R-C Thermal Model Parameters

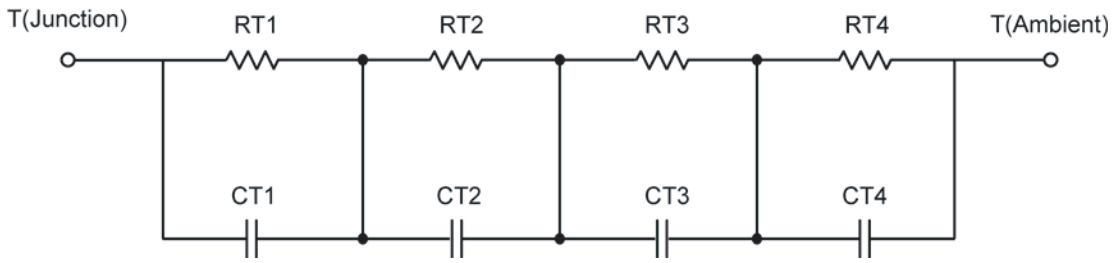
DESCRIPTION

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.

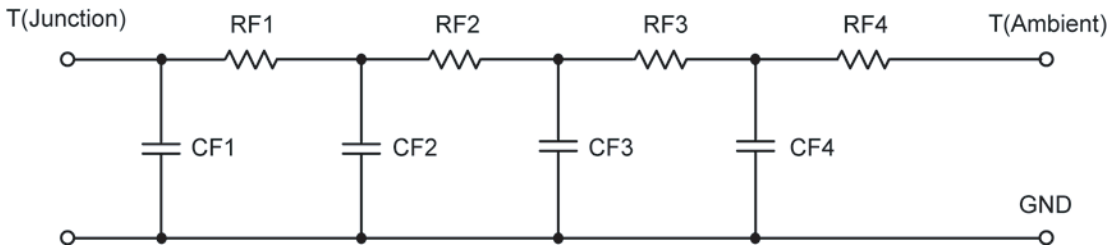
Note:
For a detailed explanation of implementing these values in P-SPICE, refer to Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform.

R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.6811	N/A	891.0972 m
RT2	22.4894	N/A	4.0712
RT3	38.0947	N/A	10.1982
RT4	14.3700	N/A	5.7147
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	4.7707 m	N/A	1.3179 m
CT2	35.3707 m	N/A	17.9042 m
CT3	2.0586	N/A	142.5083 m
CT4	300.2025 m	N/A	27.2660 m

R-C THERMAL MODEL FOR FILTER CONFIGURATION

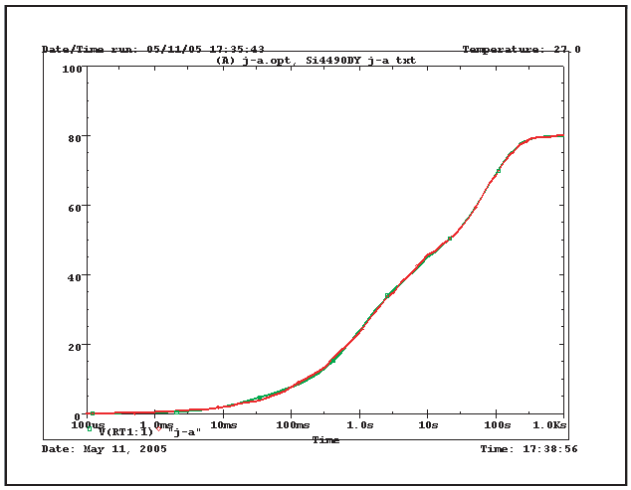


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.2689	N/A	925.9429 m
RF2	13.5460	N/A	8.5511
RF3	20.3323	N/A	6.4206
RF4	36.3667	N/A	5.0542
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.1986 m	N/A	769.4818 µ
CF2	23.1430 m	N/A	8.4844 m
CF3	73.9096 m	N/A	44.1144 m
CF4	1.9824	N/A	302.5240 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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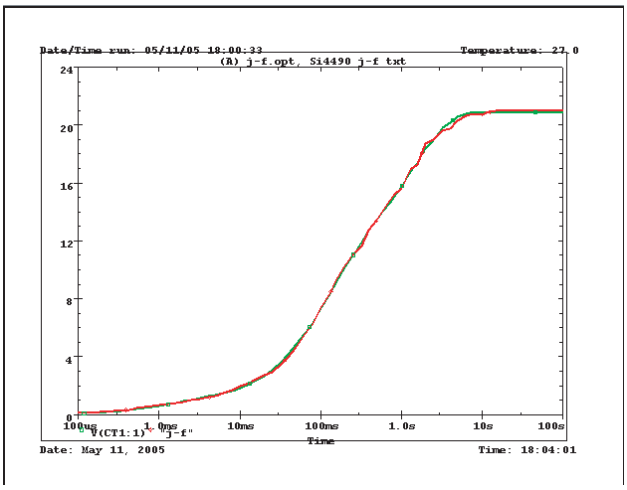
Temperature: 27.0
(A) j-a.opt, Si4490DY j-a.txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: May 11, 2005
Time: 17:38:56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20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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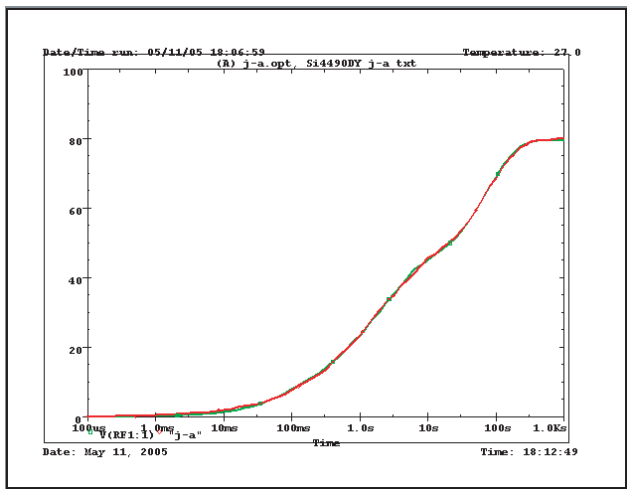
Time
Date: May 11, 2005
Time: 18:04:01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60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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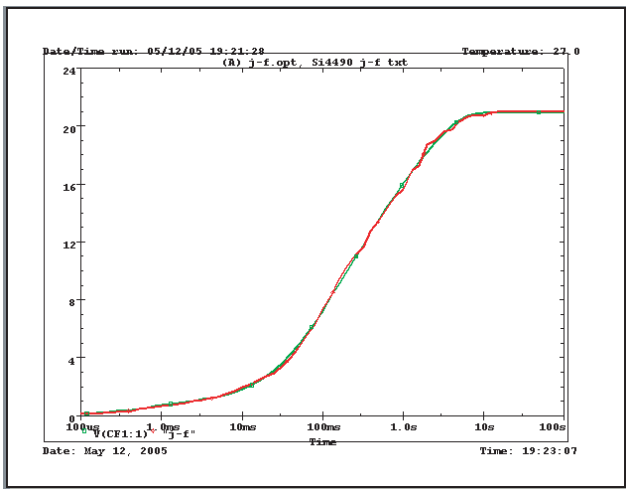
Time
Date: May 11, 2005
Time: 18:12:49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24
20
16
12
8
4
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: May 12, 2005
Time: 19:23:07