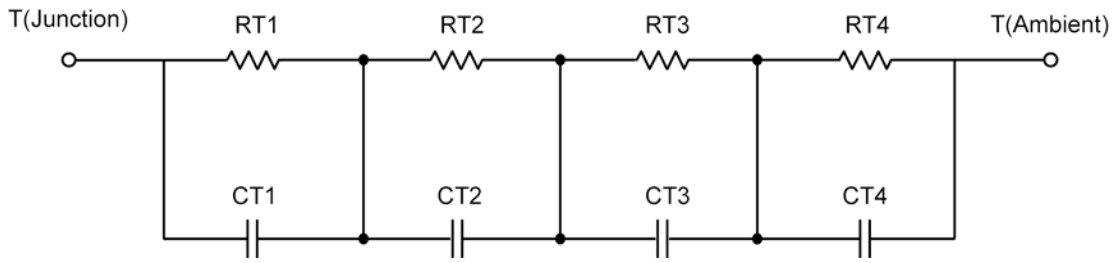
R-C Thermal Model Parameters

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."

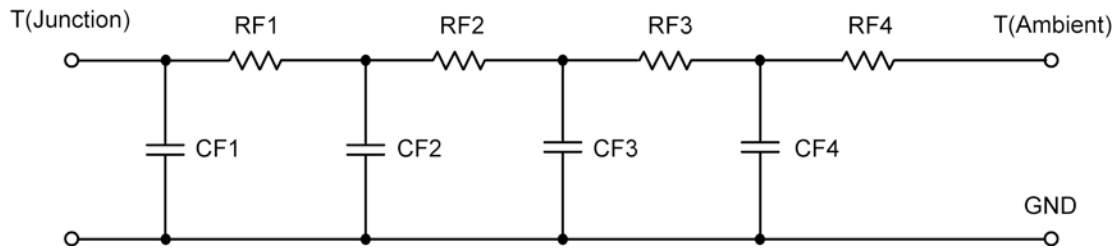
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.0679	N/A	2.3723
RT2	2.5692	N/A	7.6539
RT3	45.6494	N/A	2.7113
RT4	26.7135	N/A	12.2625
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	12.0849 m	N/A	639.9809 u
CT2	536.6335 u	N/A	9.2486 m
CT3	1.3531	N/A	463.6974 m
CT4	62.5585 m	N/A	70.3636 m

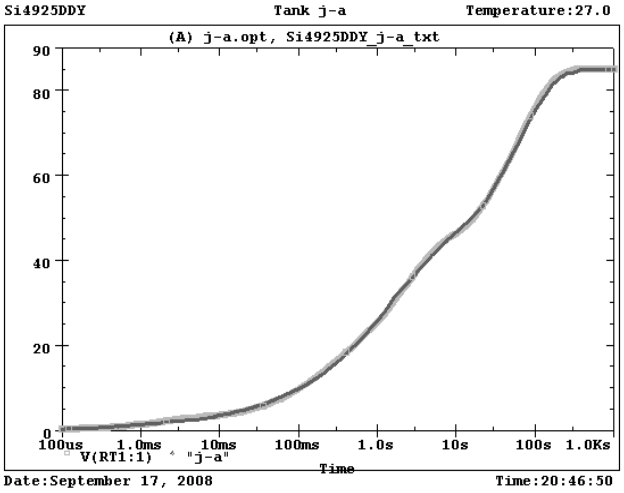
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

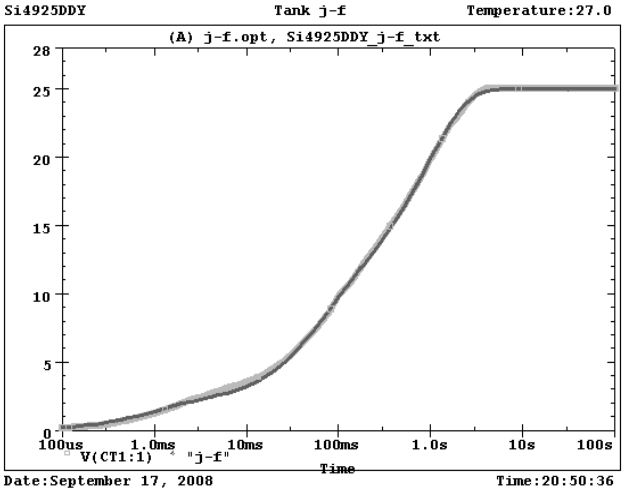
R-C THERMAL MODEL FOR FILTER CONFIGURATION

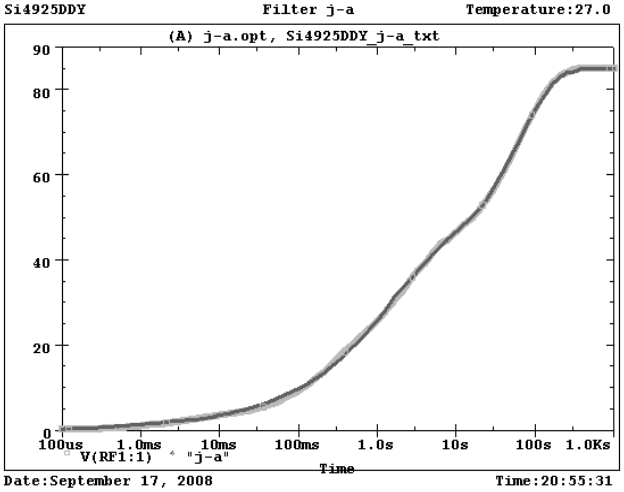


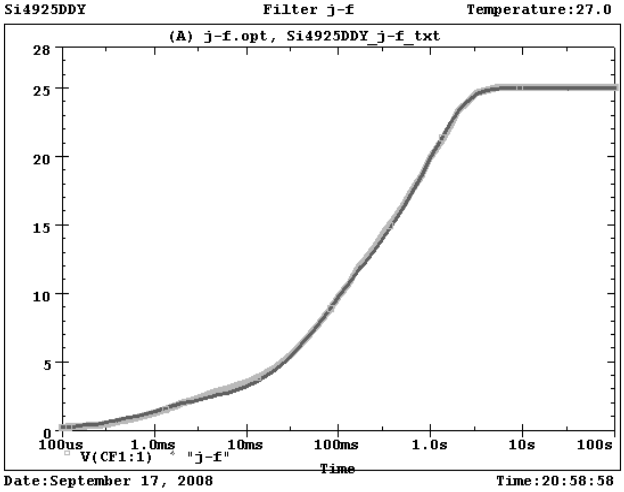
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.1513	N/A	2.6928
RF2	16.9724	N/A	10.0087
RF3	23.0698	N/A	7.2768
RF4	41.8065	N/A	5.0217
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	869.8273 u	N/A	592.5592 u
CF2	11.4743 m	N/A	7.6428 m
CF3	75.6833 m	N/A	62.4334 m
CF4	1.4839	N/A	28.3770 m

Note
NA indicates not applicable


Si4925DDY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4925DDY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:September 17, 2008
Time:20:46:50


Si4925DDY
Tank j-f
Temperature:27.0
(A) j-f.opt, Si4925DDY_j-f_txt
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)
"j-f"
Time
Date:September 17, 2008
Time:20:50:36


Si4925DDY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4925DDY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:September 17, 2008
Time:20:55:31


Si4925DDY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4925DDY_j-f_txt
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date:September 17, 2008
Time:20:58:58