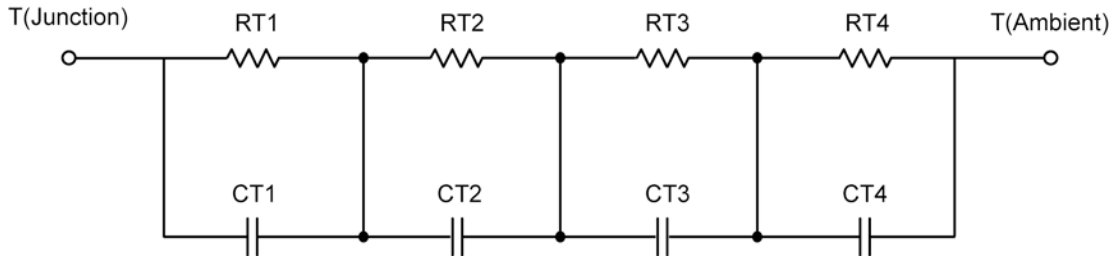
R-C Thermal Model Parameters

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."

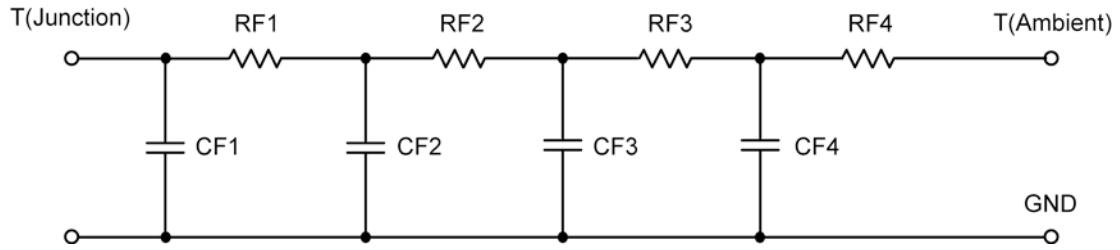
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.8023	183.8400 m	N/A
RT2	19.7128	673.8600 m	N/A
RT3	15.3153	1.4447	N/A
RT4	49.1696	1.6976	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.0364 m	35.1412 m	N/A
CT2	13.7076 m	148.4840 u	N/A
CT3	199.8086 m	1.0594 m	N/A
CT4	1.5762	730.9526 u	N/A

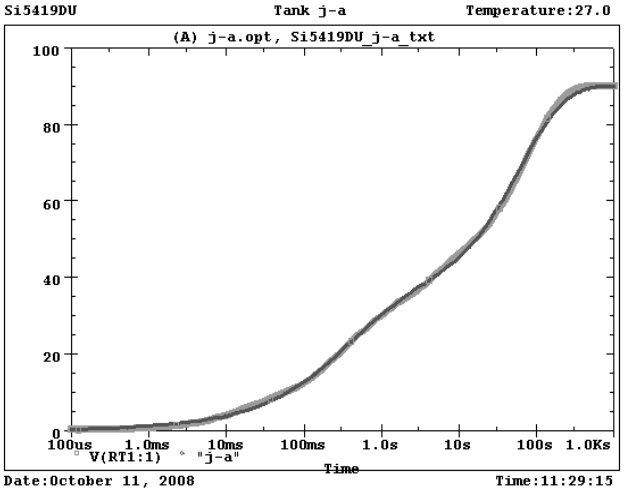
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

