R-C Thermal Model Parameters

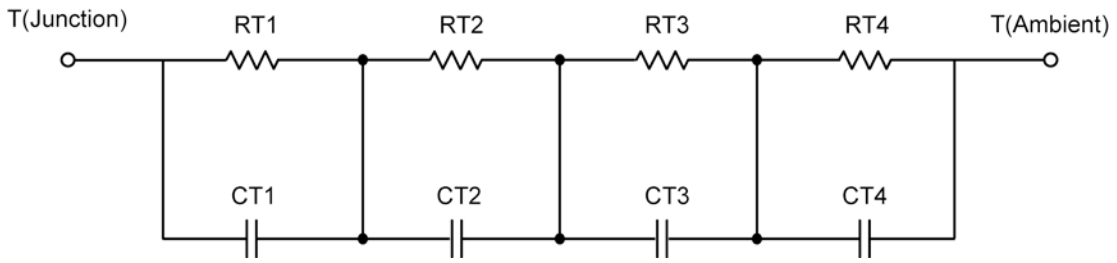
DESCRIPTION

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.

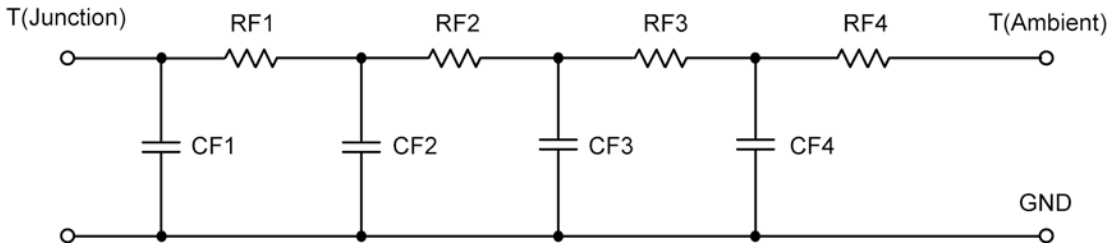
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Foot**	**Case Ch1**	**Case Ch2**
RT1	4.2936	8.1935	N/A	2.8747	1.6211
RT2	55.8743	17.8438	N/A	975.9883 m	2.3928
RT3	15.4872	12.7256	N/A	644.5117 m	499.7070 m
RT4	18.3449	55.2371	N/A	2.5048	886.3930 m
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Foot**	**Case Ch1**	**Case Ch2**
CT1	270.6081 u	468.6693 u	N/A	1.2121 m	1.2956 m
CT2	1.1785	52.5522 m	N/A	181.7676 u	2.7955 m
CT3	4.6975 m	4.9237 m	N/A	20.5911 m	12.1729 m
CT4	59.7351 m	1.7682	N/A	1.2534 m	268.2308 u

