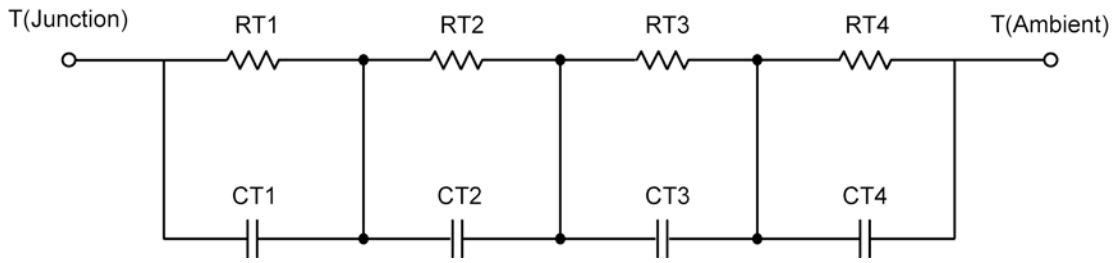
R-C Thermal Model Parameters

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."

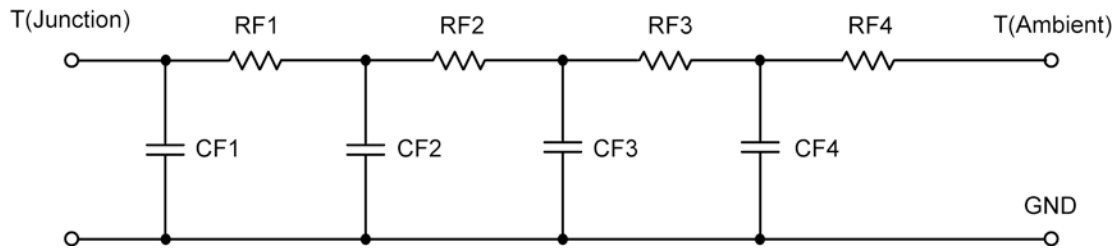
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	25.8101	1.3523	N/A
RT2	12.2296	5.6589	N/A
RT3	27.8919	5.0019	N/A
RT4	44.0684	3.9869	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.8429 m	1.0155 m	N/A
CT2	90.4530 u	564.8306 u	N/A
CT3	27.4482 m	55.9280 u	N/A
CT4	1.0617	357.4204 u	N/A

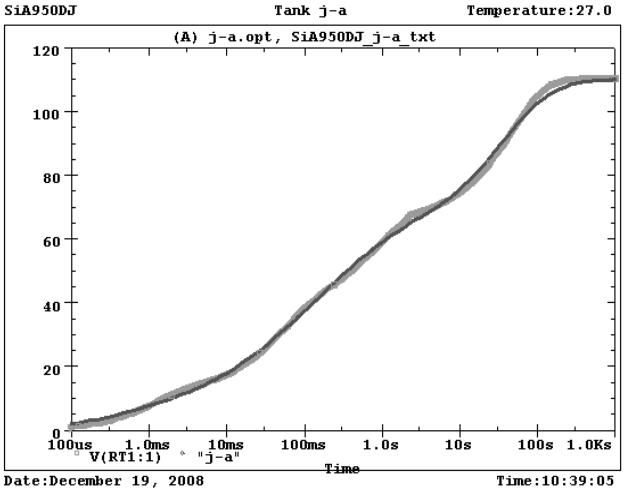
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

