R-C Thermal Model Parameters

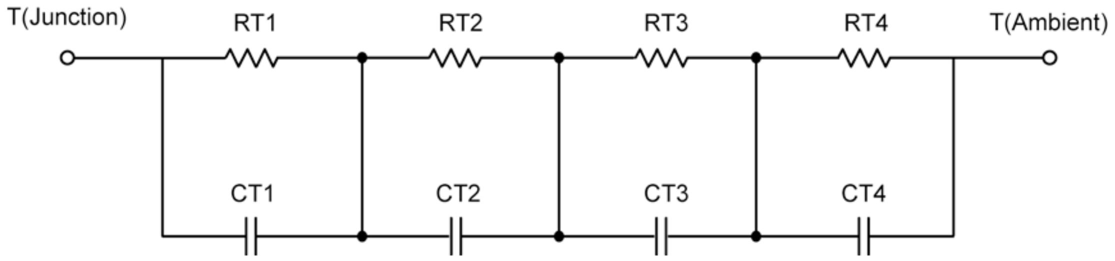
DESCRIPTION

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.

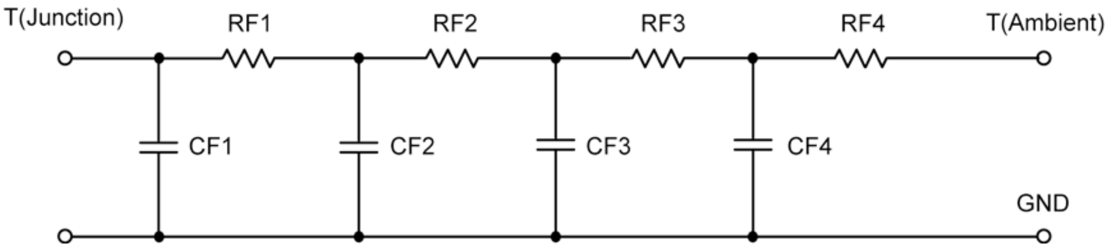
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
	Thermal Resistance (°C/W)		
Junction to	**Ambient**	**Case**	**Foot**
RT1	8.2427	294.2544 m	N/A
RT2	18.6995	2.0714	N/A
RT3	14.6088	215.6456 m	N/A
RT4	38.4490	5.5187	N/A
	Thermal Capacitance (Joules/°C)		
Junction to	**Ambient**	**Case**	**Foot**
CT1	190.9428 u	34.7275 m	N/A
CT2	7.8958 m	133.0633 u	N/A
CT3	544.9157 m	156.1653 m	N/A
CT4	2.5805	505.0581 u	N/A

