R-C Thermal Model Parameters

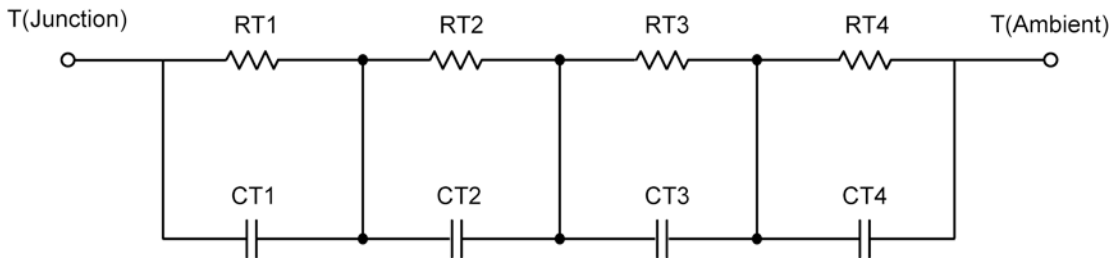
DESCRIPTION

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.

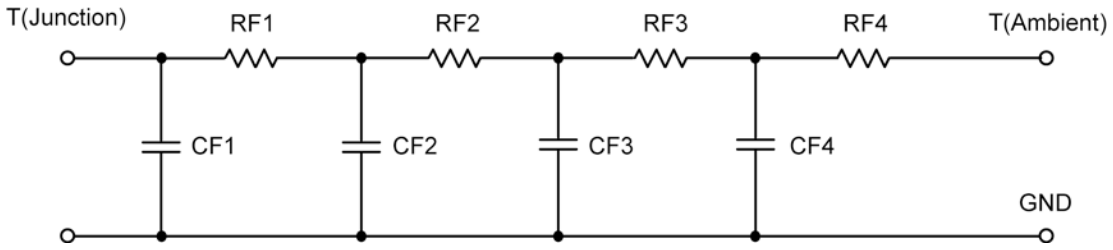
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	992.6000 m	93.9290 m	N/A
RT2	2.6998	173.8834 m	N/A
RT3	10.1707	86.9621 m	N/A
RT4	26.1369	45.2255 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	356.5717 m	5.1600 m	N/A
CT2	1.1724	8.4852 m	N/A
CT3	12.2160	67.7729 m	N/A
CT4	3.2766	300.2018 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

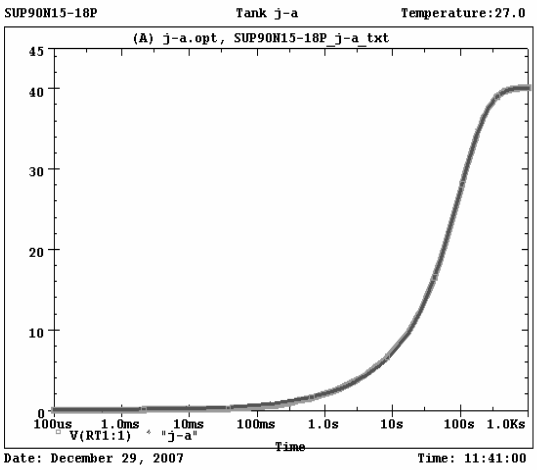


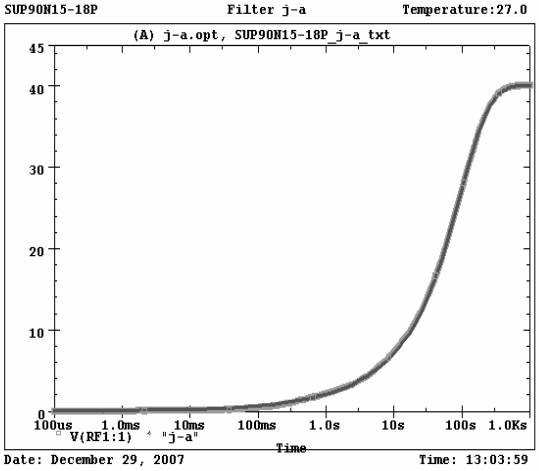
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.9657	46.9586 m	N/A
RF2	7.0669	199.1931 m	N/A
RF3	25.7046	55.9628 m	N/A
RF4	5.2628	97.8855 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	195.1037 m	2.1953 m	N/A
CF2	929.6338 m	1.2938 m	N/A
CF3	1.8530	19.0286 m	N/A
CF4	92.8485 m	26.1317 m	N/A

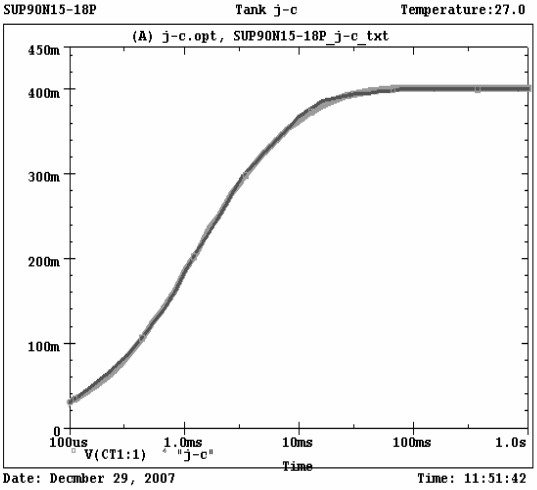
Note: NA indicates not applicable

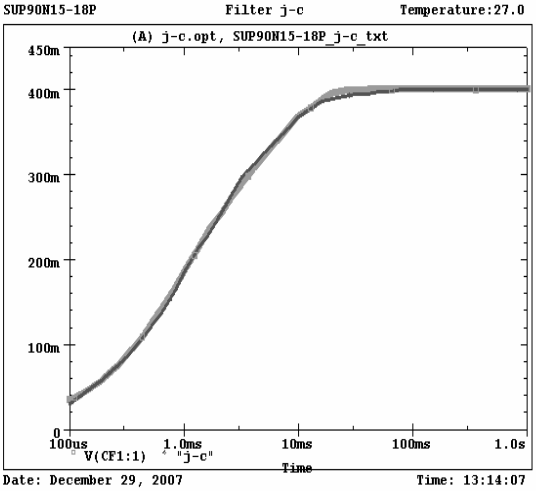
Reference:

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


SUP90N15-18P
Tank j-a
Temperature:27.0
(A) j-a.opt, SUP90N15-18P_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: December 29, 2007
Time: 11:41:00


SUP90N15-18P
Filter j-a
Temperature:27.0
(A) j-a.opt, SUP90N15-18P_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: December 29, 2007
Time: 13:03:59


SUP90N15-18P
Tank j-c
Temperature:27.0
(A) j-c.opt, SUP90N15-18P_j-c_txt
450m
400m
300m
200m
100m
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date: Decmber 29, 2007
Time: 11:51:42


SUP90N15-18P
Filter j-c
Temperature:27.0
(A) j-c.opt, SUP90N15-18P_j-c_txt
450m
400m
300m
200m
100m
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date: December 29, 2007
Time: 13:14:07