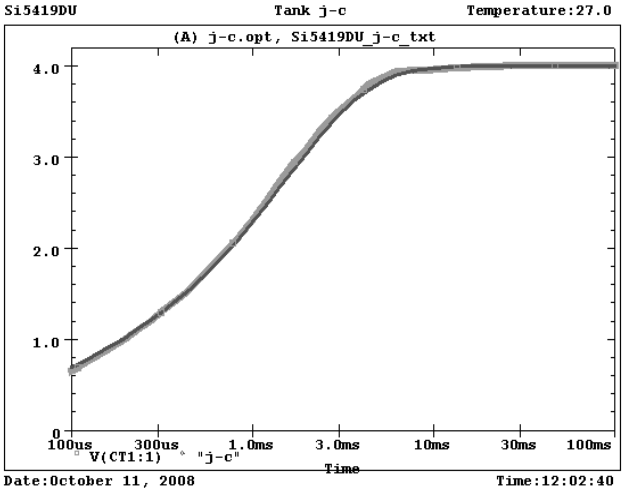
R-C THERMAL MODEL FOR FILTER CONFIGURATION

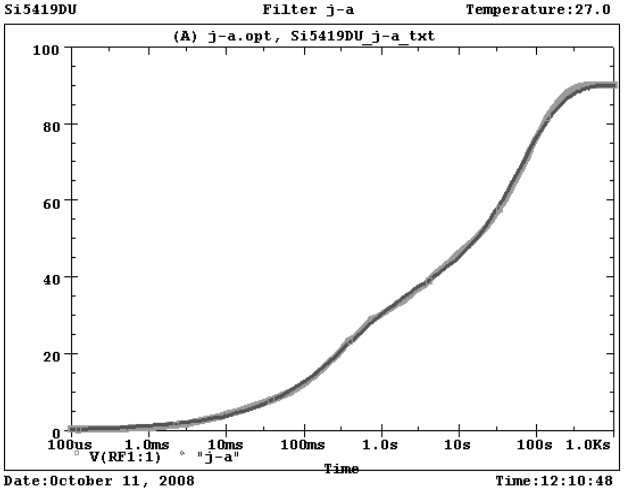


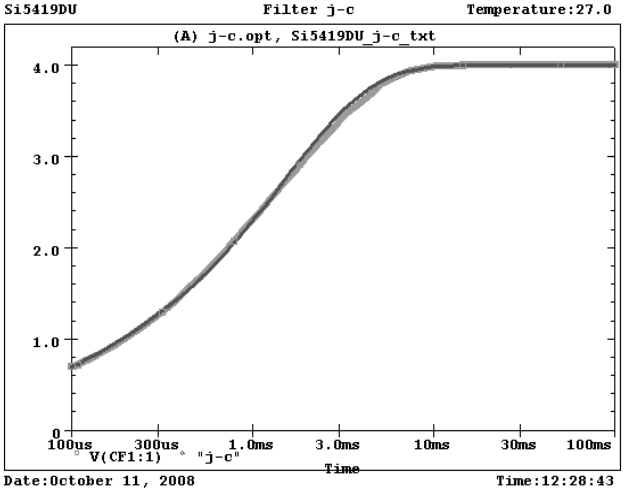
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.4287	721.2799 m	N/A
RF2	22.4787	1.8363	N/A
RF3	16.4303	839.3397 m	N/A
RF4	44.6623	603.0804 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.5458 m	78.0570 u	N/A
CF2	10.6099 m	227.4741 u	N/A
CF3	209.9492 m	1.0005 m	N/A
CF4	1.5045	88.8663 u	N/A

Note
NA indicates not applicable


Si5419DU
Tank j-a
Temperature:27.0
(A) j-a.opt, Si5419DU_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:October 11, 2008
Time:11:29:15


Si5419DU
Tank j-c
Temperature:27.0
(A) j-c.opt, Si5419DU_j-c_txt
4.0
3.0
2.0
1.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)
"j-c"
Time
Date:October 11, 2008
Time:12:02:40


Si5419DU
Filter j-a
Temperature:27.0
(A) j-a.opt, Si5419DU_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:October 11, 2008
Time:12:10:48


Si5419DU
Filter j-c
Temperature:27.0
(A) j-c.opt, Si5419DU_j-c_txt
4.0
3.0
2.0
1.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)
"j-c"
Time
Date:October 11, 2008
Time:12:28:43