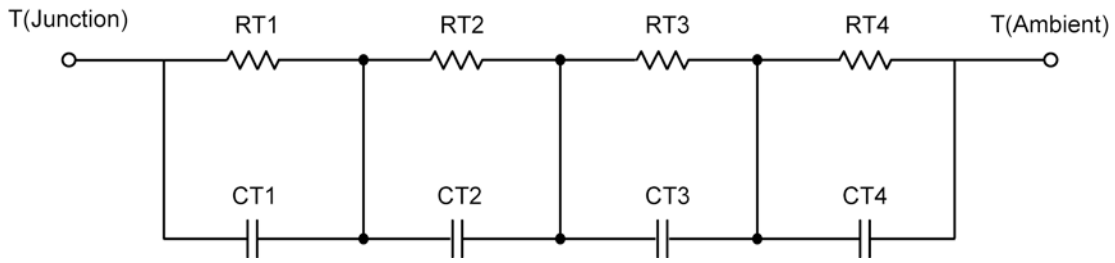
R-C Thermal Model Parameters

DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. R-C values for the electrical circuit in the Foster/Tank and Cauer/Filter configurations are included. When implemented in P-Spice, these values have matching characteristic curves to the single-pulse transient thermal impedance curves for the MOSFET.

These RC values can be used in the P-SPICE simulation to evaluate the thermal behavior of the MOSFET junction temperature under a defined power profile. These techniques are described in Application Note AN609, "Thermal Simulation of Power MOSFETs on the P-Spice Platform."

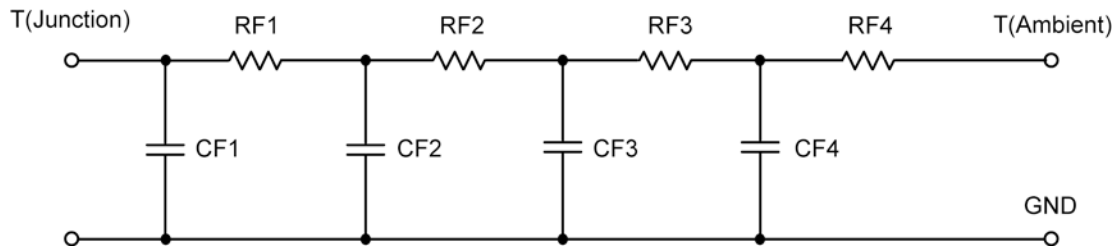
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RT1	3.1362	602.0700 m	1.9579
RT2	12.0459	1.0938	1.7234
RT3	17.6497	2.5327	2.6525
RT4	35.1682	771.4300 m	666.2000 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CT1	1.9835 m	379.1138 m	49.2110 m
CT2	51.6893 m	24.6176 m	9.9046 m
CT3	1.0084	18.1494 m	195.3756 m
CT4	2.9679	1.0428 m	458.3565 u

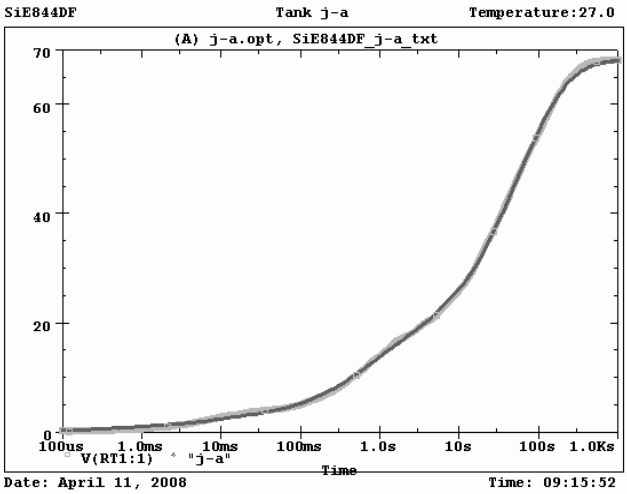
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

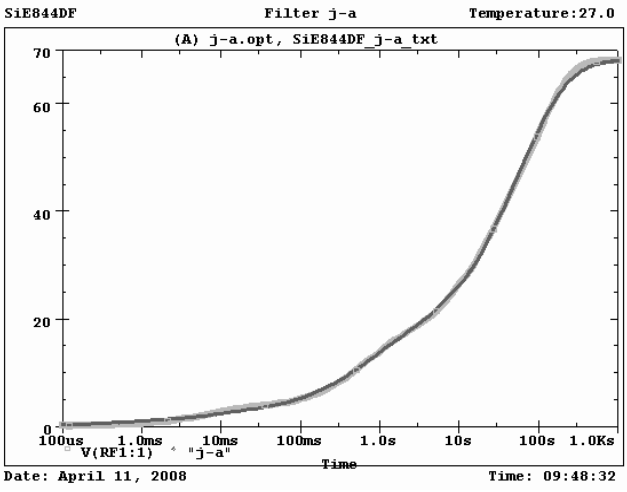
R-C THERMAL MODEL FOR FILTER CONFIGURATION

