R-C Thermal Model Parameters

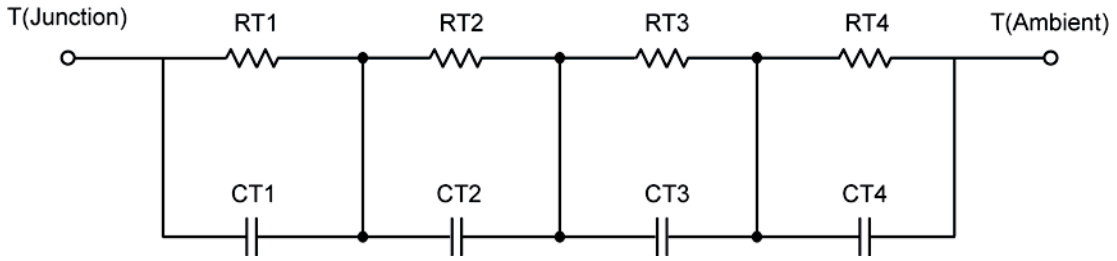
DESCRIPTION

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.

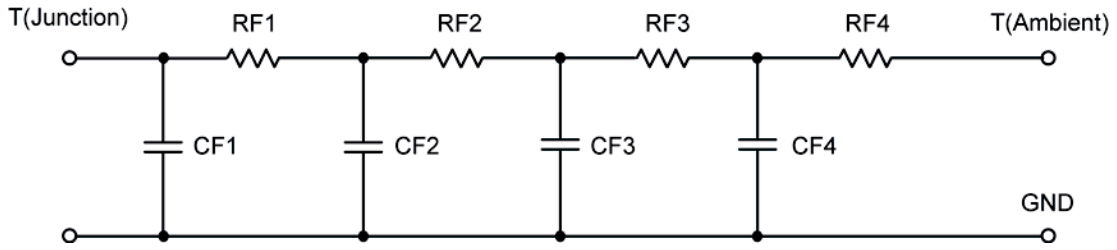
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
RT1	41.3839	41.3839	N/A	40.4167	40.4167
RT2	17.8424	17.8424	N/A	22.9343	22.9343
RT3	45.3883	45.3883	N/A	17.3862	17.3862
RT4	45.3854	45.3854	N/A	9.2628	9.2628
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
CT1	16.2284 m	16.2284 m	N/A	3.0281 m	3.0281 m
CT2	372.8238 u	372.8238 u	N/A	1.3611 m	1.3611 m
CT3	2.2494 m	2.2494 m	N/A	52.5443 m	52.5443 m
CT4	1.8817	1.8817	N/A	185.6658 u	185.6658 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

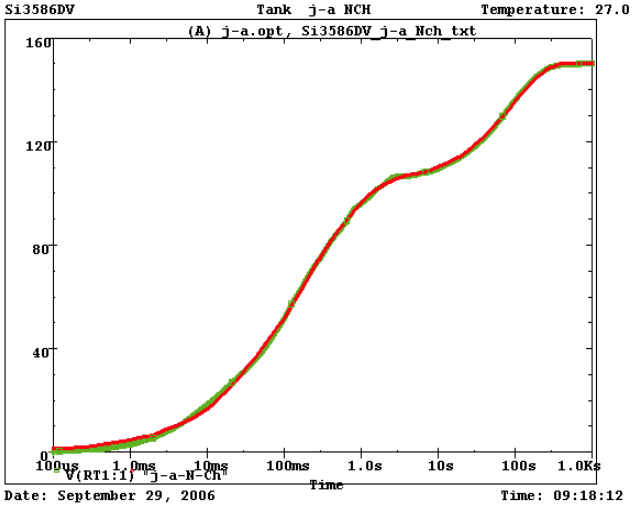


R-C VALUES FOR FILTER CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
RF1	22.8768	22.8768	N/A	20.1603	20.1603
RF2	52.3054	52.3054	N/A	46.1553	46.1553
RF3	29.9906	29.9906	N/A	14.2631	14.2631
RF4	44.8272	44.8272	N/A	9.4213	9.4213
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
CF1	297.9209 u	297.9216 u	N/A	229.8178 u	229.8183 u
CF2	1.7172 m	1.7173 m	N/A	1.2102 m	1.2102 m
CF3	18.6653 m	18.6654 m	N/A	10.6983 m	10.6983 m
CF4	1.8697	1.8697	N/A	118.2024 m	118.2025 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


