R-C Thermal Model Parameters

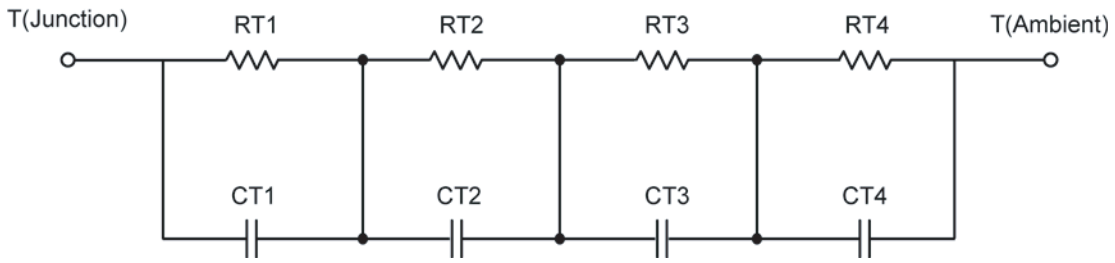
DESCRIPTION

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.

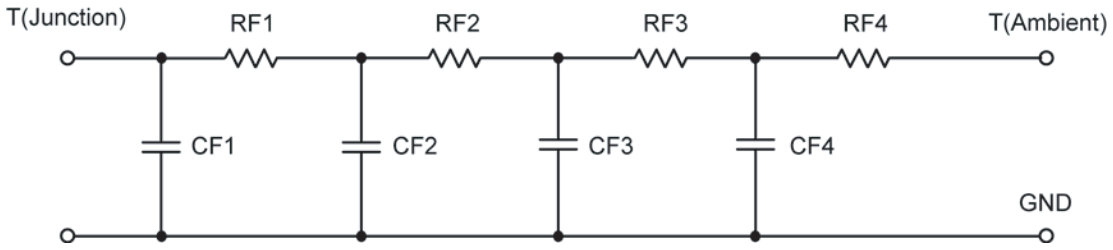
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	20.0466	151.1131 m	N/A
RT2	6.1037	16.3308 m	N/A
RT3	28.4278	1.4110	N/A
RT4	26.3760	4.7567	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	42.5777 m	2.9710 u	N/A
CT2	10.5522 m	649.1179 m	N/A
CT3	455.9951 m	474.6372 u	N/A
CT4	3.0291	2.7428 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

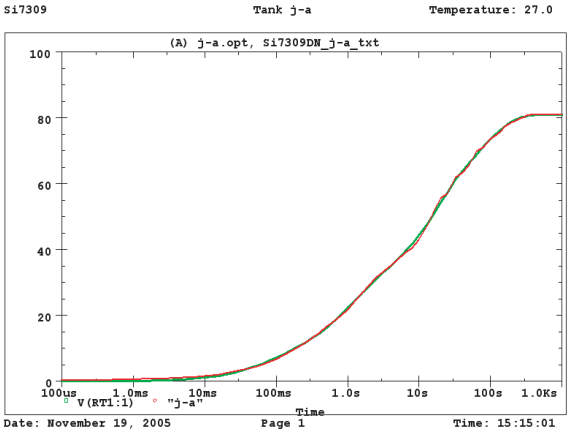


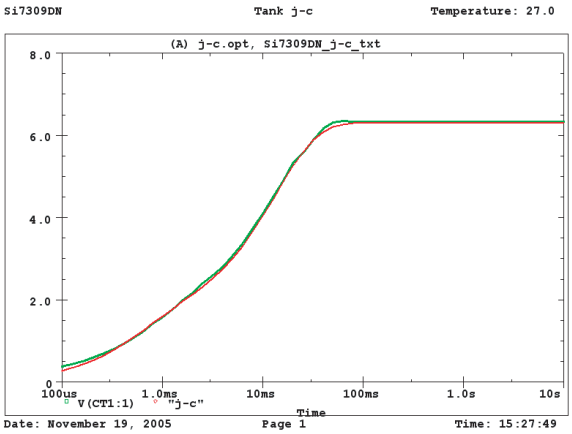
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.4462	2.0317	N/A
RF2	22.3086	1.5447	N/A
RF3	32.3300	1.6868	N/A
RF4	17.8990	1.0327	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.4209 m	366.1827 u	N/A
CF2	32.6110 m	1.9491 m	N/A
CF3	404.0912 m	1.5414 m	N/A
CF4	3.9829	3.9366 m	N/A

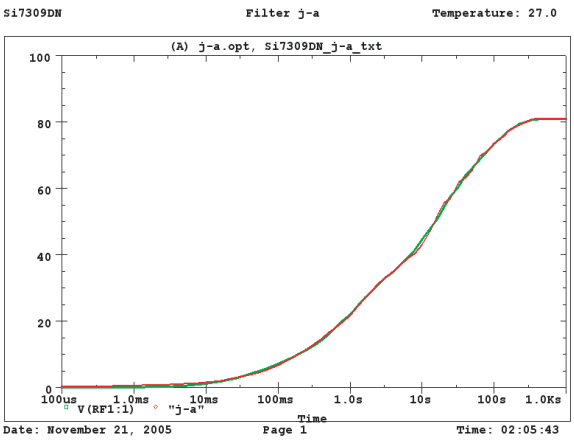
Note: NA indicates not applicable

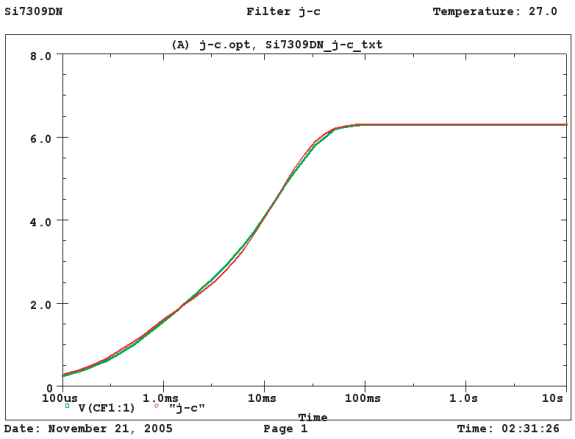
Reference:

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


Si7309
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7309DN_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
Date: November 19, 2005
Page 1
Time: 15:15:01


Si7309DN
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si7309DN_j-c_txt
8.0
6.0
4.0
2.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"j-c"
Time
Date: November 19, 2005
Page 1
Time: 15:27:49


Si7309DN
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7309DN_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
Date: November 21, 2005
Page 1
Time: 02:05:43


Si7309DN
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7309DN_j-c_txt
8.0
6.0
4.0
2.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-c"
Time
Date: November 21, 2005
Page 1
Time: 02:31:26