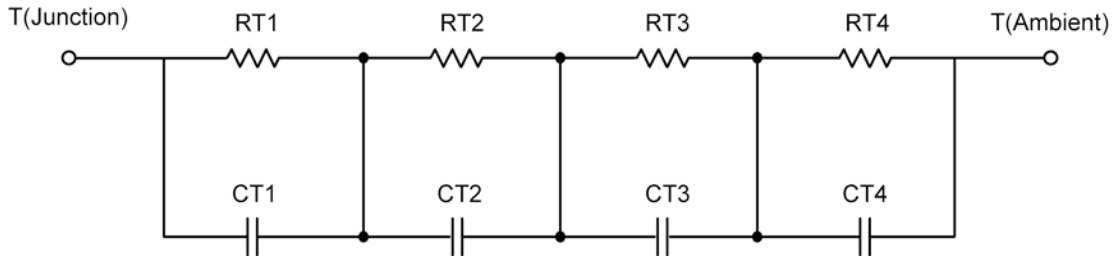
R-C Thermal Model Parameters

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."

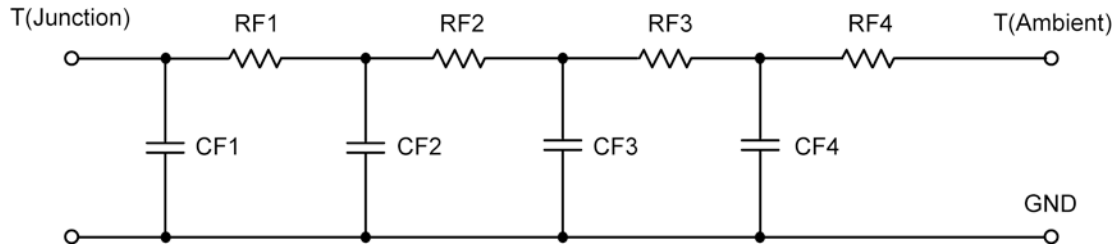
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RT1	1.2715	541.9300 u	383.3629 m
RT2	7.4755	23.8824 m	2.9708
RT3	10.4813	959.1097 m	41.5326 m
RT4	48.7717	216.4666 m	4.3045 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CT1	2.1640 m	45.9474 m	1.0193 m
CT2	230.0674 m	33.4132 m	16.5484 m
CT3	42.6031 m	18.2706 m	1.1648
CT4	1.2991	2.5656 m	6.8513 m

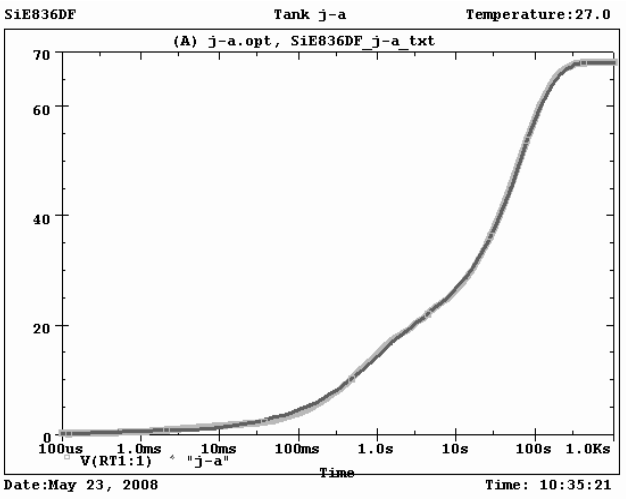
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

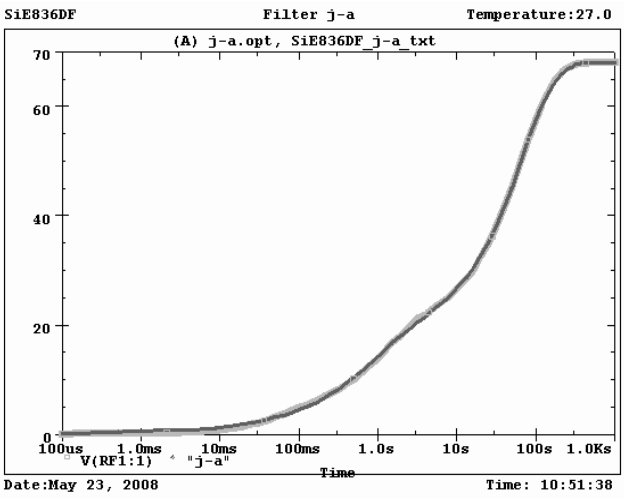
R-C THERMAL MODEL FOR FILTER CONFIGURATION