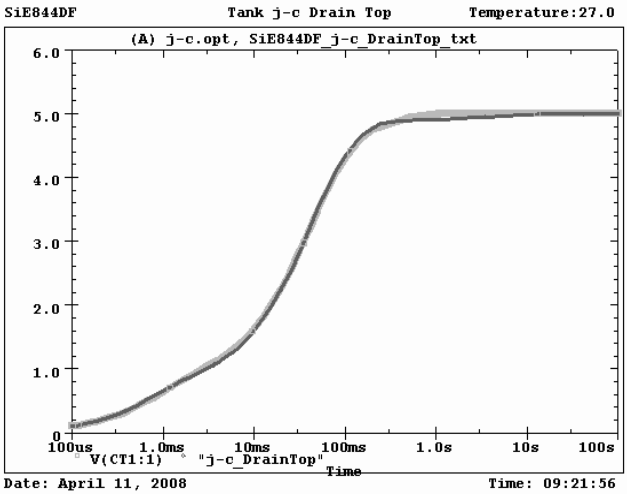


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RF1	34.101	696.6948 m	900.7000 m
RF2	12.9975	1.8804	2.3465
RF3	24.3507	2.0724	2.1335
RF4	27.2417	350.5052 m	1.6193
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CF1	1.8381 m	688.2587 u	592.9540 u
CF2	46.3111 m	7.2464 m	8.7929 m
CF3	643.9230 m	6.9696 m	34.9365 m
CF4	2.6406	690.8983 m	309.5145 m

Note
NA indicates not applicable


SiE844DF
Tank j-a
Temperature:27.0
(A) j-a.opt, SiE844DF_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: April 11, 2008
Time: 09:15:52


SiE844DF
Filter j-a
Temperature:27.0
(A) j-a.opt, SiE844DF_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: April 11, 2008
Time: 09:48:32


SiE844DF
Tank j-c Drain Top
Temperature:27.0
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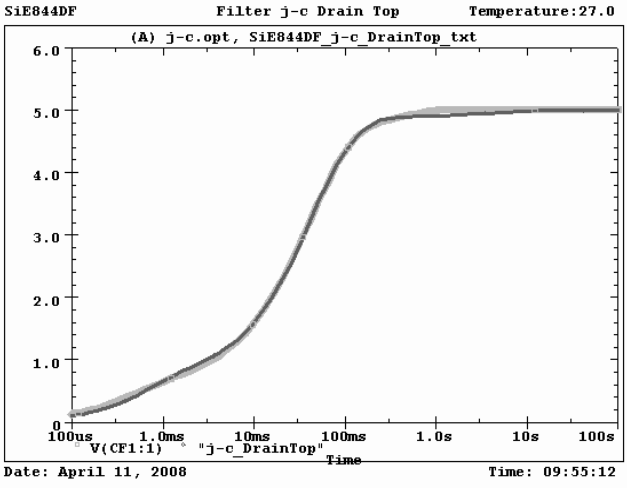
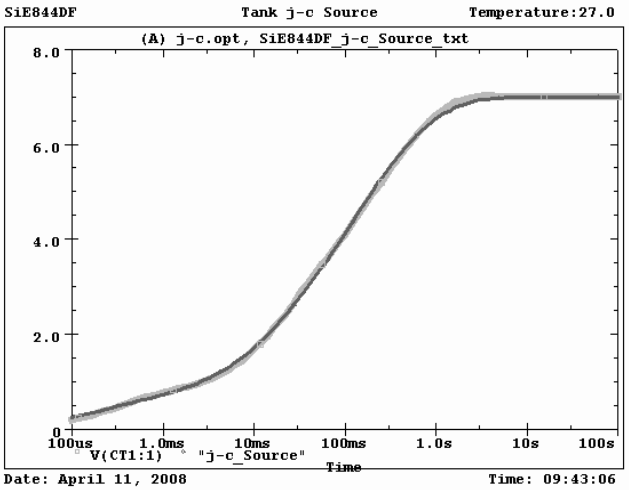
6.0
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)
"j-c_DrainTop"
Time
Date: April 11, 2008
Time: 09:21:56


SiE844DF
Filter j-c Drain Top
Temperature:27.0
(A) j-c.opt, SiE844DF_j-c_DrainTop_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-c_DrainTop"
Time
Date: April 11, 2008
Time: 09:55:12


SiE844DF
Tank j-c Source
Temperature:27.0
(A) j-c.opt, SiE844DF_j-c_Source_txt
8.0
6.0
4.0
2.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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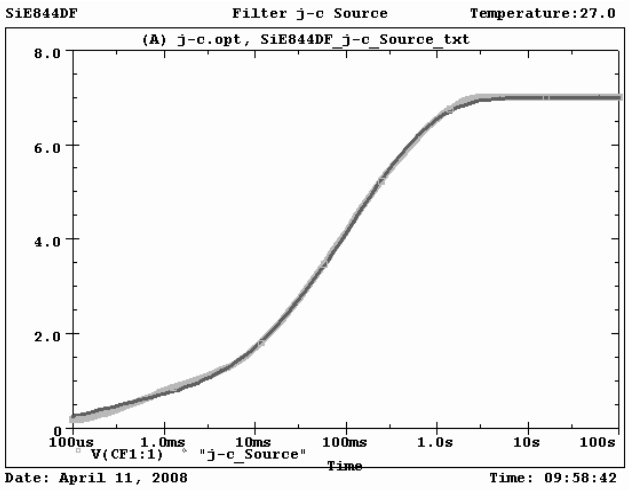
Time
Date: April 11, 2008
Time: 09:43:06


SiE844DF
Filter j-c Source
Temperature:27.0
(A) j-c.opt, SiE844DF_j-c_Source_txt
8.0
6.0
4.0
2.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) - "j-c_Source"
Time
Date: April 11, 2008
Time: 09:58:42