R-C Thermal Model Parameters

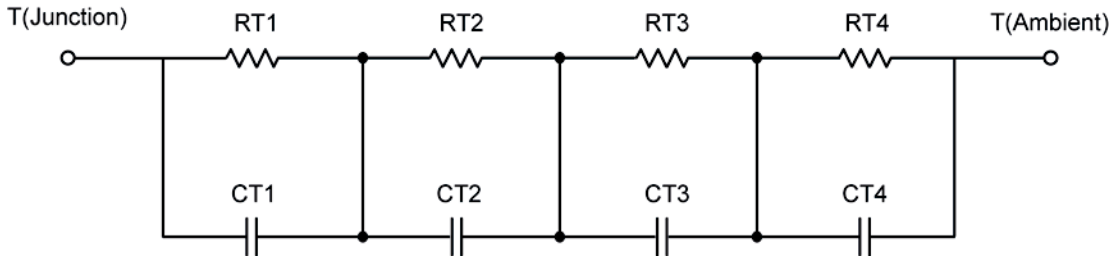
DESCRIPTION

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.

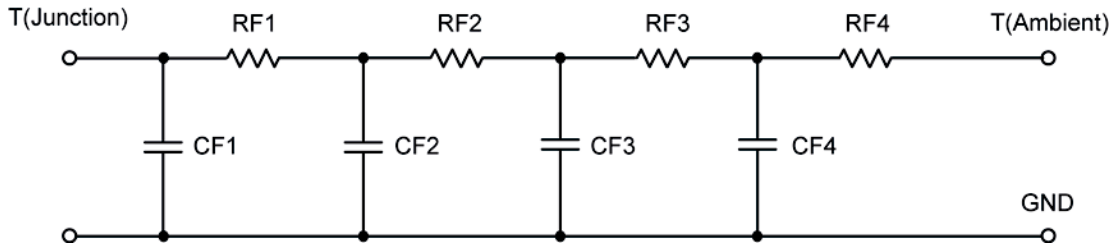
R-C THERMAL MODEL FOR TANK CONFIGURATION



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	29.1228	29.1228
RT2	17.8424	17.8424	N/A	22.7539	22.7539
RT3	45.3883	45.3883	N/A	25.6195	25.6195
RT4	45.3854	45.3854	N/A	12.5038	12.5038
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
CT1	16.1949 m	16.1970 m	N/A	4.1372 m	4.1372 m
CT2	382.3994 u	382.7570 u	N/A	1.7457 m	1.7457 m
CT3	2.2482 m	2.2475 m	N/A	15.3997 m	15.3997 m
CT4	1.8858	1.8858	N/A	255.9679 u	255.9679 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

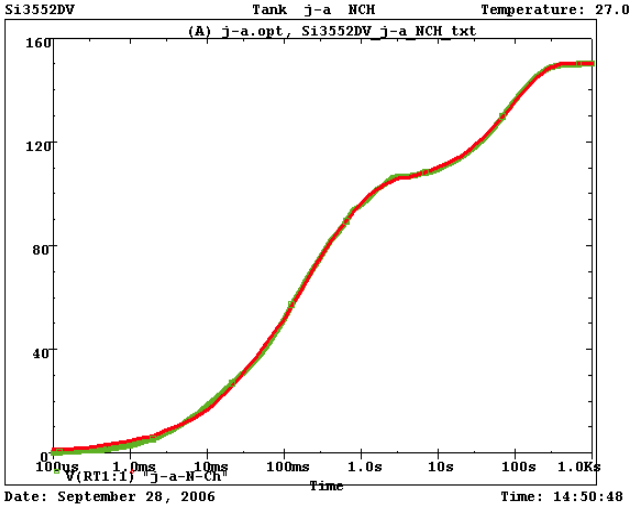


R-C VALUES FOR FILTER CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
RF1	22.8768	22.8768	N/A	19.6121	19.6121
RF2	52.3054	52.3054	N/A	49.1762	49.1762
RF3	29.9906	29.9906	N/A	10.9809	10.9809
RF4	44.8272	44.8272	N/A	10.2308	10.2308
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Nch**	**Ambient Pch**	**Case**	**Foot Nch**	**Foot Pch**
CF1	297.9304 u	297.9304 u	N/A	217.5442 u	217.5442 u
CF2	1.7175 m	1.7175 m	N/A	1.2366 m	1.2366 m
CF3	18.6664 m	18.6664 m	N/A	13.3522 m	13.3522 m
CF4	1.8697	1.8697	N/A	4.0317 m	4.0317 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


