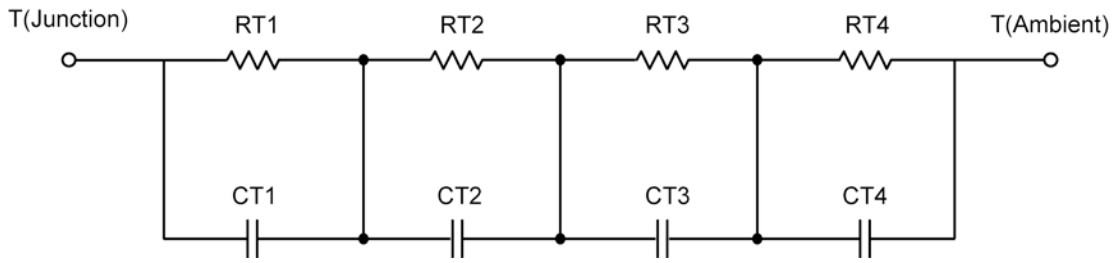
R-C Thermal Model Parameters

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."

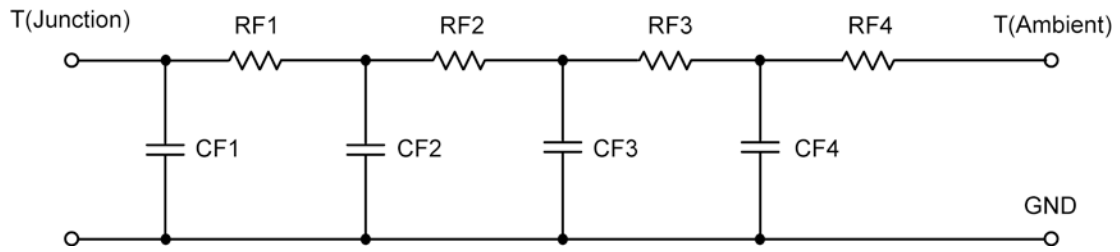
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	2.7109	439.7378 m	N/A
RT2	6.1095	281.6401 m	N/A
RT3	9.6207	344.5221 m	N/A
RT4	51.5589	1.4341	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	5.6676 m	802.1918 u	N/A
CT2	104.6094 m	91.0062 m	N/A
CT3	373.3295 m	10.3965 m	N/A
CT4	1.3878	8.9360 m	N/A

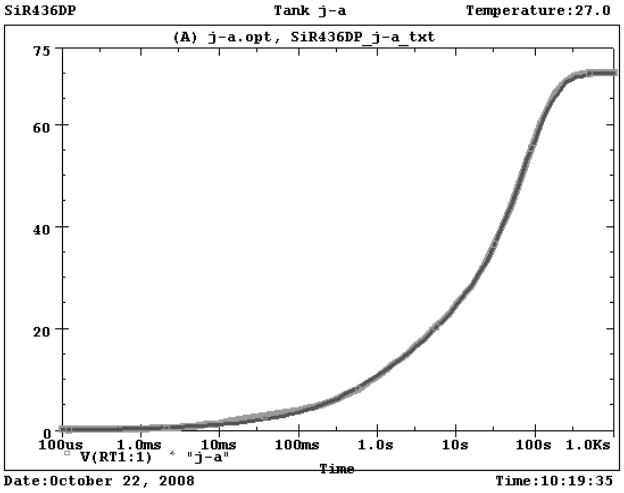
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

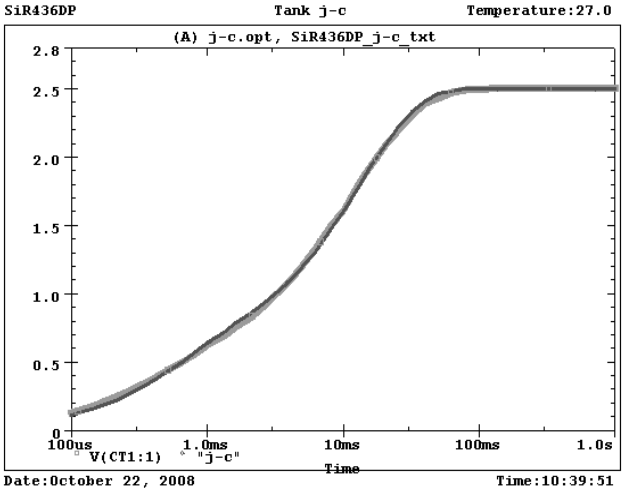
R-C THERMAL MODEL FOR FILTER CONFIGURATION

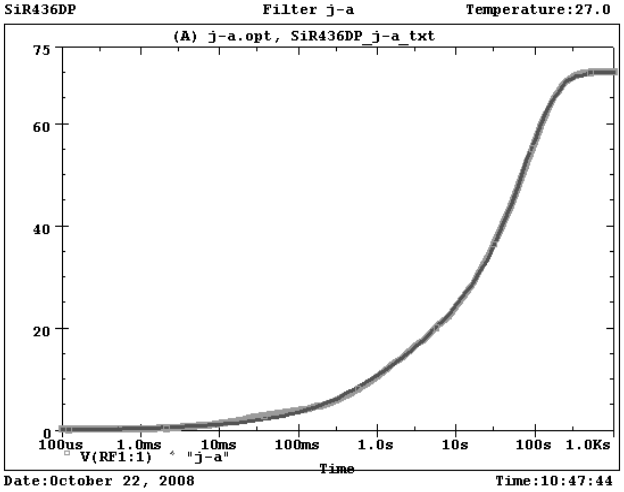


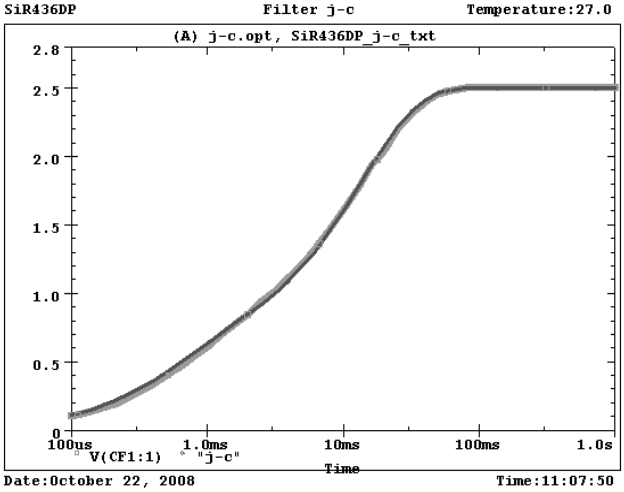
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.2077	805.2409 m	N/A
RF2	12.6600	925.3491 m	N/A
RF3	18.9417	544.9138 m	N/A
RF4	35.1906	224.4962 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	5.8905 m	936.1000 u	N/A
CF2	83.6761 m	5.7764 m	N/A
CF3	624.8972 m	5.6358 m	N/A
CF4	1.3066	648.7882 u	N/A

Note
NA indicates not applicable


SiR436DP
Tank j-a
Temperature:27.0
(A) j-a.opt, SiR436DP_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:October 22, 2008
Time:10:19:35


SiR436DP
Tank j-c
Temperature:27.0
(A) j-c.opt, SiR436DP_j-c_txt
2.8
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:October 22, 2008
Time:10:39:51


SiR436DP
Filter j-a
Temperature:27.0
(A) j-a.opt, SiR436DP_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:October 22, 2008
Time:10:47:44


SiR436DP
Filter j-c
Temperature:27.0
(A) j-c.opt, SiR436DP_j-c_txt
2.8
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:October 22, 2008
Time:11:07:50