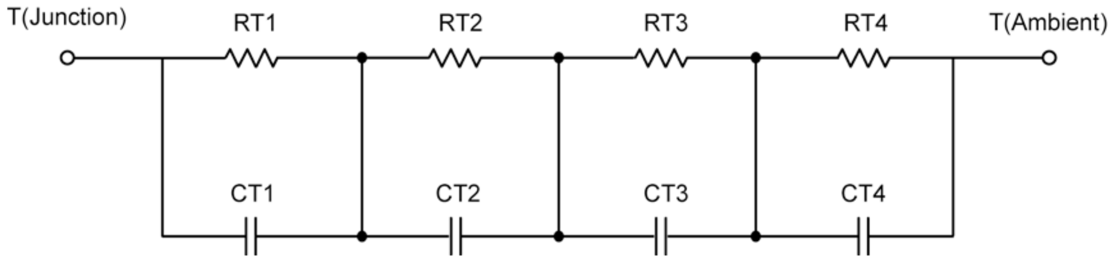
DESCRIPTION

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.

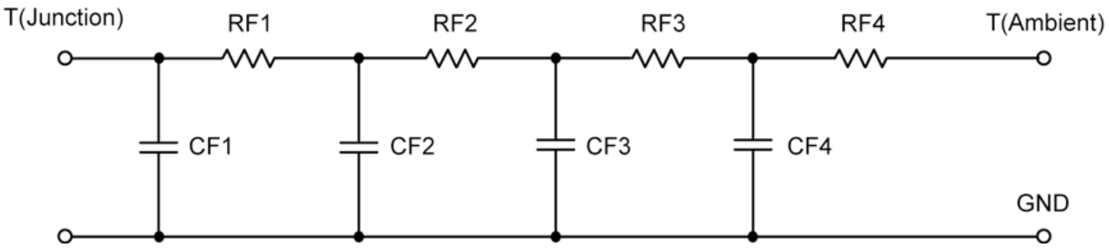
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	15.0476	N/A	13.0402
RT2	36.8637	N/A	2.3255
RT3	31.1373	N/A	14.0671
RT4	26.9514	N/A	12.5672
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.6070 m	N/A	9.6807 m
CT2	11.6735 m	N/A	789.9828 u
CT3	301.5099 m	N/A	2.8885 m
CT4	6.2978	N/A	47.4175 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