Si3552DV
Tank j-a NCH
Temperature: 27.0
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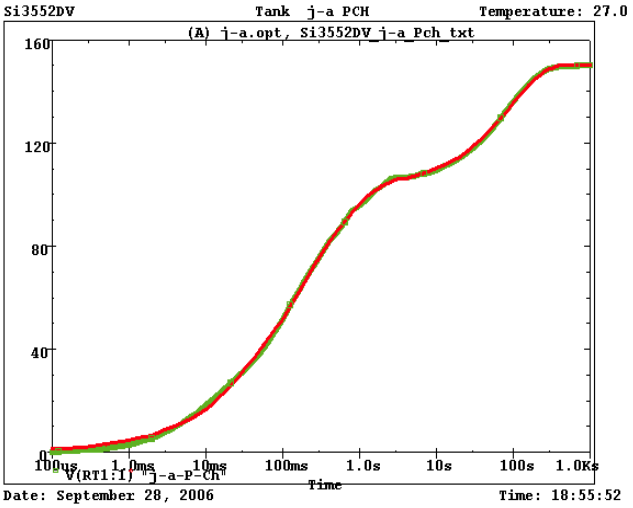
160
120
80
40
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a-N-Ch"
Time
Date: September 28, 2006
Time: 14:50:48


Si3552DV
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
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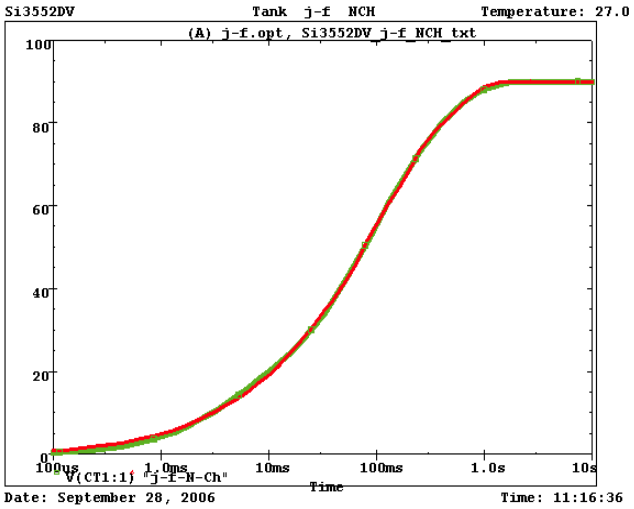
Time
Date: September 28, 2006
Time: 18:55:52


Si3552DV
Tank j-f NCH
Temperature: 27.0
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100
80
60
40
20
0
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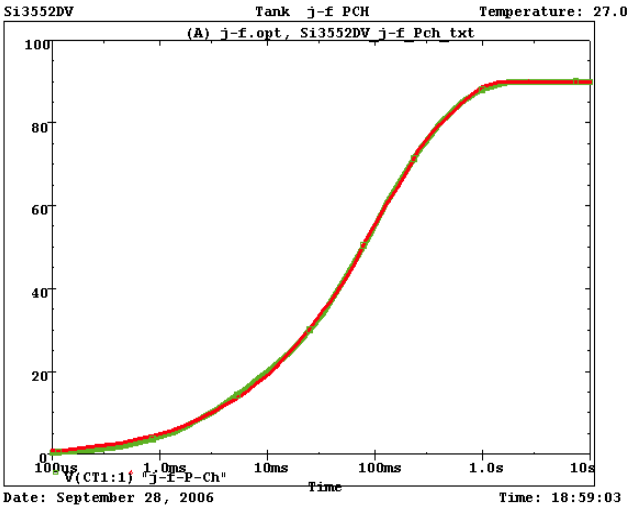
V(CT1:1) "j-f-N-Ch"
Time
Date: September 28, 2006
Time: 11:16:36


Si3552DV
Tank j-f PCH
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80
60
40
20
0
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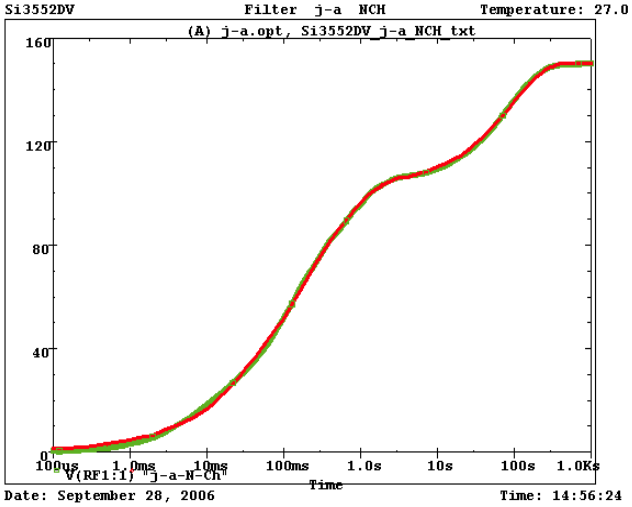
V(CT1:1) "j-f-P-Ch"
Time
Date: September 28, 2006
Time: 18:59:03


