R-C Thermal Model Parameters

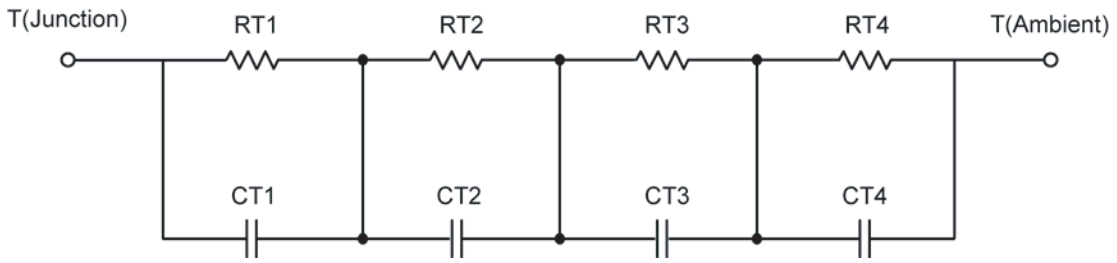
DESCRIPTION

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.

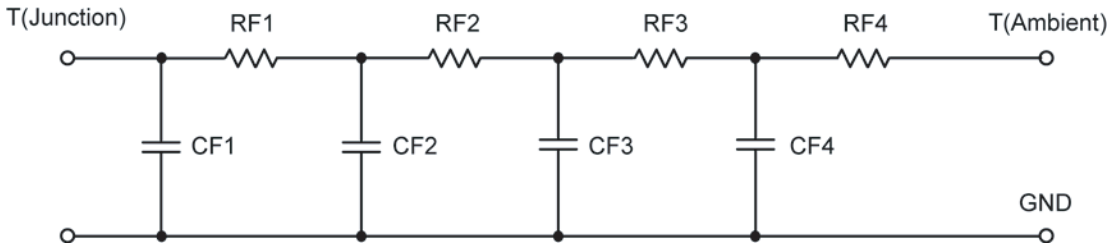
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.9649	N/A	4.0988
RT2	21.2681	N/A	4.3972
RT3	8.2475	N/A	8.9214
RT4	54.5195	N/A	2.5826
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	3.0753 m	N/A	25.7953 m
CT2	38.2529 m	N/A	22.9326 m
CT3	583.3595 m	N/A	139.1862 m
CT4	1.5751	N/A	1.3664 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

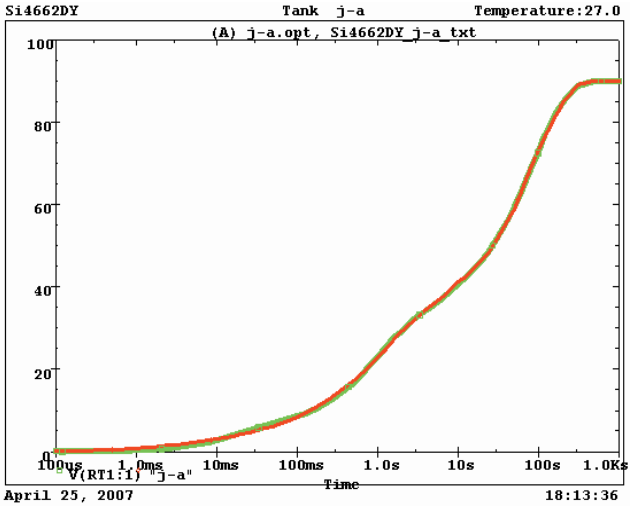


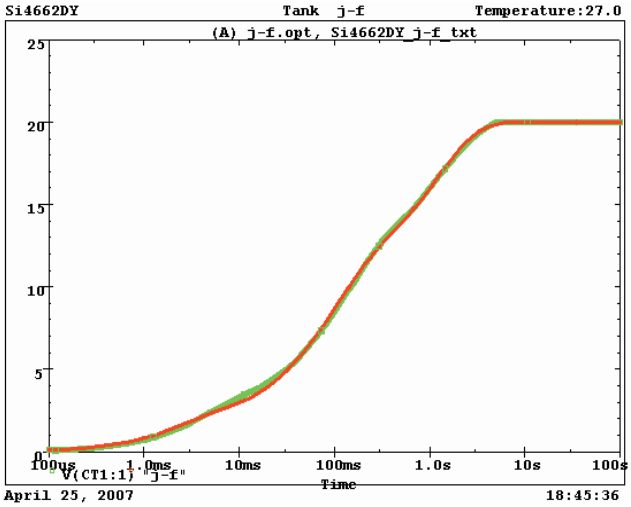
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.7136	N/A	3.0189
RF2	23.8338	N/A	7.5248
RF3	14.5321	N/A	4.9225
RF4	44.9205	N/A	4.5338
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.6616 m	N/A	1.2852 m
CF2	31.8442 m	N/A	8.4776 m
CF3	505.2645 m	N/A	54.4991 m
CF4	1.3716	N/A	191.5966 m

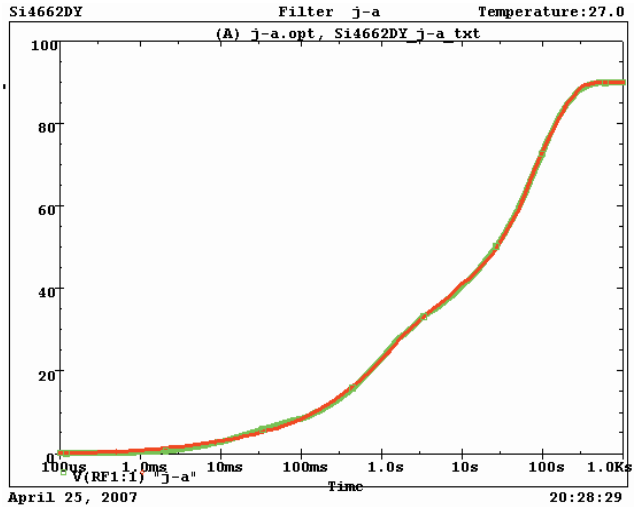
Note: NA indicates not applicable

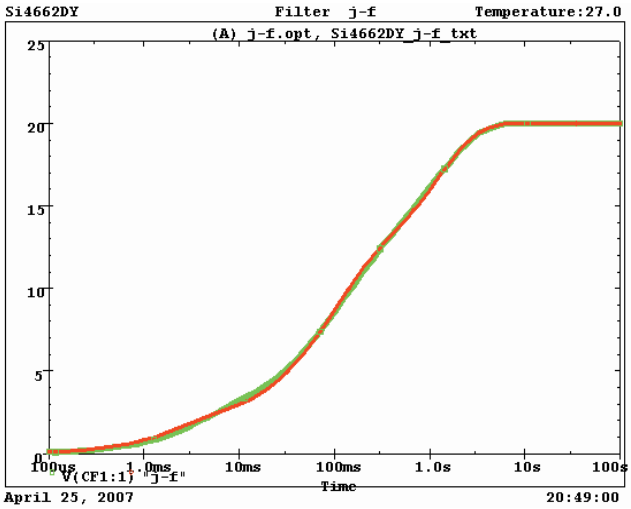
Reference:

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


Si4662DY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4662DY_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
April 25, 2007
18:13:36


Si4662DY
Tank j-f
Temperature:27.0
(A) j-f.opt, Si4662DY_j-f_txt
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1) "j-f"
Time
April 25, 2007
18:45:36


Si4662DY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4662DY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
April 25, 2007
20:28:29


Si4662DY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4662DY_j-f_txt
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
April 25, 2007
20:49:00