Si3586DV
Tank j-a NCH
Temperature: 27.0
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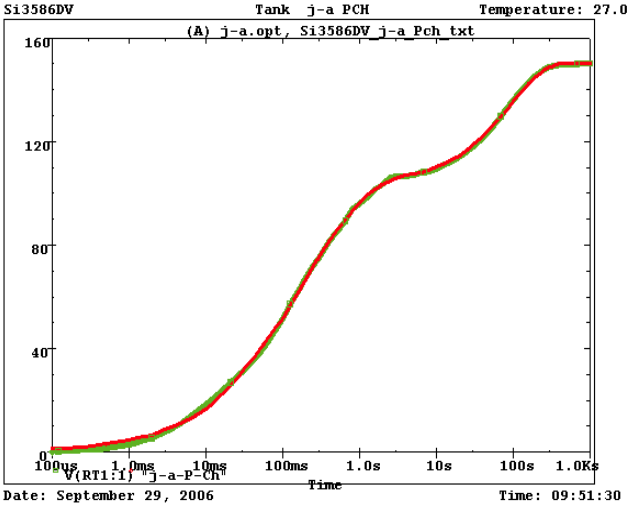
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a-N-Ch"
Time
Date: September 29, 2006
Time: 09:18:12


Si3586DV
Tank j-a PCH
Temperature: 27.0
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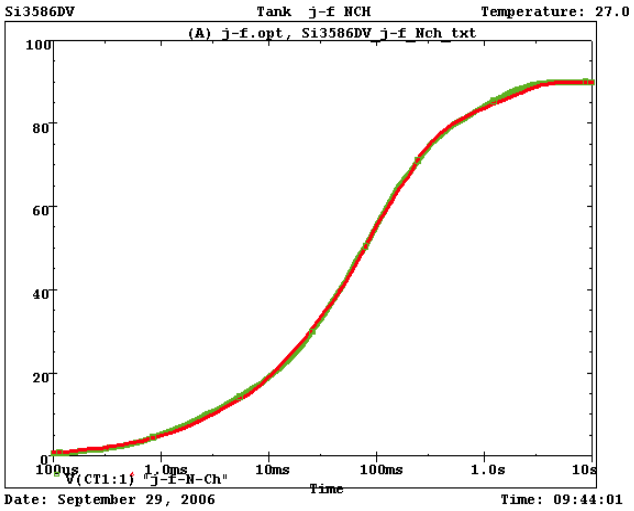
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a-P-Ch"
Time
Date: September 29, 2006
Time: 09:51:30


Si3586DV
Tank j-f NCH
Temperature: 27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
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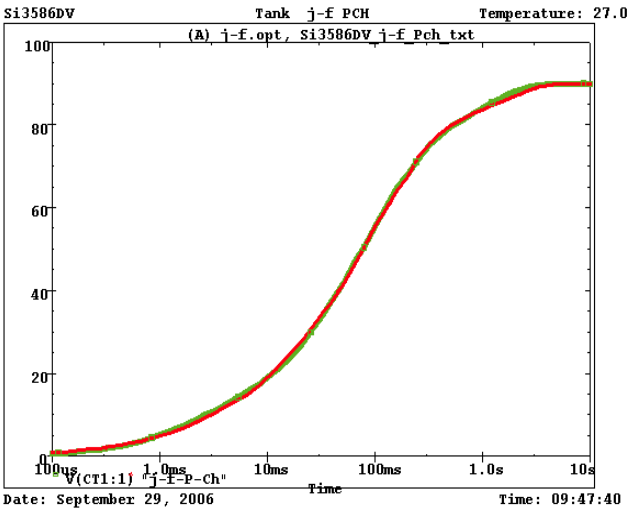
Time
Date: September 29, 2006
Time: 09:44:01


