R-C Thermal Model Parameters

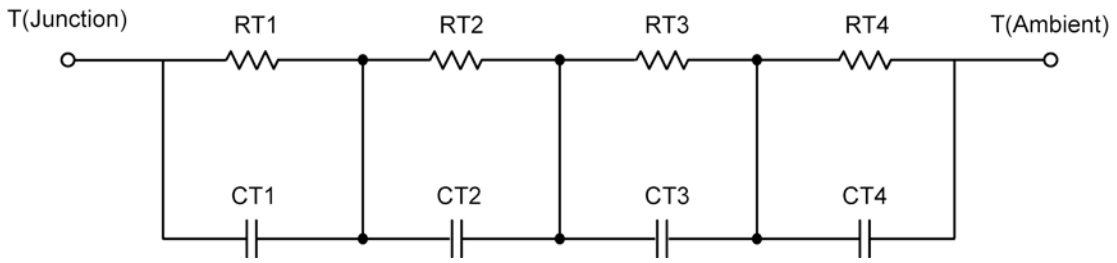
DESCRIPTION

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.

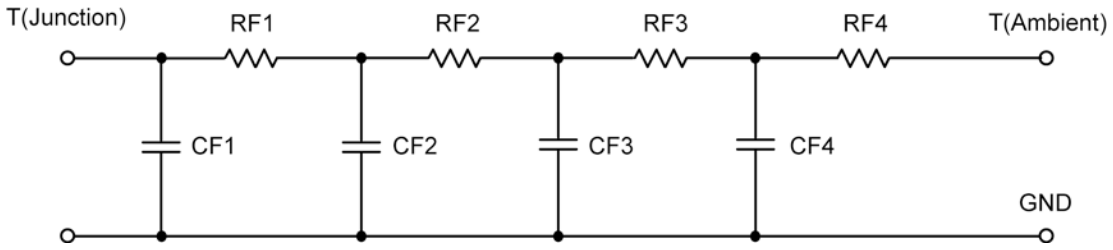
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	1.2249	372.5499 m	N/A
RT2	4.7488	264.1711 m	N/A
RT3	7.1836	175.7637 m	N/A
RT4	36.8427	287.5153 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.3735 m	42.1826 m	N/A
CT2	33.5184 m	2.2347 m	N/A
CT3	270.6510 m	91.3125 m	N/A
CT4	1.0212	337.2429 m	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

