R-C Thermal Model Parameters

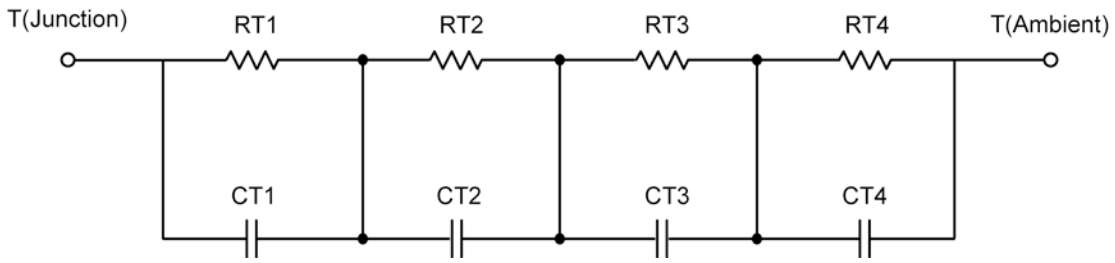
DESCRIPTION

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.

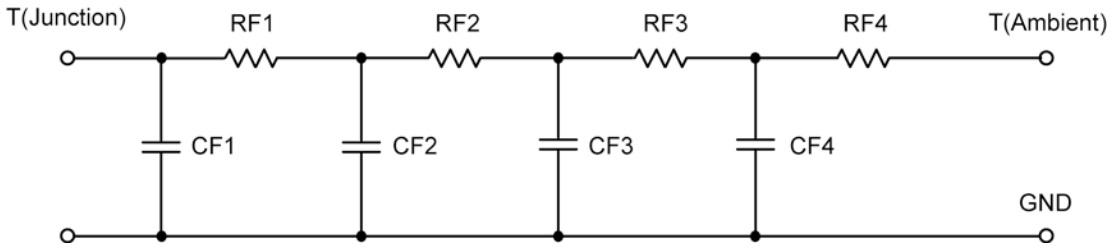
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	19.4441	259.8443 m	N/A
RT2	1.6506	237.0984 m	N/A
RT3	5.0732	469.6874 m	N/A
RT4	13.8321	133.3699 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.6868	31.6726 m	N/A
CT2	24.8303 m	2.1850 m	N/A
CT3	361.6781 m	69.8366 m	N/A
CT4	18.4117	2.0158	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