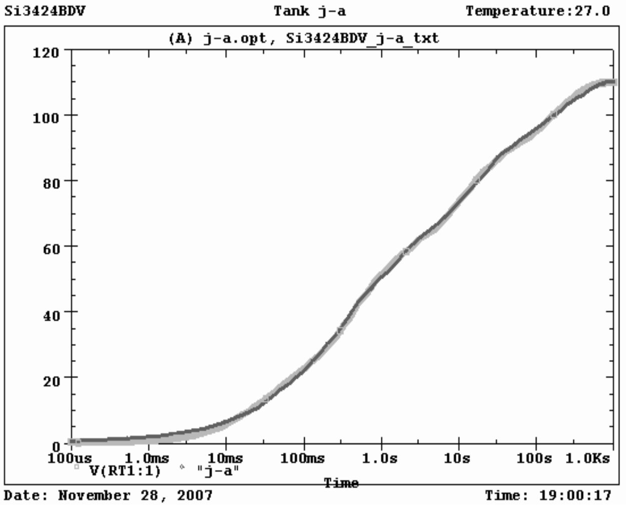
R-C VALUES FOR FILTER CONFIGURATION

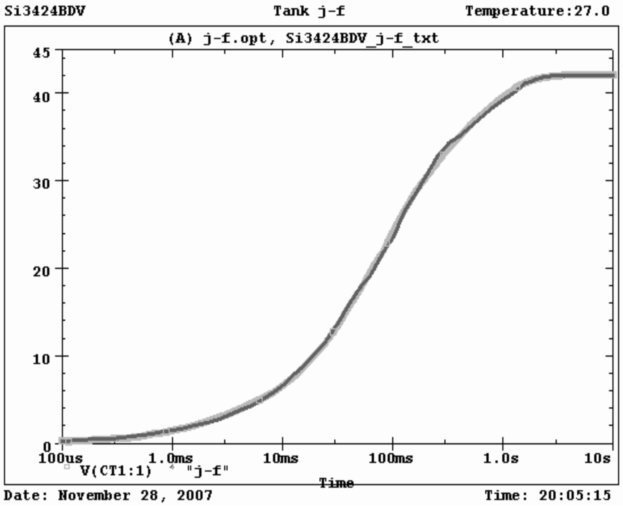
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	15.7004	N/A	8.1801
RF2	38.8091	N/A	18.3379
RF3	31.9389	N/A	7.1910
RF4	23.5516	N/A	8.2910
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.1519 m	N/A	798.6702 u
CF2	8.7934 m	N/A	2.3266 m
CF3	301.0265 m	N/A	4.7806 m
CF4	7.1625	N/A	73.3071 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


Si3424BDV
Tank j-a
Temperature:27.0
(A) j-a.opt, Si3424BDV_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: November 28, 2007
Time: 19:00:17


Si3424BDV
Tank j-f
Temperature:27.0
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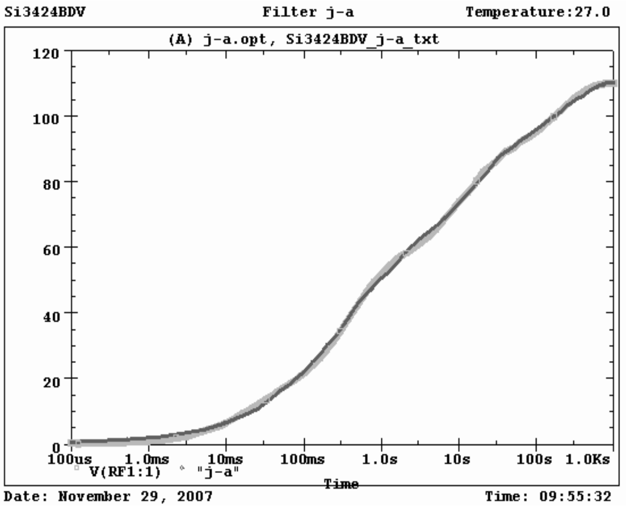
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"j-f"
Time
Date: November 28, 2007
Time: 20:05:15


Si3424BDV
Filter j-a
Temperature:27.0
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100
80
60
40
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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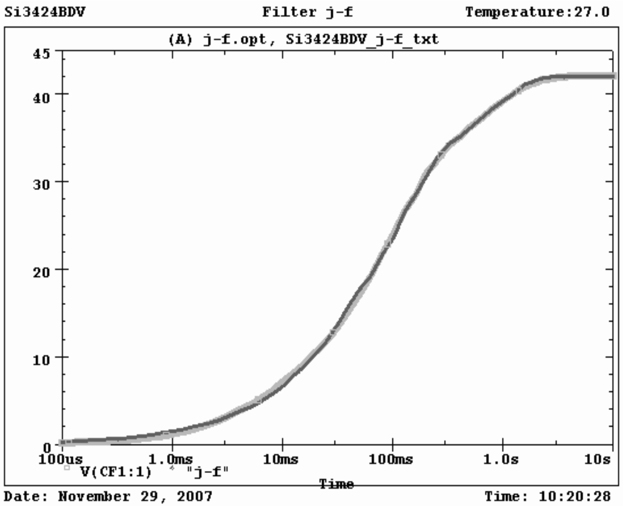
"j-a"
Time
Date: November 29, 2007
Time: 09:55:32


Si3424BDV
Filter j-f
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40
30
20
10
0
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1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: November 29, 2007
Time: 10:20:28