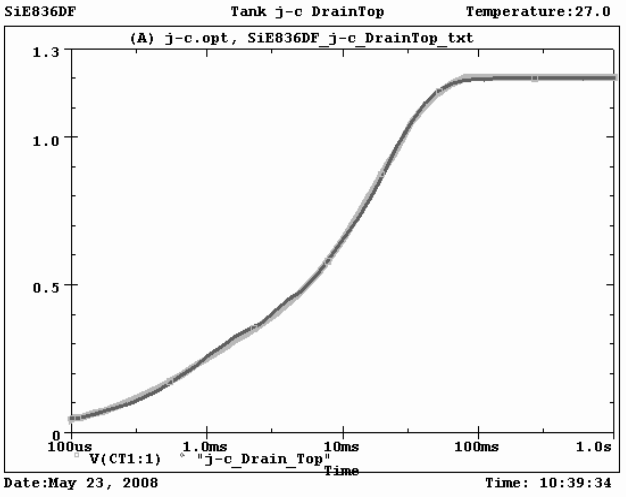


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RF1	6.0874	310.0466 m	422.0638 m
RF2	7.6744	555.8000 u	1.2538
RF3	7.6389	52.0767 m	727.6428 m
RF4	46.5993	837.3209 m	996.4934 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CF1	11.6397 m	2.0570 m	938.7525 u
CF2	60.3507 m	396.0260 u	14.1029 m
CF3	17.0829 m	16.5376 m	1.3296 m
CF4	1.3018	85.3684 u	9.2135 m

Note
NA indicates not applicable


SiE836DF
Tank j-a
Temperature:27.0
(A) j-a.opt, SiE836DF_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:May 23, 2008
Time: 10:35:21


SiE836DF
Filter j-a
Temperature:27.0
(A) j-a.opt, SiE836DF_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:May 23, 2008
Time: 10:51:38


SiE836DF
Tank j-c DrainTop
Temperature:27.0
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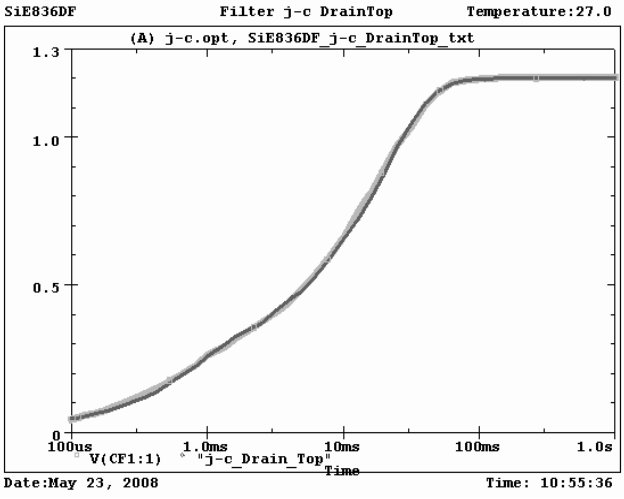
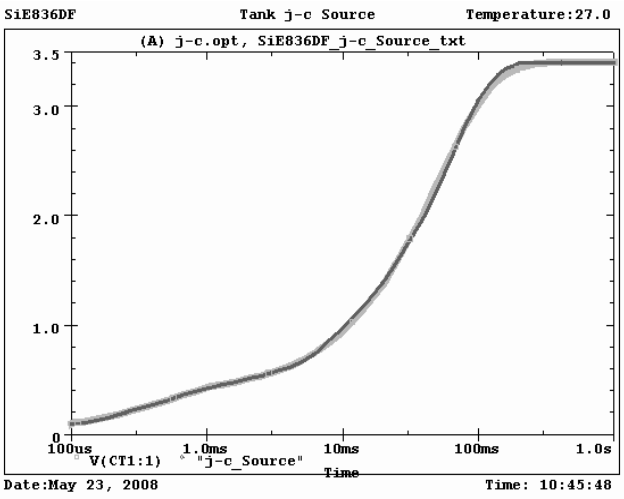
1.3
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c_Drain_Top"
Time
Date:May 23, 2008
Time: 10:39:34


SiE836DF
Filter j-c DrainTop
Temperature:27.0
(A) j-c.opt, SiE836DF_j-c_DrainTop_txt
1.3
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c_Drain_Top"
Time
Date:May 23, 2008
Time: 10:55:36


SiE836DF
Tank j-c Source
Temperature:27.0
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3.5
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
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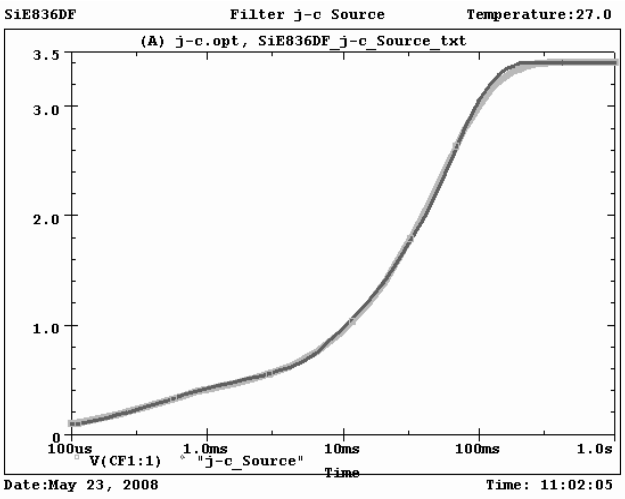
Time
Date:May 23, 2008
Time: 10:45:48


SiE836DF
Filter j-c Source
Temperature:27.0
(A) j-c.opt, SiE836DF_j-c_Source_txt
3.5
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1) - "j-c_Source"
Time
Date:May 23, 2008
Time: 11:02:05