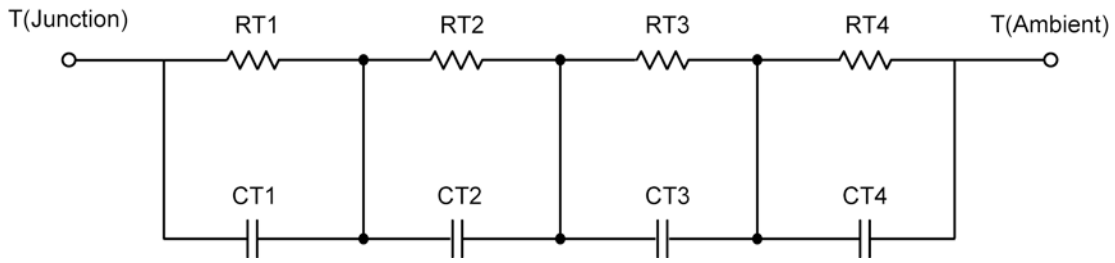
R-C Thermal Model Parameters

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."

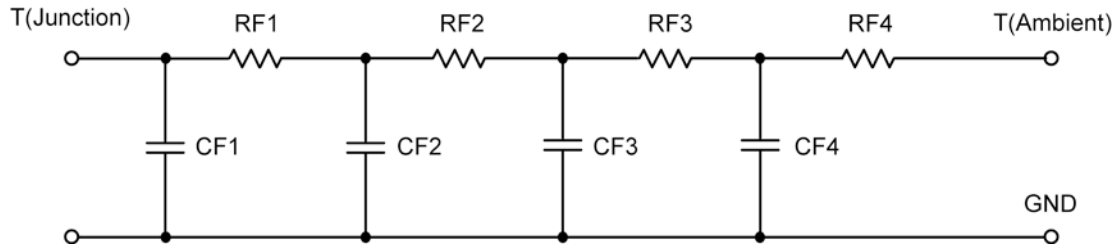
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.2339	623.4000 m	N/A
RT2	14.9833	1.4143	N/A
RT3	20.0274	1.3841	N/A
RT4	38.7554	2.0782	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.6361 m	1.3716	N/A
CT2	33.3391 m	1.6053 m	N/A
CT3	723.0025 m	830.1273 u	N/A
CT4	3.0308	7.7569 m	N/A

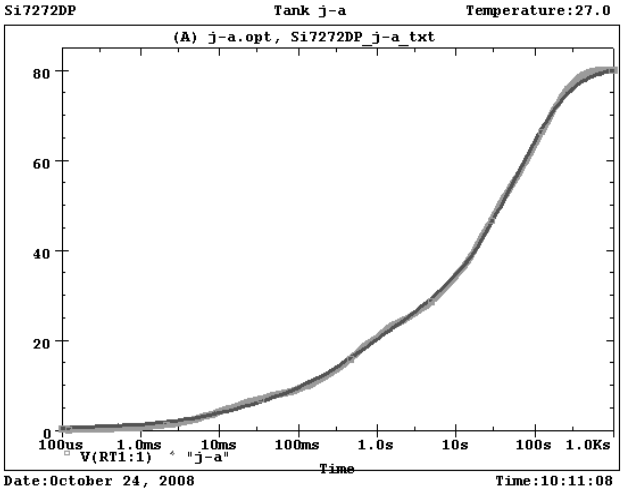
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

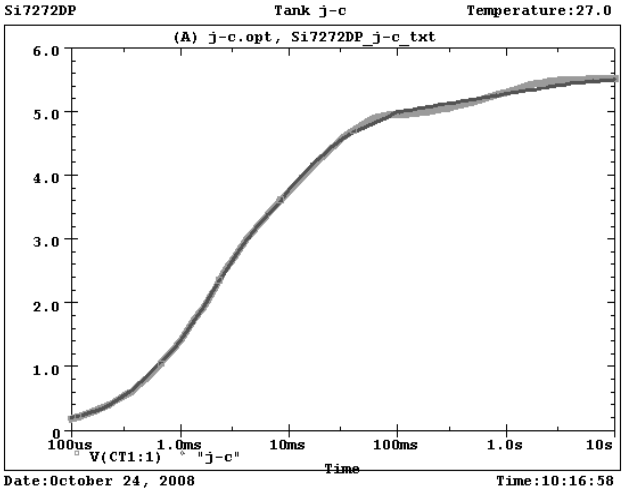
R-C THERMAL MODEL FOR FILTER CONFIGURATION

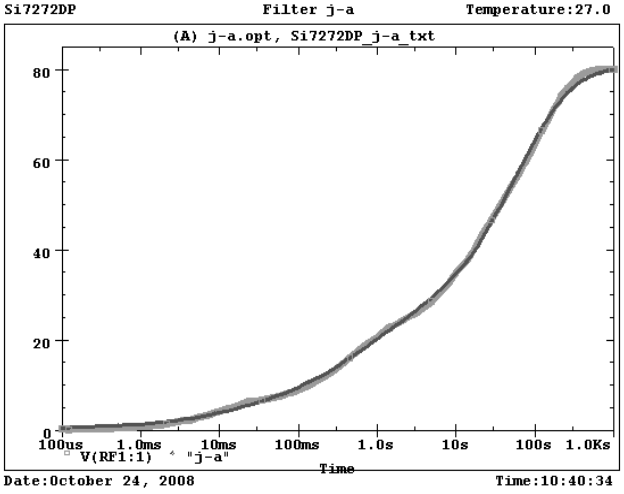


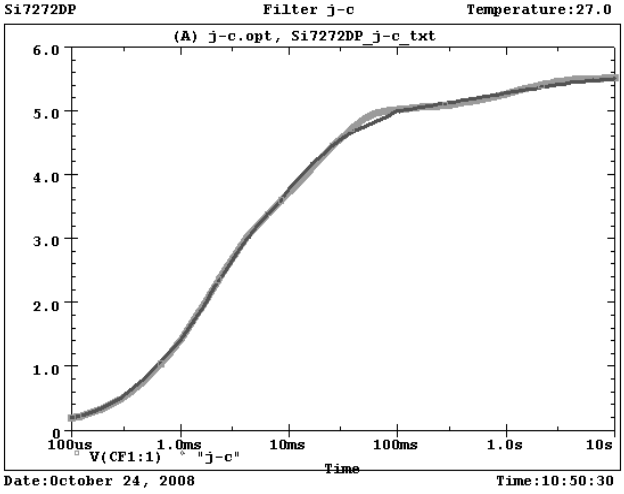
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.2528	3.1111	N/A
RF2	16.0082	427.6000 m	N/A
RF3	27.1427	1.4667	N/A
RF4	30.5963	494.6000 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.4233 m	528.7806 u	N/A
CF2	26.8160 m	6.6443 m	N/A
CF3	521.9735 m	3.4190 m	N/A
CF4	3.1262	2.5279	N/A

Note
NA indicates not applicable


Si7272DP
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7272DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:October 24, 2008
Time:10:11:08


Si7272DP
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7272DP_j-c_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"j-c"
Time
Date:October 24, 2008
Time:10:16:58


Si7272DP
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7272DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:October 24, 2008
Time:10:40:34


Si7272DP
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7272DP_j-c_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-c"
Time
Date:October 24, 2008
Time:10:50:30