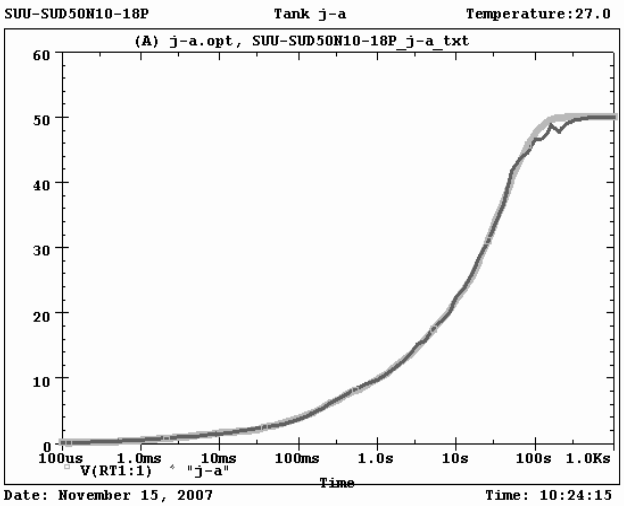


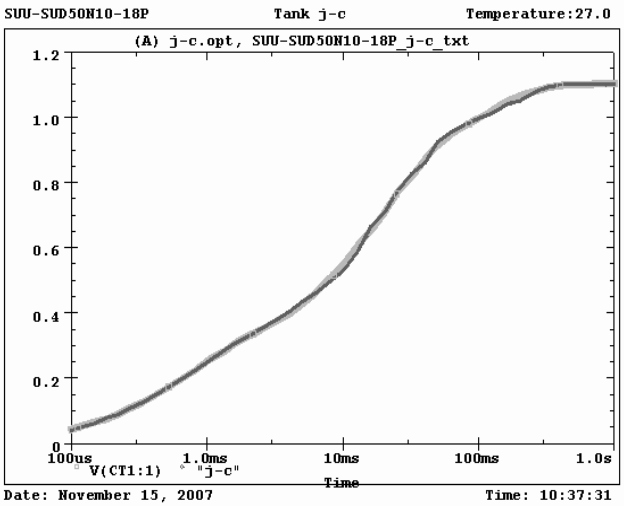
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.5435	304.7693 m	N/A
RF2	7.1618	241.3554 m	N/A
RF3	13.1748	369.1422 m	N/A
RF4	28.1199	184.7331 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.9557 m	1.9192 m	N/A
CF2	32.8259 m	25.9373 m	N/A
CF3	315.1800 m	1.1878 m	N/A
CF4	1.0357	510.4395 m	N/A

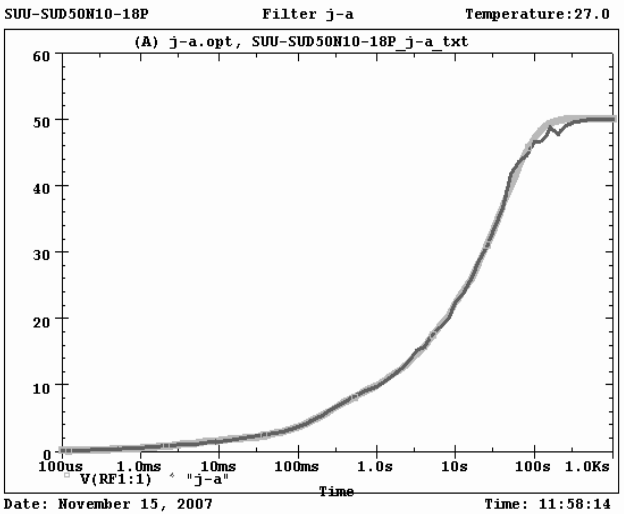
Note: NA indicates not applicable

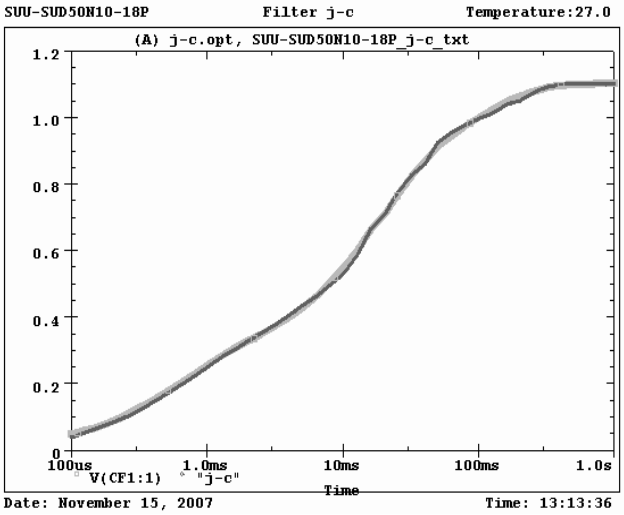
Reference:

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


SUU-SUD50N10-18P
Tank j-a
Temperature:27.0
(A) j-a.opt, SUU-SUD50N10-18P_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: November 15, 2007
Time: 10:24:15


SUU-SUD50N10-18P
Tank j-c
Temperature:27.0
(A) j-c.opt, SUU-SUD50N10-18P_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date: November 15, 2007
Time: 10:37:31


SUU-SUD50N10-18P
Filter j-a
Temperature:27.0
(A) j-a.opt, SUU-SUD50N10-18P_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: November 15, 2007
Time: 11:58:14


SUU-SUD50N10-18P
Filter j-c
Temperature:27.0
(A) j-c.opt, SUU-SUD50N10-18P_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date: November 15, 2007
Time: 13:13:36