R-C Thermal Model Parameters

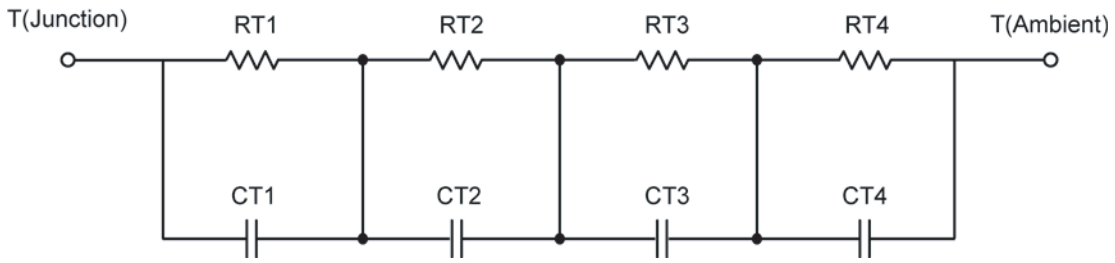
DESCRIPTION

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.

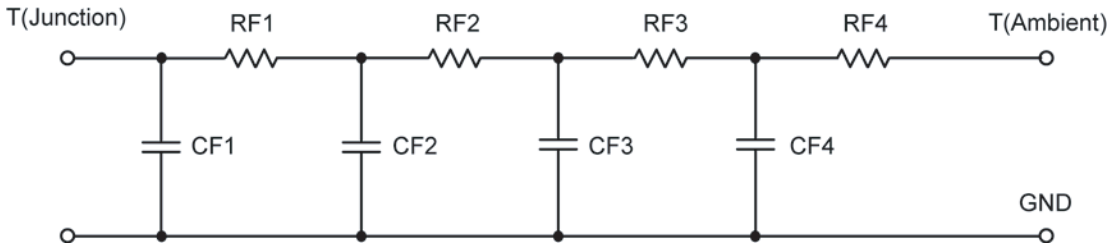
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	1.7305	15.4007 m	N/A
RT2	11.6637	258.3547 m	N/A
RT3	8.7674	507.3918 m	N/A
RT4	42.3811	720.4557 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	3.4792 m	18.7014 µ	N/A
CT2	600.5512 m	5.2493 m	N/A
CT3	58.3266 m	77.4502 m	N/A
CT4	1.8962	51.9432 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

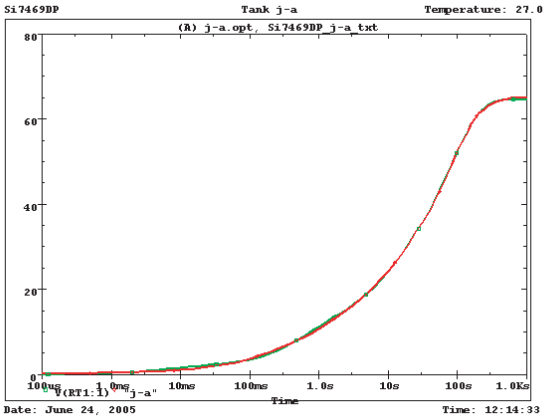


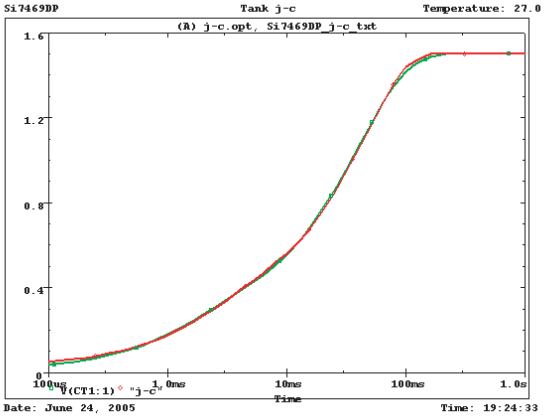
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.9820	26.6223 m	N/A
RF2	8.4966	339.6323 m	N/A
RF3	16.5738	375.4330 m	N/A
RF4	36.6392	763.8146 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.7985 m	959.7747 µ	N/A
CF2	39.7251 m	3.6157 m	N/A
CF3	355.3409 m	29.0619 m	N/A
CF4	1.7130	5.8830 µ	N/A

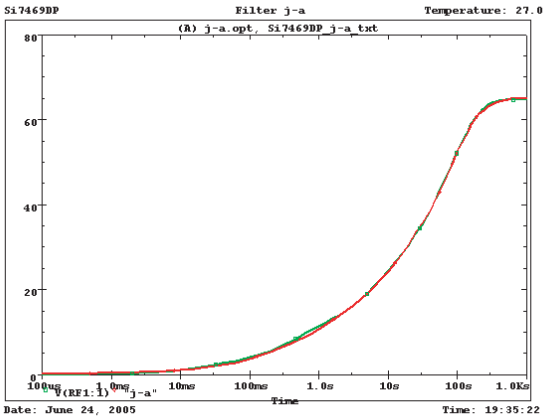
Note: NA indicates not applicable

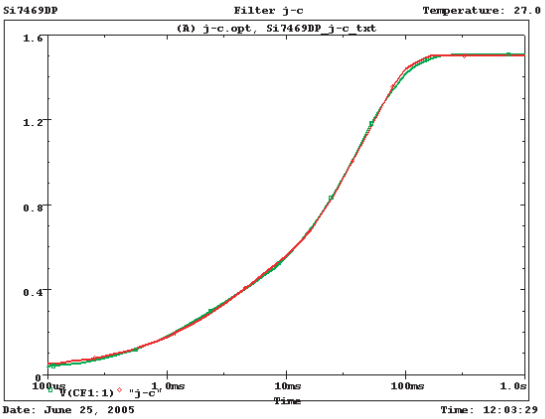
Reference:

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


Si7469DP
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7469DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: June 24, 2005
Time: 12:14:33


Si7469DP
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si7469DP_j-c_txt
1.6
1.2
0.8
0.4
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1) "j-c"
Time
Date: June 24, 2005
Time: 19:24:33


Si7469DP
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7469DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: June 24, 2005
Time: 19:35:22


Si7469DP
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7469DP_j-c_txt
1.6
1.2
0.8
0.4
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1) "j-c"
Time
Date: June 25, 2005
Time: 12:03:29