R-C Thermal Model Parameters

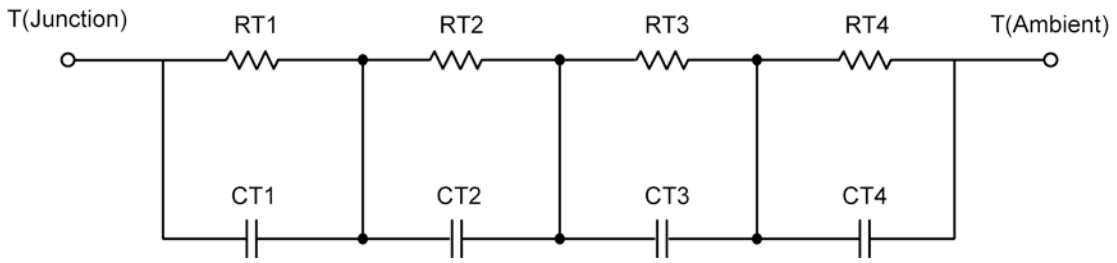
DESCRIPTION

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.

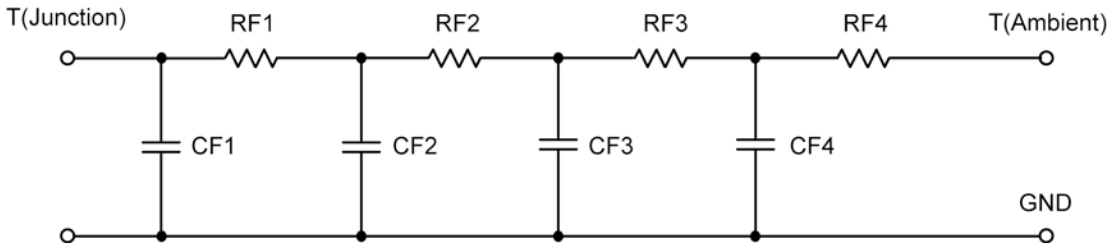
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.3781	886.3418 m	N/A
RT2	33.9005	189.9780 m	N/A
RT3	11.8113	150.1802 m	N/A
RT4	14.9101	1.3735	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	10.6403 m	3.6687 m	N/A
CT2	3.1400	1.7116 m	N/A
CT3	104.5502 m	424.2065 m	N/A
CT4	1.5087	14.2082 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

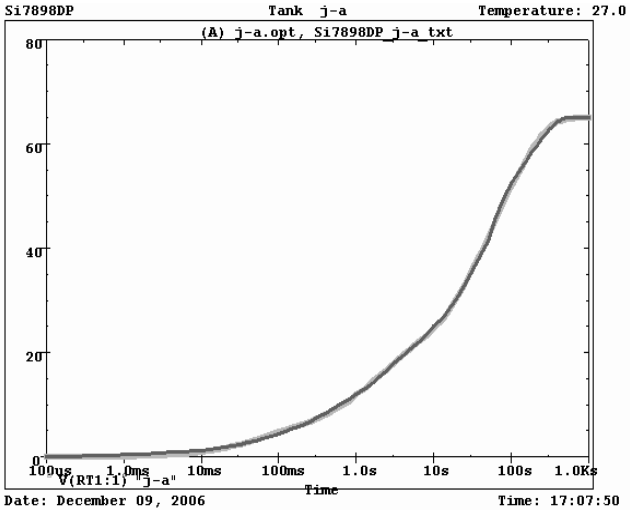


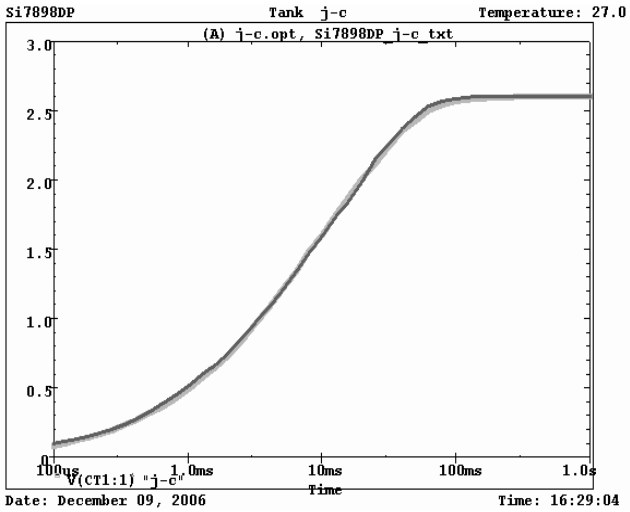
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.3670	727.7822 m	N/A
RF2	11.5077	710.4071 m	N/A
RF3	17.8002	712.8188 m	N/A
RF4	31.3251	448.9919 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	8.3305 m	1.1888 m	N/A
CF2	63.8877 m	4.9209 m	N/A
CF3	585.9560 m	381.4855 u	N/A
CF4	2.1682	55.0827 m	N/A

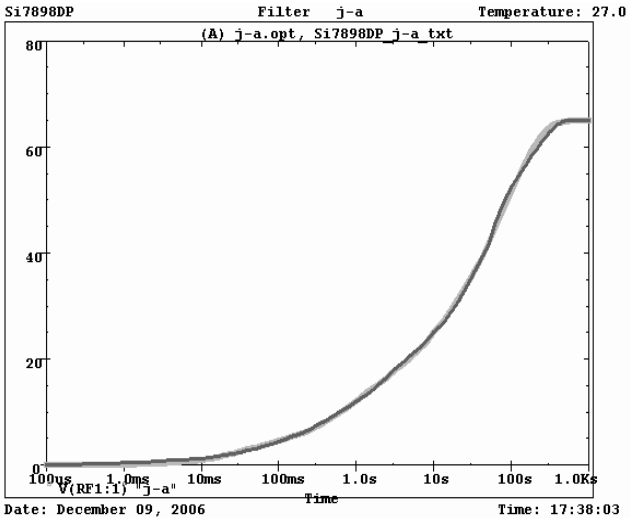
Note: NA indicates not applicable

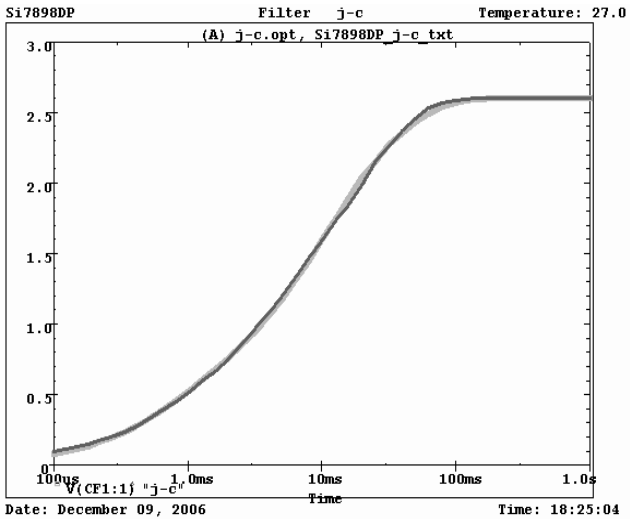
Reference:

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


Si7898DP
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7898DP_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: December 09, 2006
Time: 17:07:50


Si7898DP
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si7898DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1) "j-c"
Time
Date: December 09, 2006
Time: 16:29:04


Si7898DP
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7898DP_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: December 09, 2006
Time: 17:38:03


Si7898DP
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7898DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1) "j-c"
Time
Date: December 09, 2006
Time: 18:25:04