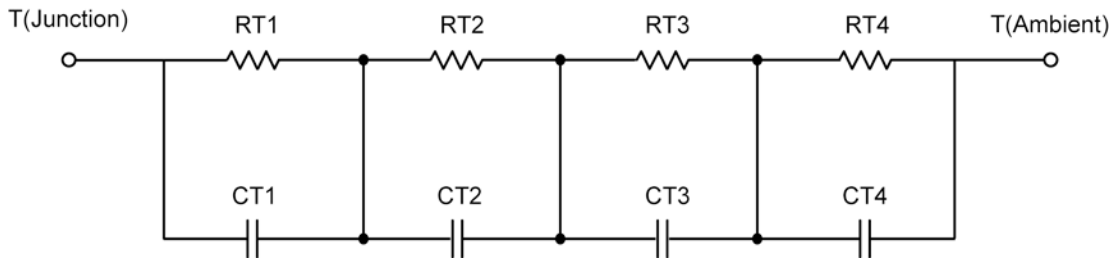
R-C Thermal Model Parameters

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."

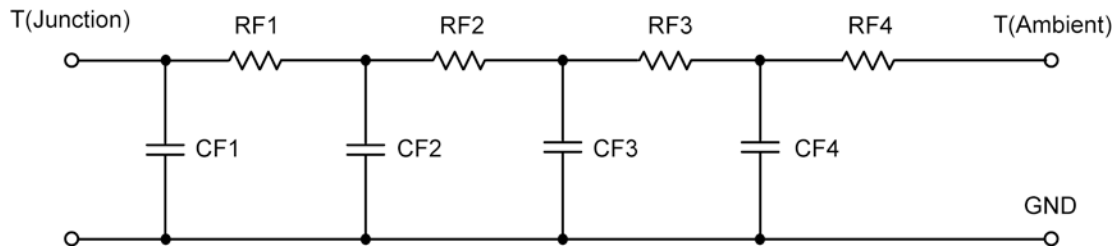
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RT1	8.5031	13.1408 m	229.4359 m
RT2	6.9925	487.0575 m	2.4496
RT3	1.2666	322.8526 m	18.9606 m
RT4	51.2378	176.9491 m	2.0035 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CT1	75.4672 m	250.3544 u	1.7816 m
CT2	225.5193 m	31.6760 m	27.4580 m
CT3	7.6034 m	63.7967 m	1.4509
CT4	1.3396	3.3354 m	1.5555 m

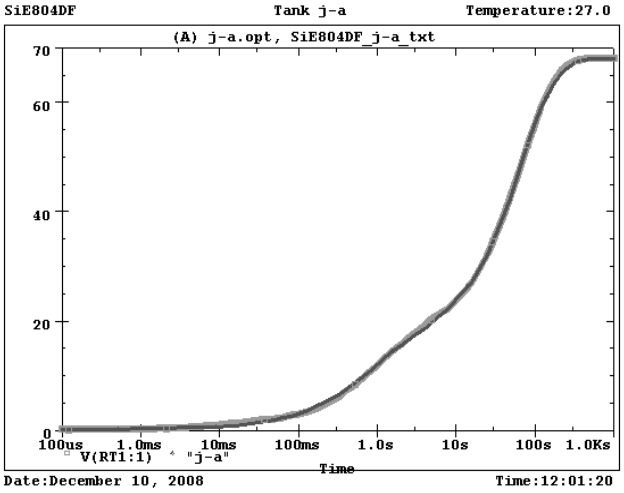
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

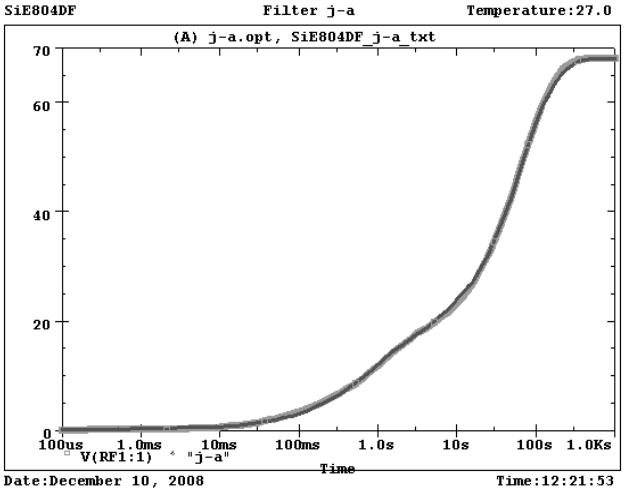
R-C THERMAL MODEL FOR FILTER CONFIGURATION

