R-C Thermal Model Parameters

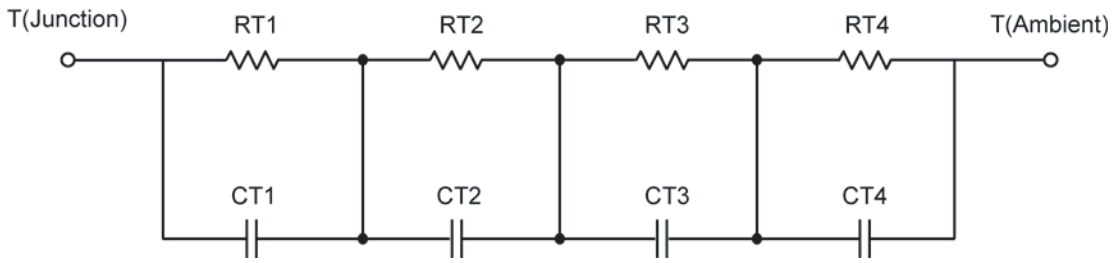
DESCRIPTION

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.

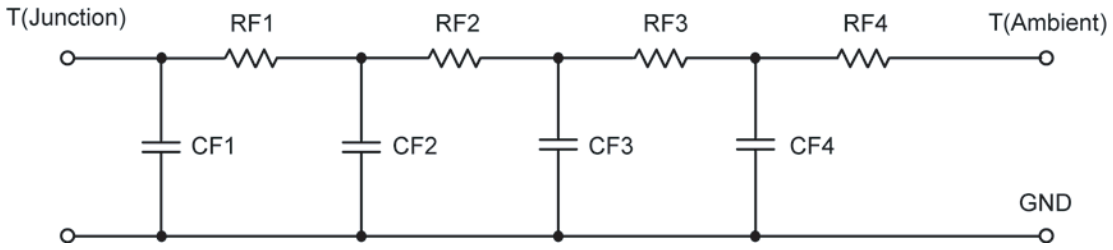
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.3312	N/A	8.6072
RT2	16.6030	N/A	1.1928
RT3	8.6883	N/A	3.2165
RT4	46.1721	N/A	6.9605
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	6.4860 m	N/A	2.9728 m
CT2	1.1631 m	N/A	736.7198 u
CT3	161.8455 m	N/A	13.6910 m
CT4	1.2554	N/A	3.4065 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

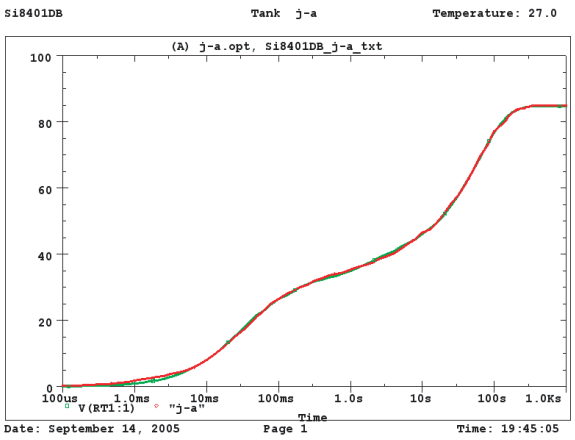


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	20.5538	N/A	2.5867
RF2	13.2427	N/A	7.6648
RF3	12.6238	N/A	7.3328
RF4	38.6222	N/A	2.4236
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	897.4162 u	N/A	482.4989 u
CF2	8.0389 m	N/A	958.4250 u
CF3	416.2893 m	N/A	222.3754 u
CF4	1.0958	N/A	2.0874 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
Temperature: 27.0
(A) j-a.opt, Si8401DB_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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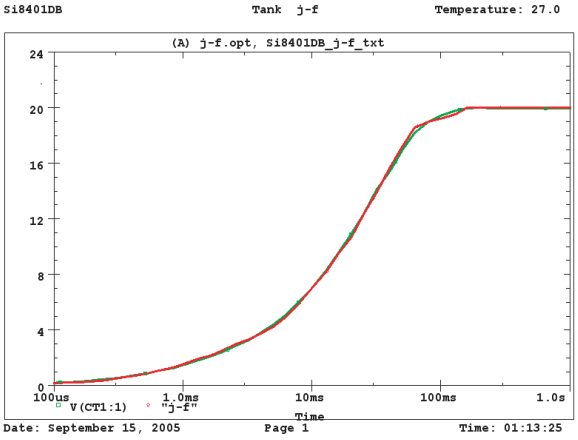
Time
Date: September 14, 2005
Page 1
Time: 19:45:05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20
16
12
8
4
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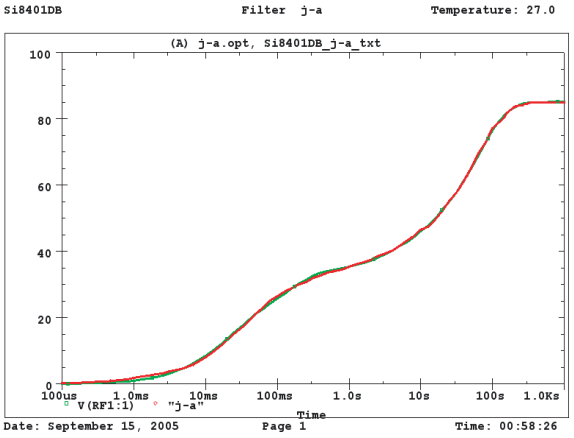
Time
Date: September 15, 2005
Page 1
Time: 01:13:25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Filter j-a
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60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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Time
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Page 1
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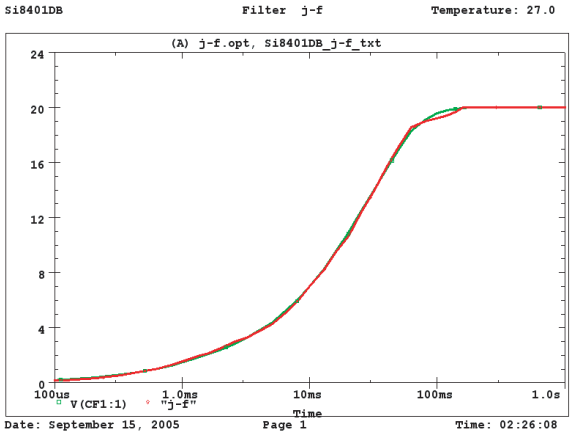
Si8401DB
Filter j-f
Temperature: 27.0
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20
16
12
8
4
0
100us 1.0ms 10ms 100ms 1.0s
V(CF1:1) "j-f"
Time
Date: September 15, 2005
Page 1
Time: 02:26:08