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

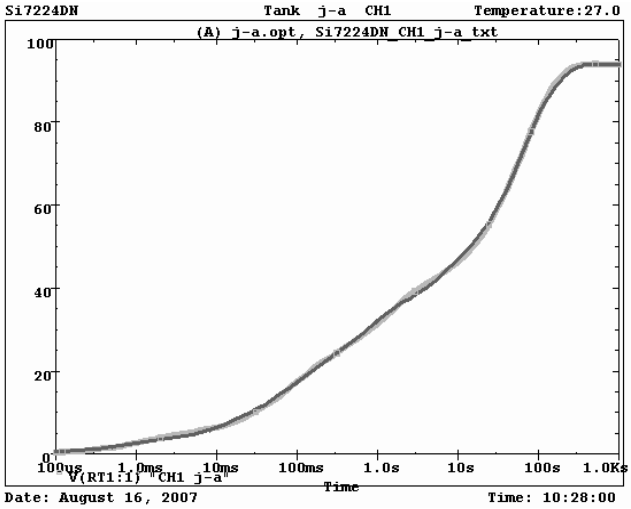


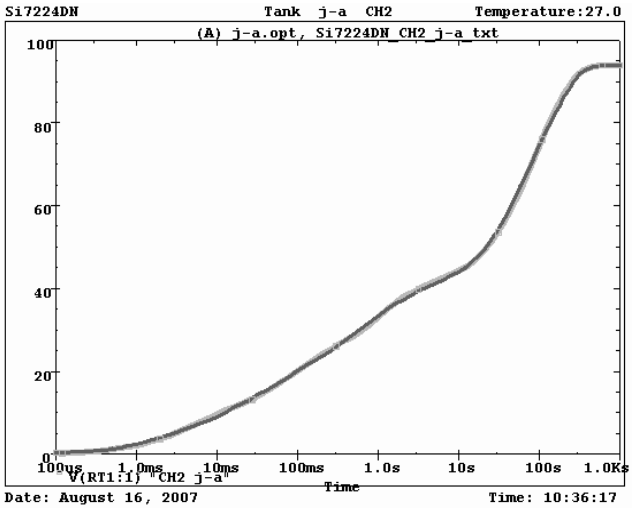
R-C VALUES FOR FILTER CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Foot**	**Case Ch1**	**Case Ch2**
RF1	5.4867	7.5185	N/A	2.0099	1.8053
RF2	16.2228	14.1968	N/A	1.6461	1.3408
RF3	18.1219	18.3474	N/A	1.5817	1.1147
RF4	54.1686	53.9373	N/A	1.7623	1.1392
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Foot**	**Case Ch1**	**Case Ch2**
CF1	364.3348 u	338.9454 u	N/A	186.1934 u	260.3856 u
CF2	4.0819 m	2.7555 m	N/A	297.6603 u	660.1799 u
CF3	53.4796 m	46.2999 m	N/A	425.7678 u	347.4685 u
CF4	1.1419	1.7508	N/A	976.0633 u	3.7122 m

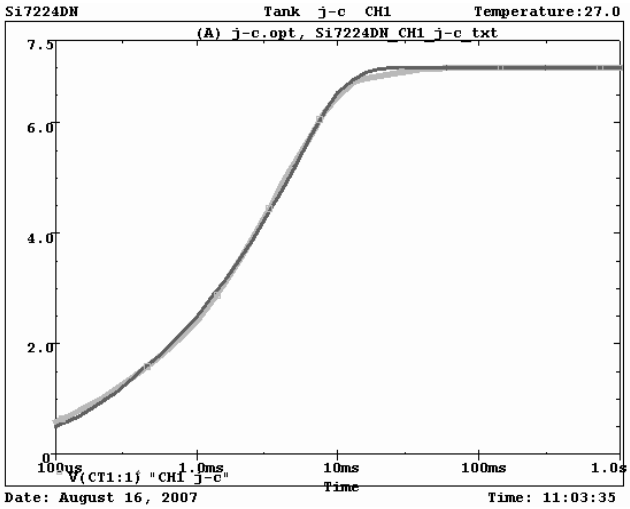
Note: NA indicates not applicable

Reference:

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


Si7224DN
Tank j-a CH1
Temperature:27.0
(A) j-a.opt, Si7224DN_CH1_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "CH1 j-a"
Time
Date: August 16, 2007
Time: 10:28:00


Si7224DN
Tank j-a CH2
Temperature:27.0
(A) j-a.opt, Si7224DN_CH2_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "CH2 j-a"
Time
Date: August 16, 2007
Time: 10:36:17