Si3586DV
Tank j-f PCH
Temperature: 27.0
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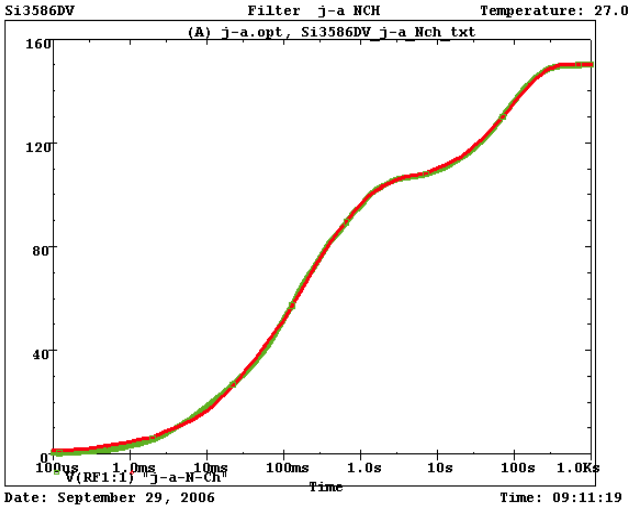
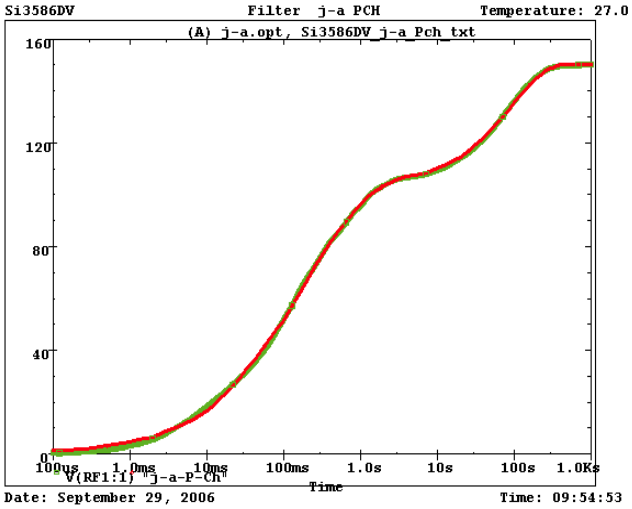
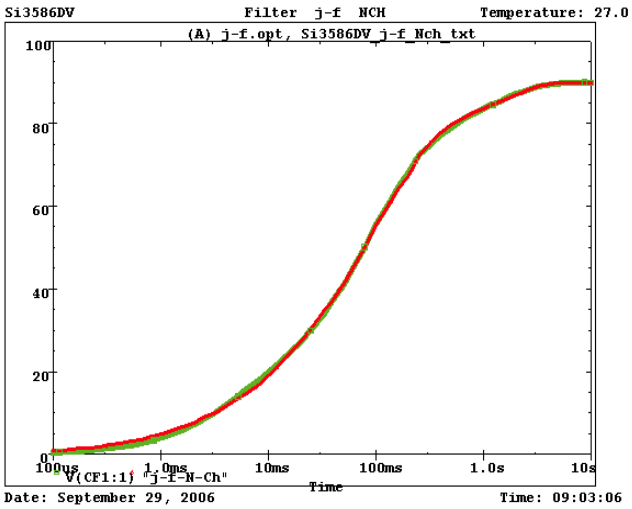
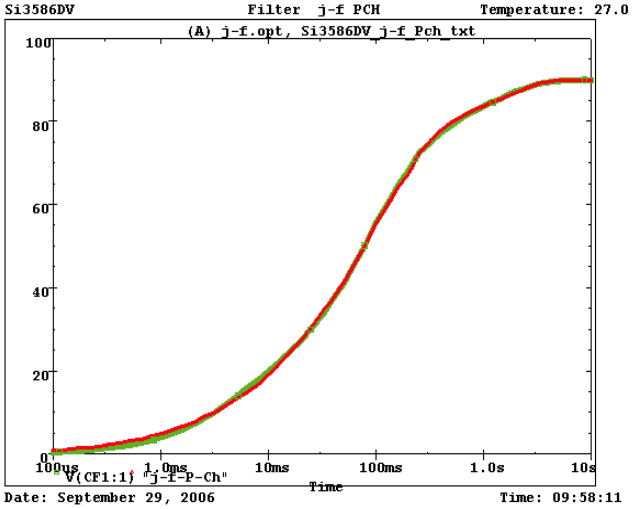
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1) "j-f-P-Ch"
Time
Date: September 29, 2006
Time: 09:47:40


Si3586DV
Filter j-a NCH
Temperature: 27.0
(A) j-a.opt, Si3586DV_j-a_Nch_txt
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a-N-Ch"
Time
Date: September 29, 2006
Time: 09:11:19


Si3586DV
Filter j-a PCH
Temperature: 27.0
(A) j-a.opt, Si3586DV_j-a_Pch_txt
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a-P-Ch"
Time
Date: September 29, 2006
Time: 09:54:53


Si3586DV
Filter j-f NCH
Temperature: 27.0
(A) j-f.opt, Si3586DV_j-f_Nch_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-f-N-Ch"
Time
Date: September 29, 2006
Time: 09:03:06


Si3586DV
Filter j-f PCH
Temperature: 27.0
(A) j-f.opt, Si3586DV_j-f_Pch_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-f-P-Ch"
Time
Date: September 29, 2006
Time: 09:58:11