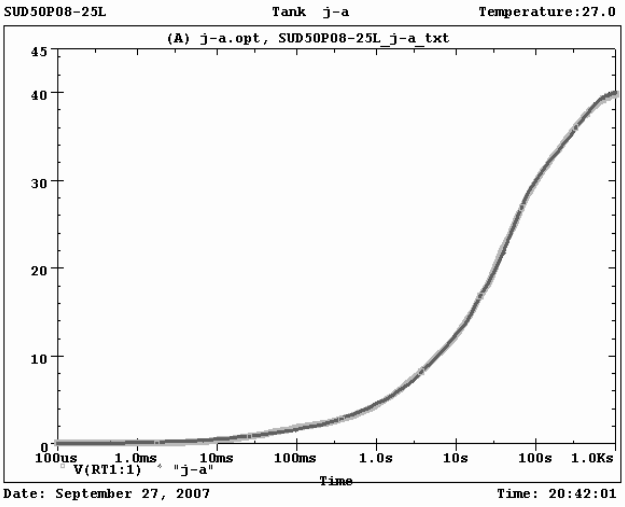


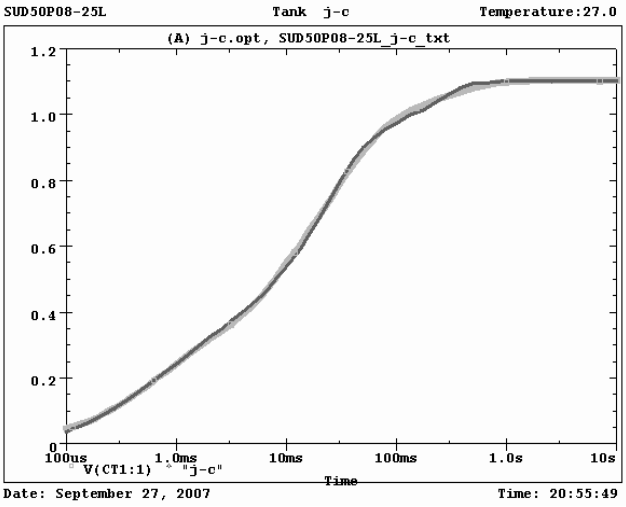
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.9226	347.3382 m	N/A
RF2	6.9952	333.2429 m	N/A
RF3	20.0771	245.6366 m	N/A
RF4	11.0051	173.7823 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	23.2658 m	2.3954 m	N/A
CF2	266.8287 m	31.7788 m	N/A
CF3	1.3332	940.9257 u	N/A
CF4	19.6287	1.0566	N/A

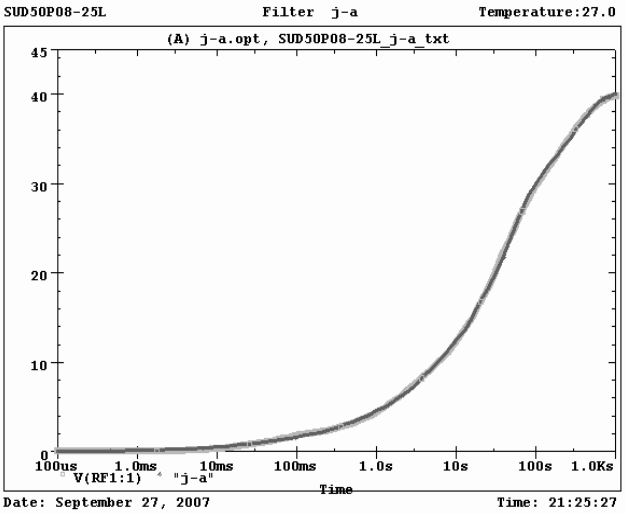
Note: NA indicates not applicable

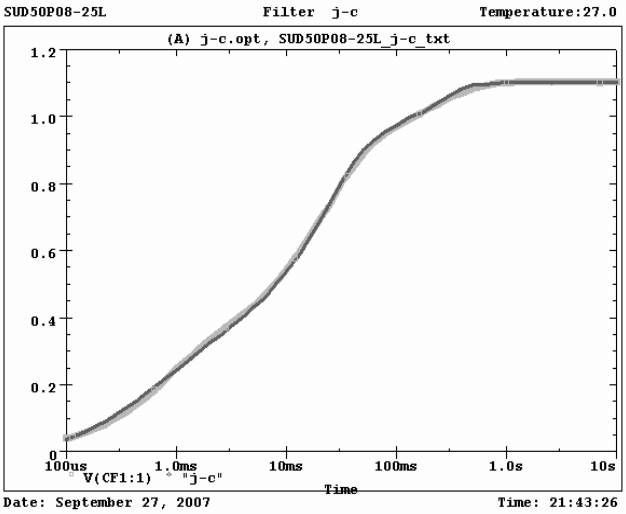
Reference:

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


SUD50P08-25L
Tank j-a
Temperature:27.0
(A) j-a.opt, SUD50P08-25L_j-a_txt
45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: September 27, 2007
Time: 20:42:01


SUD50P08-25L
Tank j-c
Temperature:27.0
(A) j-c.opt, SUD50P08-25L_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1) "j-c"
Time
Date: September 27, 2007
Time: 20:55:49


SUD50P08-25L
Filter j-a
Temperature:27.0
(A) j-a.opt, SUD50P08-25L_j-a_txt
45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: September 27, 2007
Time: 21:25:27


SUD50P08-25L
Filter j-c
Temperature:27.0
(A) j-c.opt, SUD50P08-25L_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-c"
Time
Date: September 27, 2007
Time: 21:43:26