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



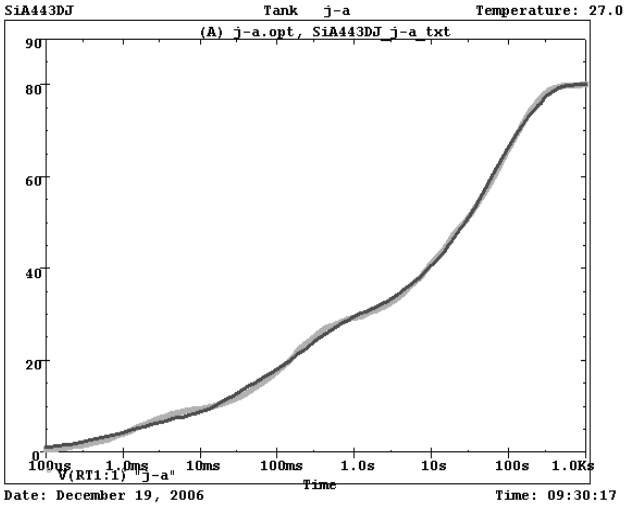
R-C VALUES FOR FILTER CONFIGURATION

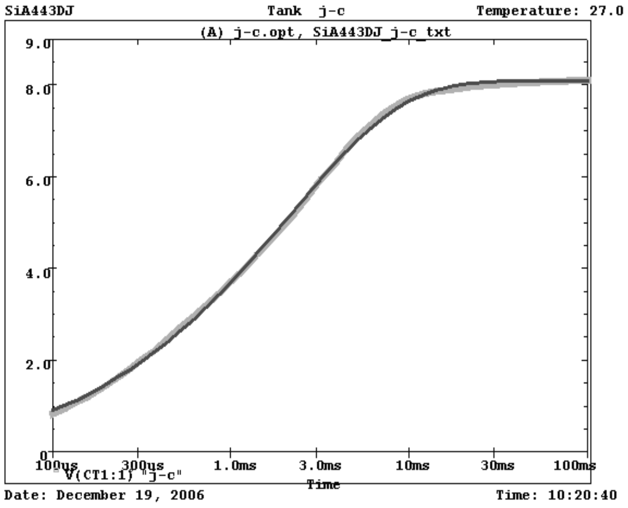
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.7733	3.2090	N/A
RF2	18.0803	4.5690	N/A
RF3	15.8789	259.5600 m	N/A
RF4	38.2675	62.4400 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	161.2678 u	104.1400 u	N/A
CF2	6.0545 m	488.8216 u	N/A
CF3	267.1137 m	71.1095 m	N/A
CF4	1.9957	13.6588 m	N/A

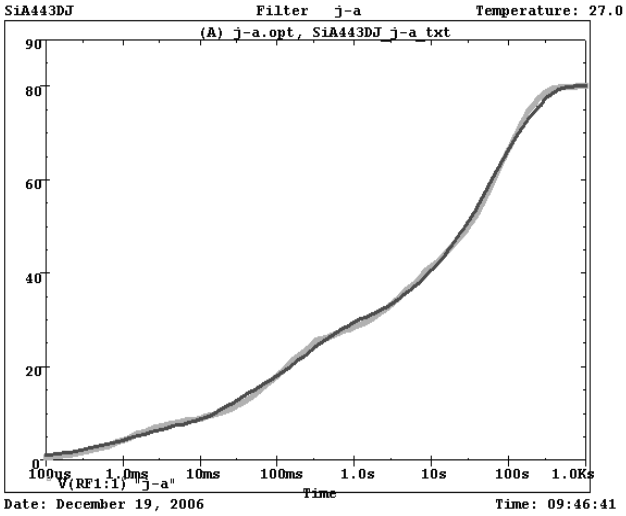
Note: NA indicates not applicable

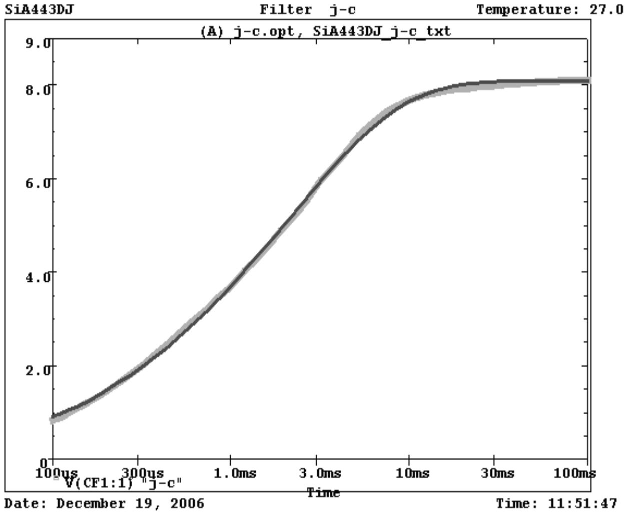
Reference:

[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya, IEEE / SEMITHERM 2002


SiA443DJ
Tank j-a
Temperature: 27.0
(A) j-a.opt, SiA443DJ_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: December 19, 2006
Time: 09:30:17


SiA443DJ
Tank j-c
Temperature: 27.0
(A) j-c.opt, SiA443DJ_j-c_txt
9.0
8.0
6.0
4.0
2.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1) "j-c"
Time
Date: December 19, 2006
Time: 10:20:40


SiA443DJ
Filter j-a
Temperature: 27.0
(A) j-a.opt, SiA443DJ_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: December 19, 2006
Time: 09:46:41


SiA443DJ
Filter j-c
Temperature: 27.0
(A) j-c.opt, SiA443DJ_j-c_txt
9.0
8.0
6.0
4.0
2.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1) "j-c"
Time
Date: December 19, 2006
Time: 11:51:47