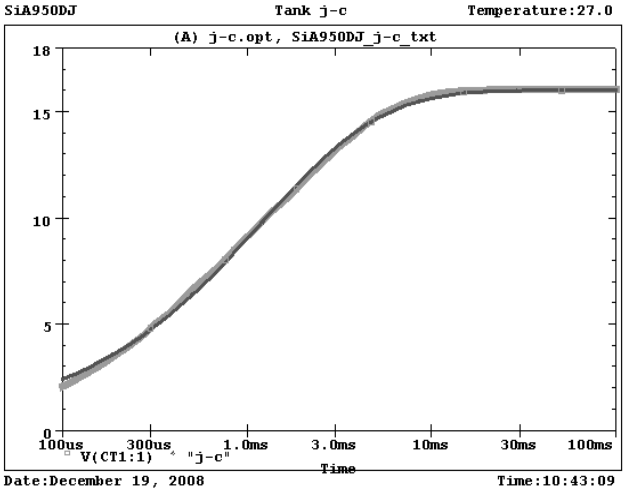
R-C THERMAL MODEL FOR FILTER CONFIGURATION

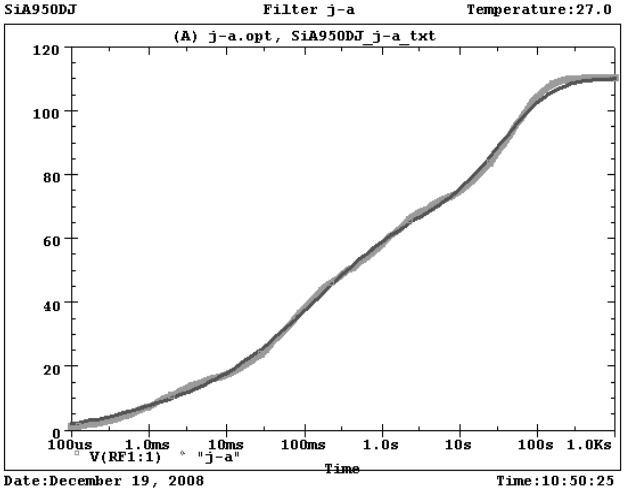


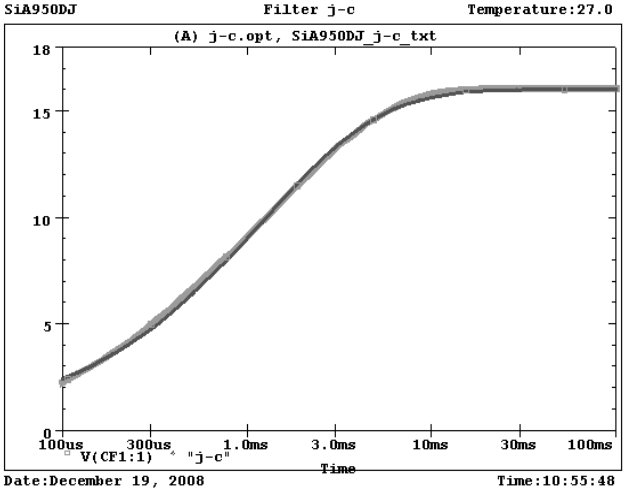
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.2316	6.6789	N/A
RF2	31.2017	4.9199	N/A
RF3	23.4768	2.7079	N/A
RF4	41.0899	1.6933	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	92.0082 u	37.0761 u	N/A
CF2	2.0230 m	118.4691 u	N/A
CF3	43.4109 m	211.8647 u	N/A
CF4	1.1315	980.4259 u	N/A

Note
NA indicates not applicable


SiA950DJ
Tank j-a
Temperature:27.0
(A) j-a.opt, SiA950DJ_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 19, 2008
Time:10:39:05


SiA950DJ
Tank j-c
Temperature:27.0
(A) j-c.opt, SiA950DJ_j-c_txt
18
15
10
5
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CT1:1) "j-c"
Time
Date:December 19, 2008
Time:10:43:09


SiA950DJ
Filter j-a
Temperature:27.0
(A) j-a.opt, SiA950DJ_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 19, 2008
Time:10:50:25


SiA950DJ
Filter j-c
Temperature:27.0
(A) j-c.opt, SiA950DJ_j-c_txt
18
15
10
5
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "j-c"
Time
Date:December 19, 2008
Time:10:55:48