R-C Thermal Model Parameters

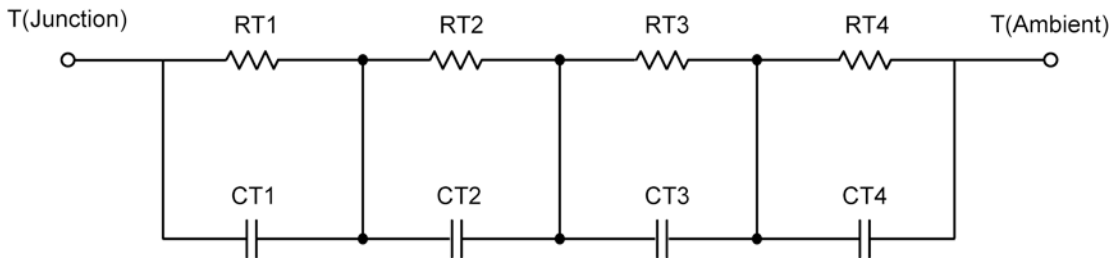
DESCRIPTION

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.

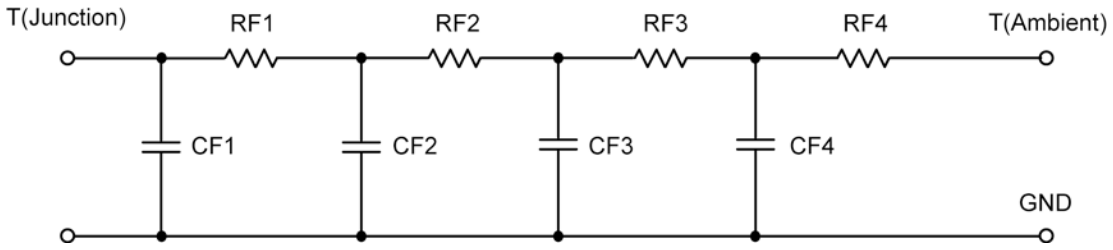
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	31.5841	69.0737 m	N/A
RT2	736.5000 m	132.9812 m	N/A
RT3	2.9311	149.4828 m	N/A
RT4	4.7483	148.4623 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.8728	11.4355 m	N/A
CT2	200.9925 m	512.4947 m	N/A
CT3	730.7719 m	68.1290 m	N/A
CT4	26.2971	239.9071 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