Si3552DV
Filter j-a NCH
Temperature: 27.0
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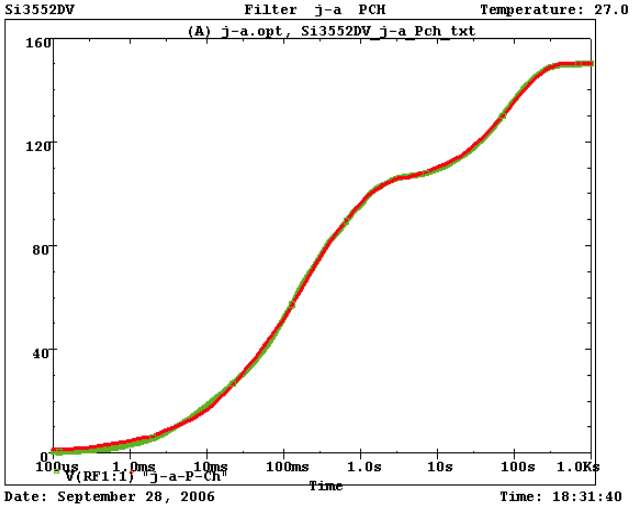
160
120
80
40
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a-N-Ch"
Time
Date: September 28, 2006
Time: 14:56:24


Si3552DV
Filter j-a PCH
Temperature: 27.0
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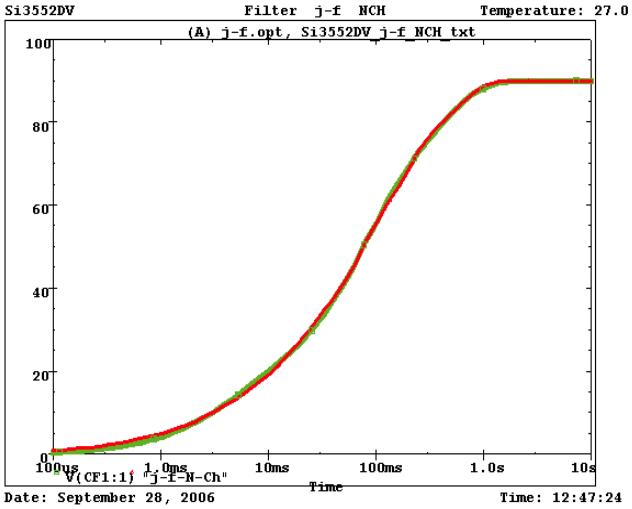
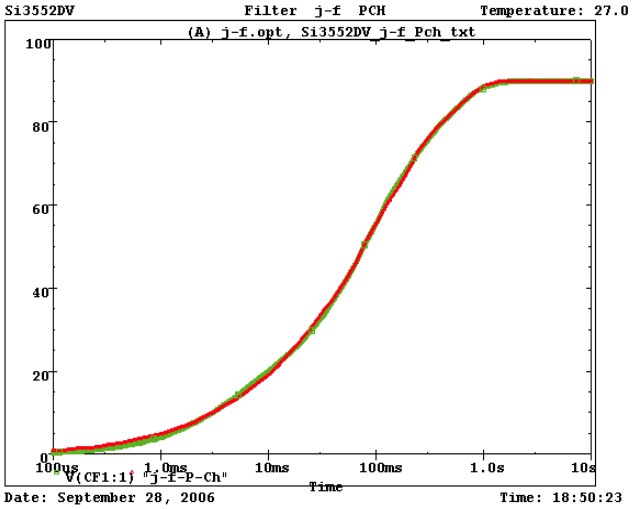
160
120
80
40
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a-P-Ch"
Time
Date: September 28, 2006
Time: 18:31:40


Si3552DV
Filter j-f NCH
Temperature: 27.0
(A) j-f.opt, Si3552DV_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 28, 2006
Time: 12:47:24


Si3552DV
Filter j-f PCH
Temperature: 27.0
(A) j-f.opt, Si3552DV_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 28, 2006
Time: 18:50:23