R-C Thermal Model Parameters

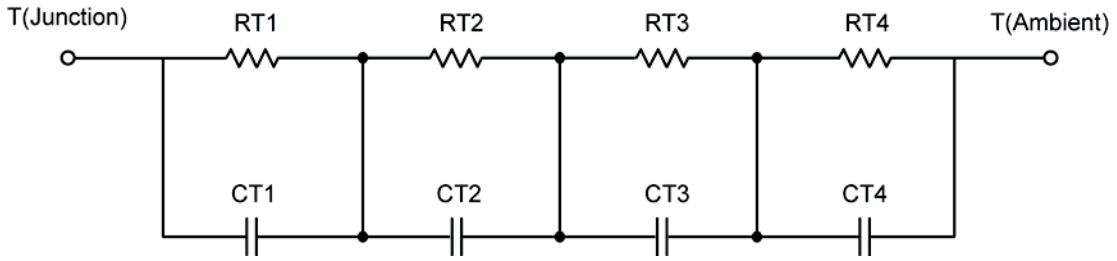
DESCRIPTION

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.

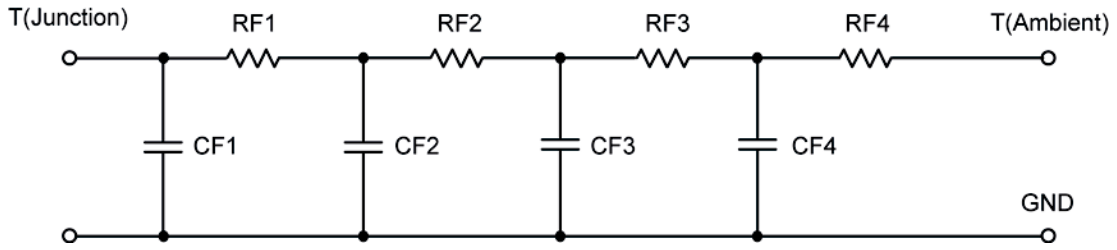
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	7.9474	N/A	3.9539
RT2	13.8948	N/A	3.0190
RT3	37.4396	N/A	16.9043
RT4	50.5626	N/A	15.0020
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.2868 m	N/A	8.3834 m
CT2	69.9427 m	N/A	308.0764 u
CT3	8.3291 m	N/A	14.4734 m
CT4	1.2354	N/A	4.1561 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

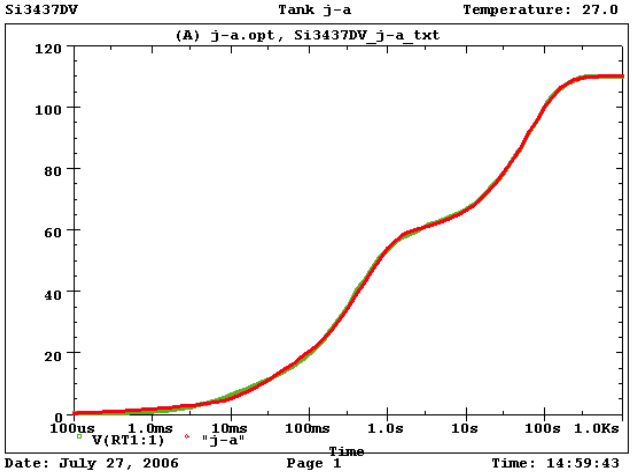


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.0037	N/A	4.7053
RF2	27.6645	N/A	13.9834
RF3	17.8069	N/A	13.7406
RF4	50.4668	N/A	6.5571
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.6258 m	N/A	433.9929 u
CF2	6.3373 m	N/A	2.1524 m
CF3	15.0498 m	N/A	626.8923 u
CF4	1.1715	N/A	48.0595 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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Tank j-a
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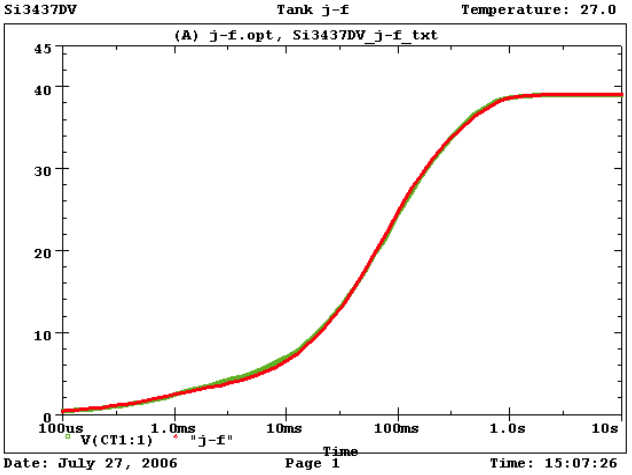
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: July 27, 2006
Page 1
Time: 14:59:43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20
10
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1.0ms
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1.0s
10s
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Time
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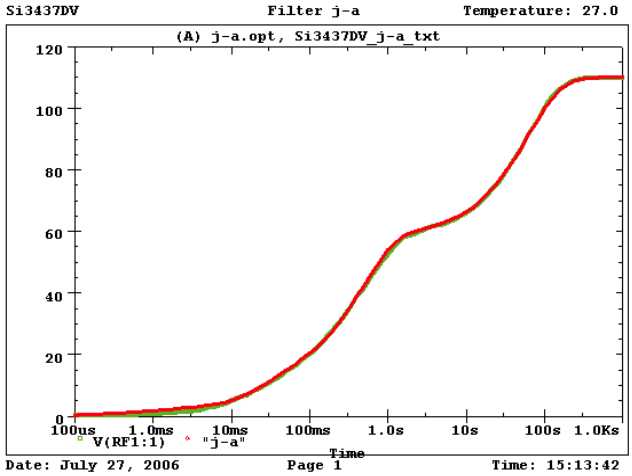
Time: 15:07:26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Filter j-a
Temperature: 27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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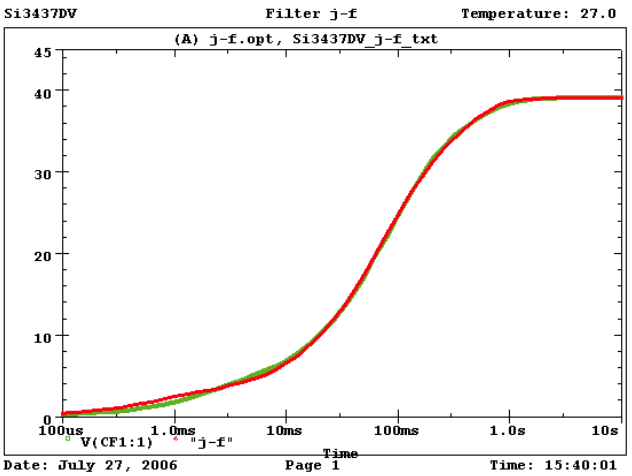
Time
Date: July 27, 2006
Page 1
Time: 15:13:42


Si3437DV
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
Date: July 27, 2006
Page 1
Time: 15:40:01