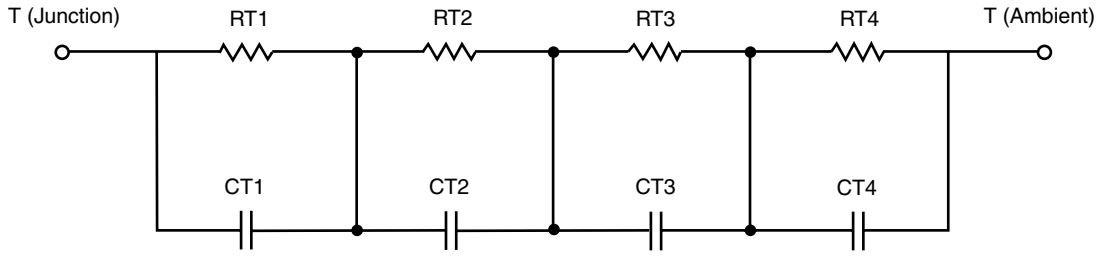
R-C Thermal Model Parameters

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

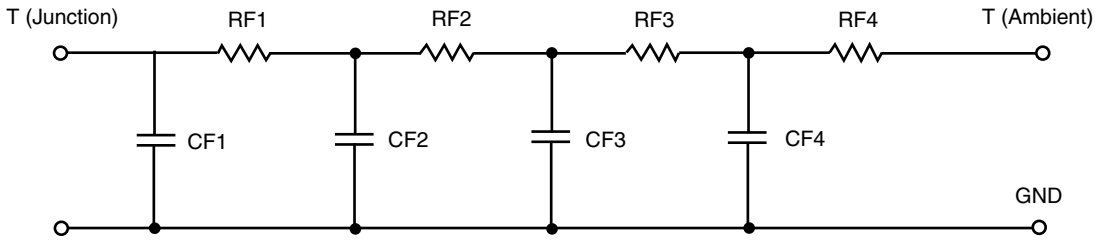


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.0717	686.0182 m	N/A
RT2	9.0193	537.5085 m	N/A
RT3	7.6215	937.7654 m	N/A
RT4	49.2875	338.7079 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	16.4762 m	29.0428 m	N/A
CT2	149.3290 m	942.8889 u	N/A
CT3	1.1137	8.0961 m	N/A
CT4	1.5406	60.1126 m	N/A

Note
N/A indicates not applicable

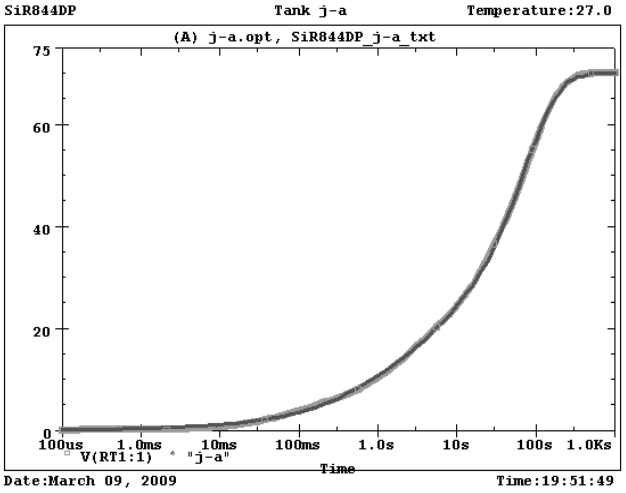
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

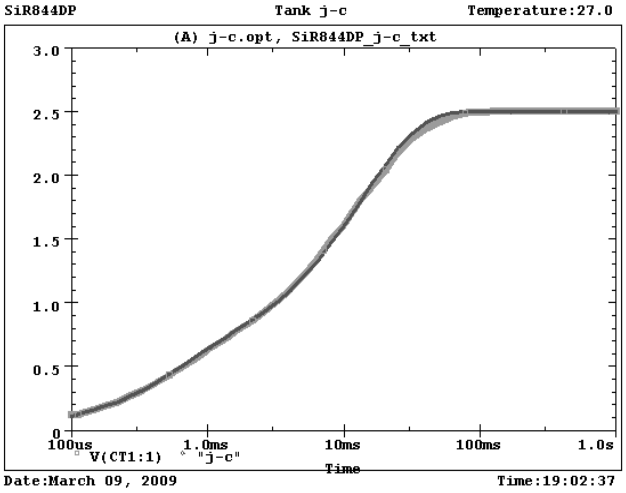
R-C THERMAL MODEL FOR FILTER CONFIGURATION

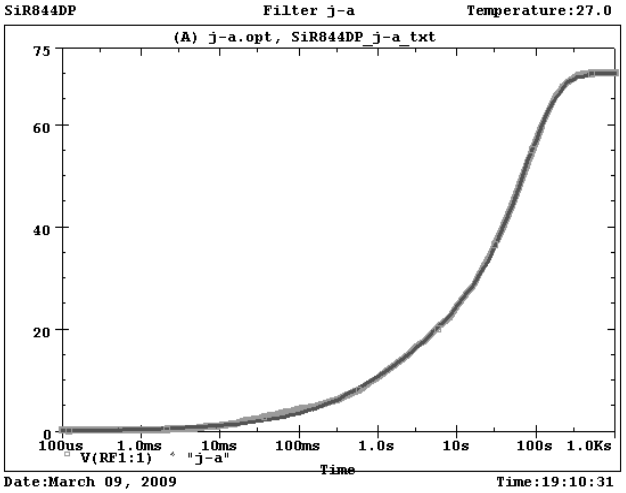


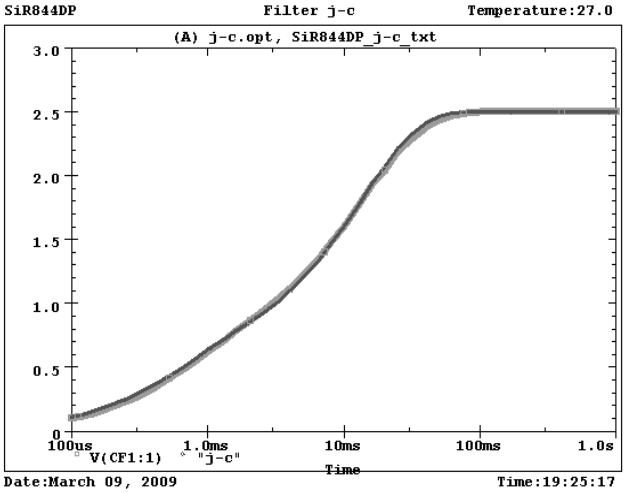
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.0007	816.8728 m	N/A
RF2	12.1908	1.4585	N/A
RF3	18.7317	170.3077 m	N/A
RF4	35.0768	54.2727 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.7740 m	922.5450 u	N/A
CF2	93.8928 m	6.5361 m	N/A
CF3	636.1392 m	46.6573 m	N/A
CF4	1.2392	52.9223 m	N/A

Note
N/A indicates not applicable


SiR844DP
Tank j-a
Temperature:27.0
(A) j-a.opt, SiR844DP_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:March 09, 2009
Time:19:51:49


SiR844DP
Tank j-c
Temperature:27.0
(A) j-c.opt, SiR844DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:March 09, 2009
Time:19:02:37


SiR844DP
Filter j-a
Temperature:27.0
(A) j-a.opt, SiR844DP_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:March 09, 2009
Time:19:10:31


SiR844DP
Filter j-c
Temperature:27.0
(A) j-c.opt, SiR844DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:March 09, 2009
Time:19:25:17