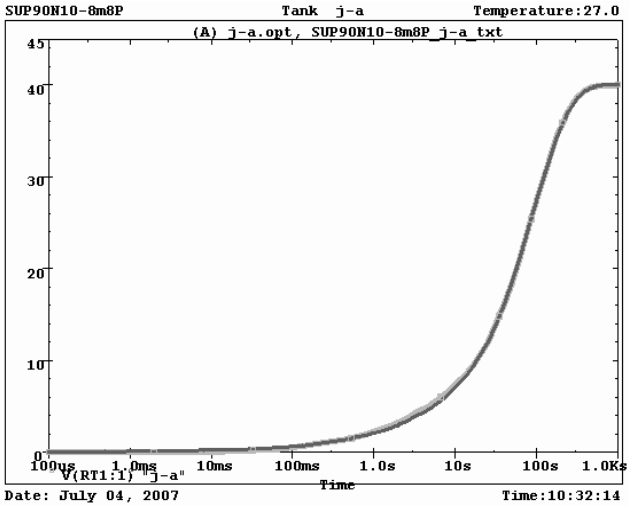


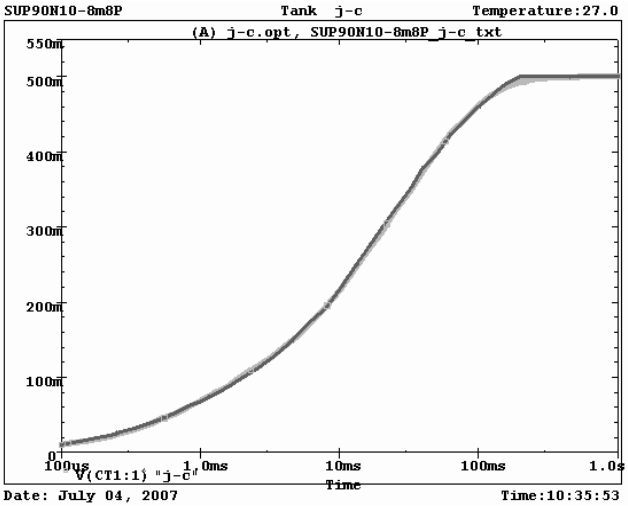
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	643.7000 m	108.9512 m	N/A
RF2	3.9845	15.2516 m	N/A
RF3	16.3586	254.3985 m	N/A
RF4	19.0132	121.3987 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	36.1175 m	10.3809 m	N/A
CF2	468.1577 m	22.6075 m	N/A
CF3	1.9545	25.6998 m	N/A
CF4	628.5618 m	435.3431 m	N/A

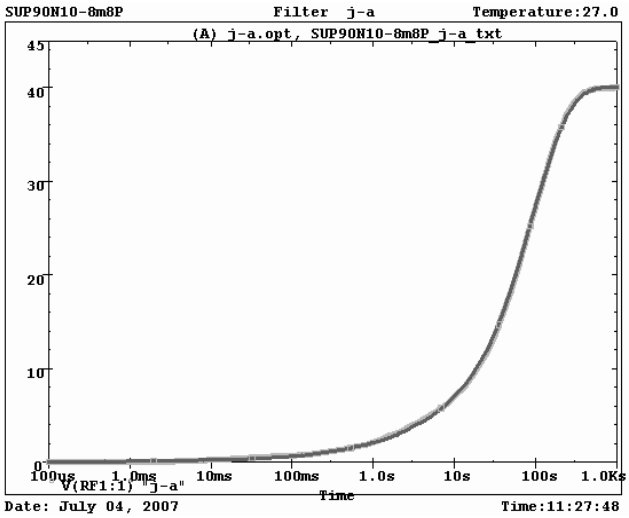
Note: NA indicates not applicable

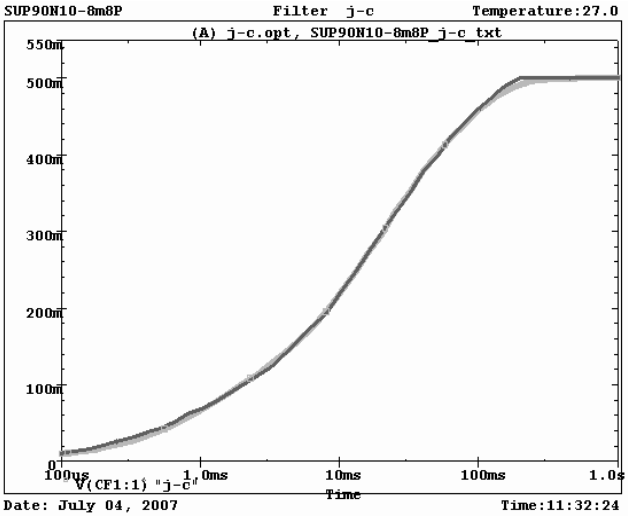
Reference:

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


SUP90N10-8m8P
Tank j-a
Temperature:27.0
(A) j-a.opt, SUP90N10-8m8P_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: July 04, 2007
Time:10:32:14


SUP90N10-8m8P
Tank j-c
Temperature:27.0
(A) j-c.opt, SUP90N10-8m8P_j-c_txt
550m
500m
400m
300m
200m
100m
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1) "j-c"
Time
Date: July 04, 2007
Time:10:35:53


SUP90N10-8m8P
Filter j-a
Temperature:27.0
(A) j-a.opt, SUP90N10-8m8P_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: July 04, 2007
Time:11:27:48


SUP90N10-8m8P
Filter j-c
Temperature:27.0
(A) j-c.opt, SUP90N10-8m8P_j-c_txt
550m
500m
400m
300m
200m
100m
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1) "j-c"
Time
Date: July 04, 2007
Time:11:32:24