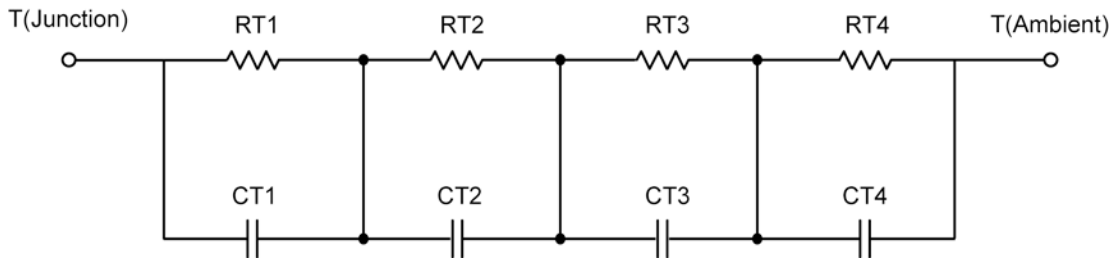
R-C Thermal Model Parameters

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."

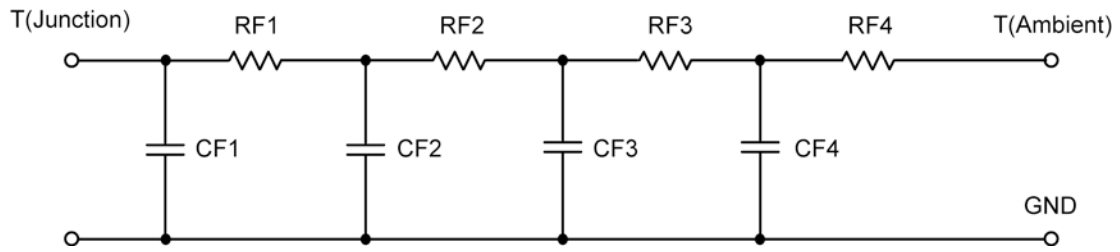
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	8.0569	N/A	19.4787
RT2	23.3179	N/A	20.6354
RT3	37.3670	N/A	5.2804
RT4	41.2582	N/A	9.6055
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	62.5310 u	N/A	77.0815 m
CT2	1.7509 m	N/A	6.2677 m
CT3	19.4202 m	N/A	60.6550 u
CT4	595.0193 m	N/A	812.5672 u

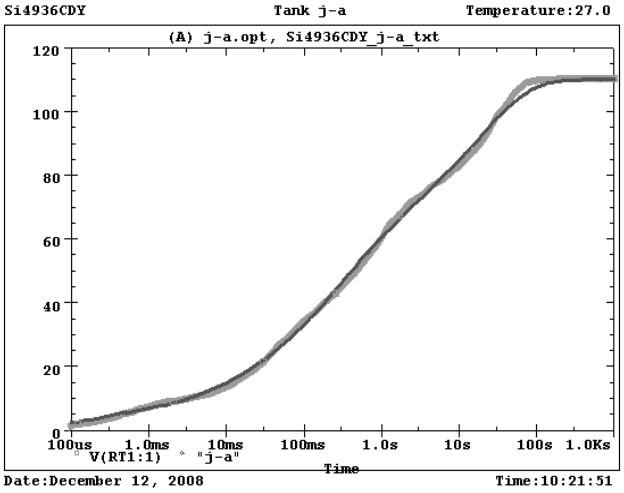
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

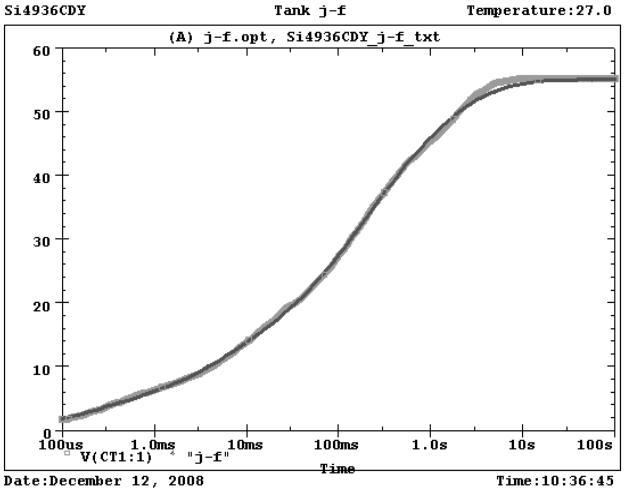
R-C THERMAL MODEL FOR FILTER CONFIGURATION

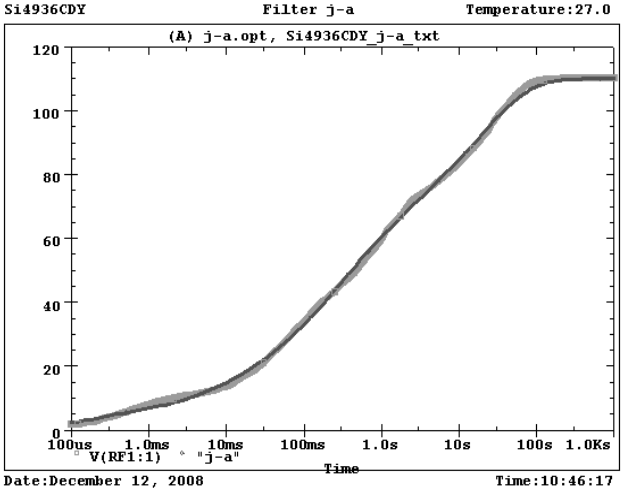


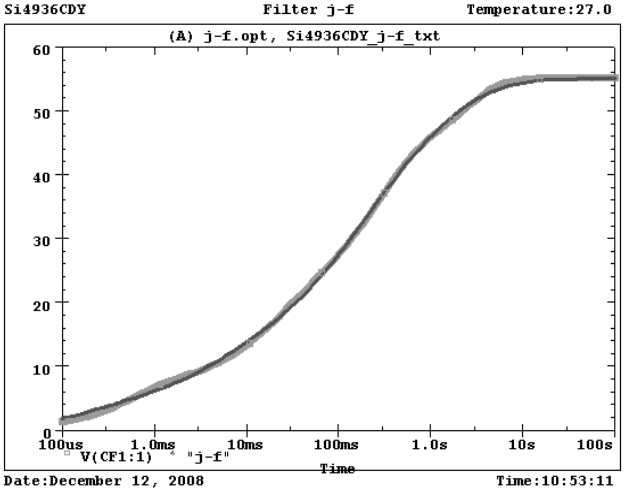
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.7619	N/A	8.0128
RF2	29.7961	N/A	14.7112
RF3	33.7741	N/A	20.9570
RF4	36.6679	N/A	11.3190
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	57.9764 u	N/A	74.7440 u
CF2	1.9414 m	N/A	1.2951 m
CF3	25.6614 m	N/A	9.6825 m
CF4	673.6587 m	N/A	170.4578 m

Note
NA indicates not applicable


Si4936CDY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4936CDY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:December 12, 2008
Time:10:21:51


Si4936CDY
Tank j-f
Temperature:27.0
(A) j-f.opt, Si4936CDY_j-f_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)
"j-f"
Time
Date:December 12, 2008
Time:10:36:45


Si4936CDY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4936CDY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:December 12, 2008
Time:10:46:17


Si4936CDY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4936CDY_j-f_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date:December 12, 2008
Time:10:53:11