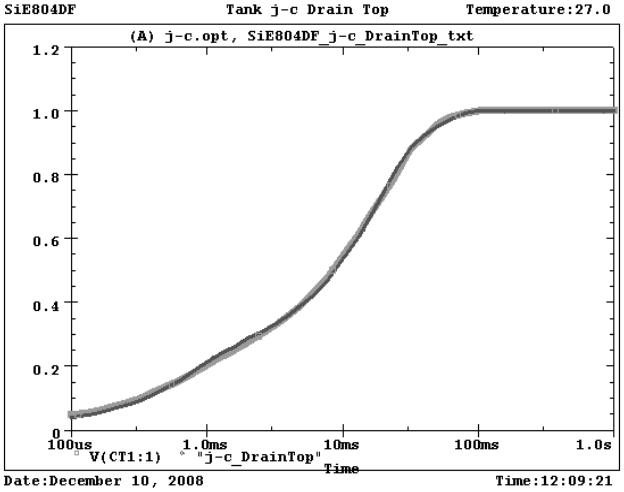


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RF1	4.0839	270.5949 m	286.8241 m
RF2	2.8985	945.5000 u	1.2831
RF3	10.5925	8.1951 m	1.0331
RF4	50.4251	720.2645 m	96.9759 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CF1	17.5650 m	2.7316 m	1.7681 m
CF2	27.8989 m	5.1728 m	25.3698 m
CF3	47.0210 m	13.7468 m	1.9573 m
CF4	1.2203	2.9036 m	135.6344 m

Note
NA indicates not applicable


SiE804DF
Tank j-a
Temperature:27.0
(A) j-a.opt, SiE804DF_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:December 10, 2008
Time:12:01:20


SiE804DF
Filter j-a
Temperature:27.0
(A) j-a.opt, SiE804DF_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:December 10, 2008
Time:12:21:53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Tank j-c Drain Top
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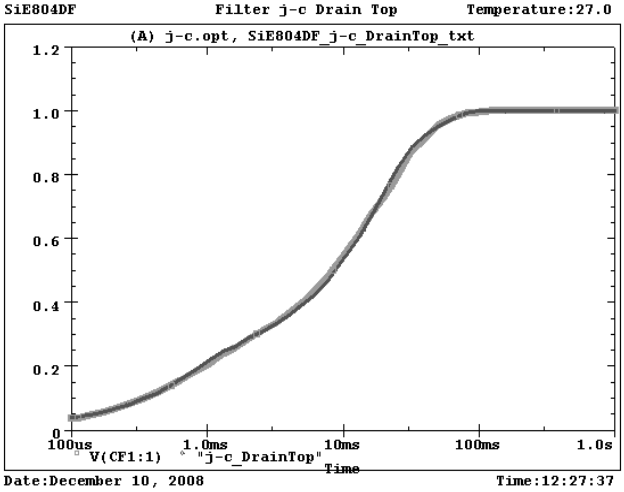
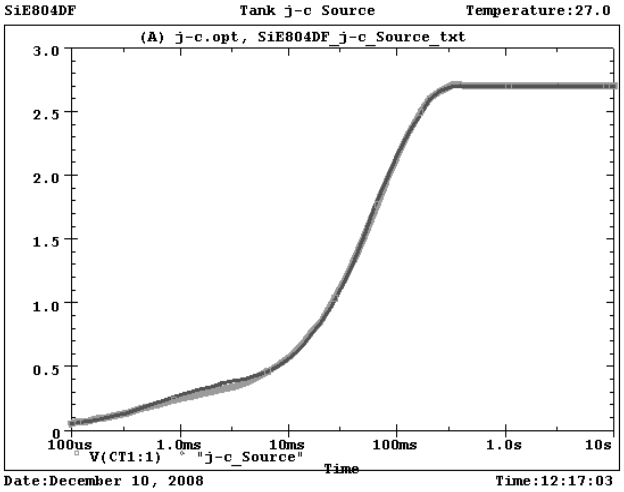
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c_DrainTop"
Time
Date:December 10, 2008
Time:12:09:21


SiE804DF
Filter j-c Drain Top
Temperature:27.0
(A) j-c.opt, SiE804DF_j-c_DrainTop_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c_DrainTop"
Time
Date:December 10, 2008
Time:12:27:37


SiE804DF
Tank j-c Source
Temperature:27.0
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2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
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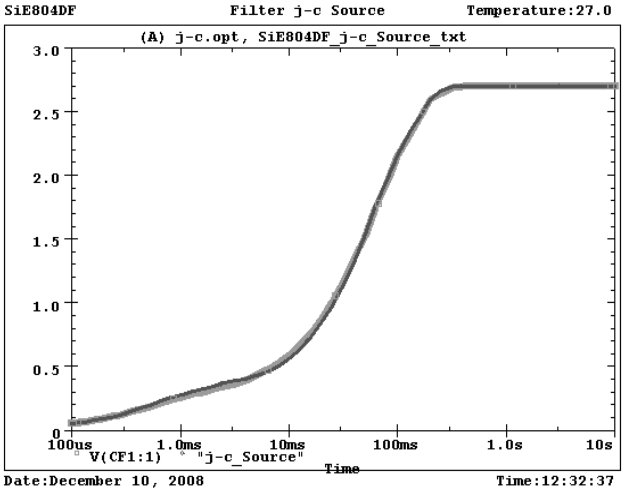
Time
Date:December 10, 2008
Time:12:17:03


SiE804DF
Filter j-c Source
Temperature:27.0
(A) j-c.opt, SiE804DF_j-c_Source_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) - "j-c_Source"
Time
Date:December 10, 2008
Time:12:32:37