Si7224DN
Tank j-c CH1
Temperature:27.0
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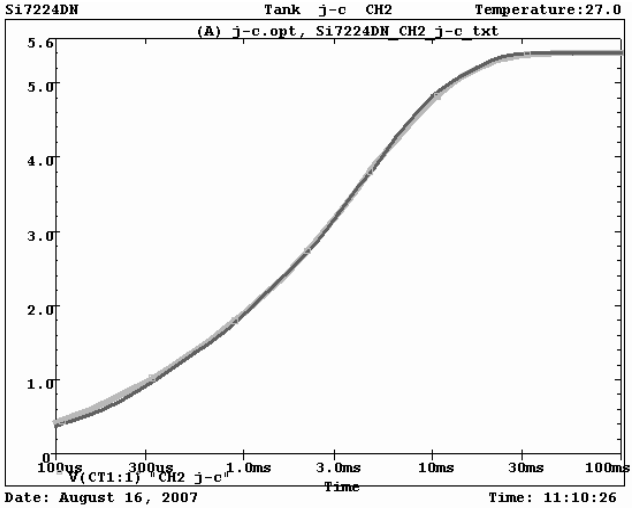
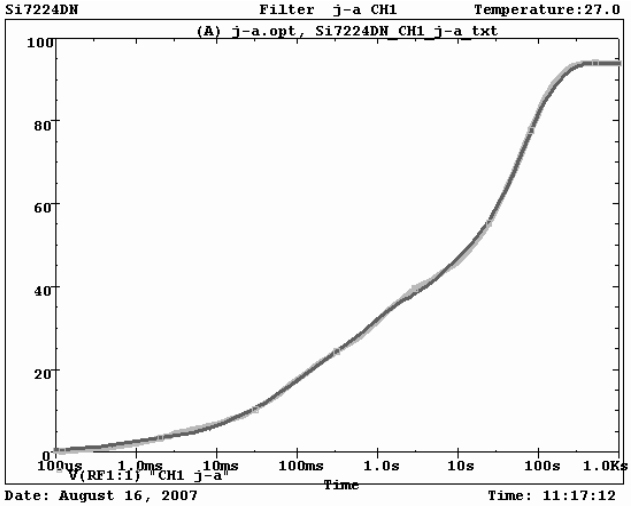
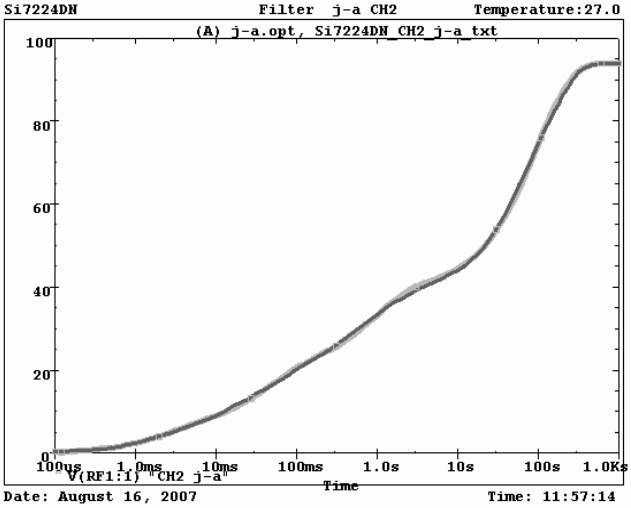
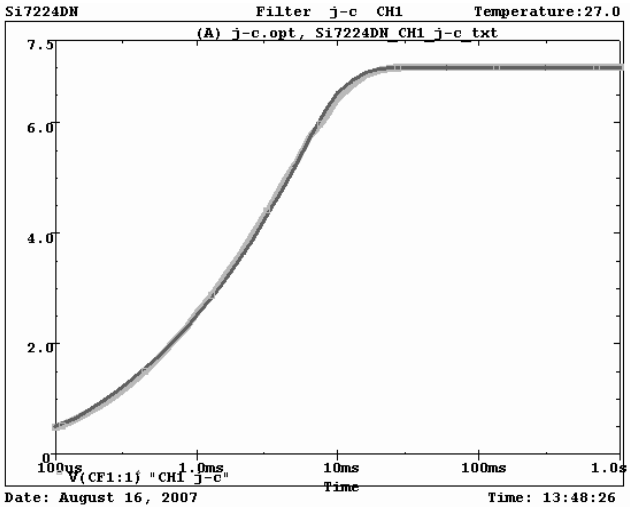
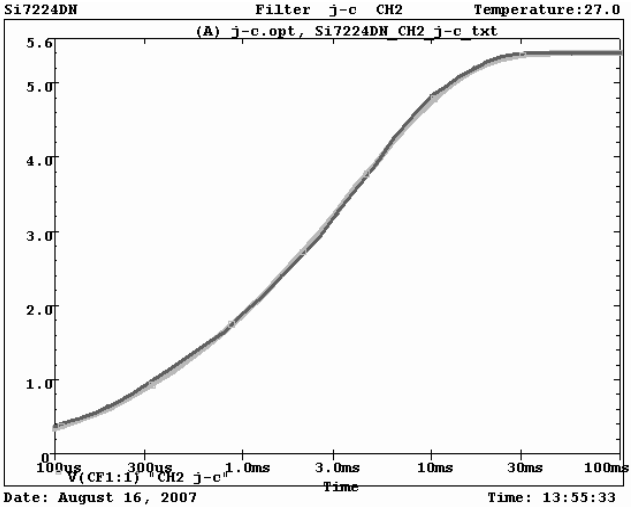
7.5
6.0
4.0
2.0
0
100us 1.0ms 10ms 100ms 1.0s
V(CT1:1) "CH1 j-c"
Time
Date: August 16, 2007
Time: 11:03:35


Si7224DN
Tank j-c CH2
Temperature:27.0
(A) j-c.opt, Si7224DN_CH2_j-c_txt
5.6
5.0
4.0
3.0
2.0
1.0
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CT1:1) "CH2 j-c"
Time
Date: August 16, 2007
Time: 11:10:26


Si7224DN
Filter j-a CH1
Temperature:27.0
(A) j-a.opt, Si7224DN_CH1_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "CH1 j-a"
Time
Date: August 16, 2007
Time: 11:17:12


Si7224DN
Filter j-a CH2
Temperature:27.0
(A) j-a.opt, Si7224DN_CH2_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "CH2 j-a"
Time
Date: August 16, 2007
Time: 11:57:14


Si7224DN
Filter j-c CH1
Temperature:27.0
(A) j-c.opt, Si7224DN_CH1_j-c_txt
7.5
6.0
4.0
2.0
0
100us 1.0ms 10ms 100ms 1.0s
V(CF1:1) "CH1 j-c"
Time
Date: August 16, 2007
Time: 13:48:26


Si7224DN
Filter j-c CH2
Temperature:27.0
(A) j-c.opt, Si7224DN_CH2_j-c_txt
5.6
5.0
4.0
3.0
2.0
1.0
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "CH2 j-c"
Time
Date: August 16, 2007
Time: 13:55:33