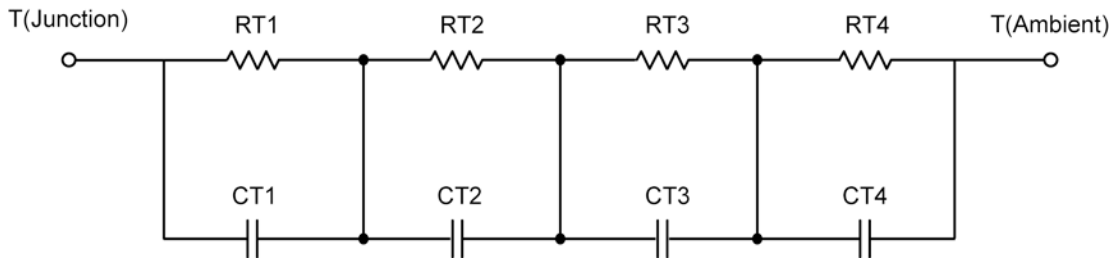
R-C Thermal Model Parameters

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."

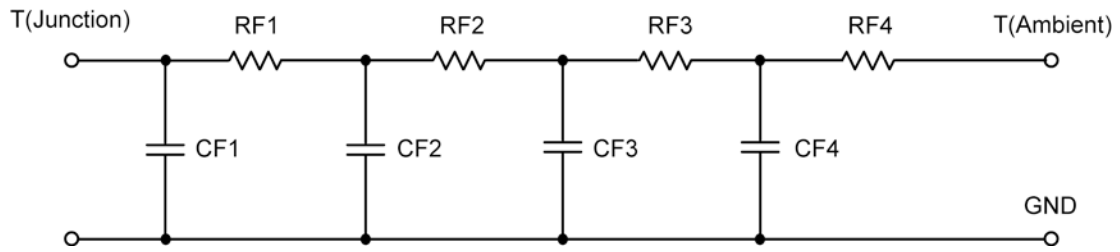
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	721.5000 m	245.8668 m	N/A
RT2	4.0594	130.7588 m	N/A
RT3	11.7228	689.2463 m	N/A
RT4	48.4963	434.1281 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.1848 m	2.1032 m	N/A
CT2	46.9554 m	63.4203 m	N/A
CT3	185.9092 m	11.8271 m	N/A
CT4	1.4565	19.0799 m	N/A

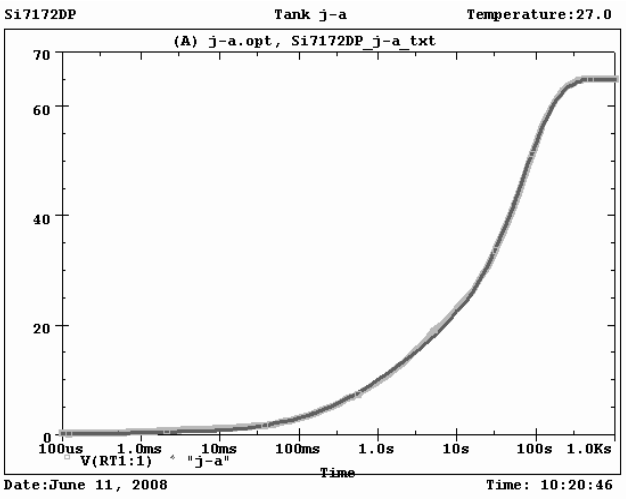
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

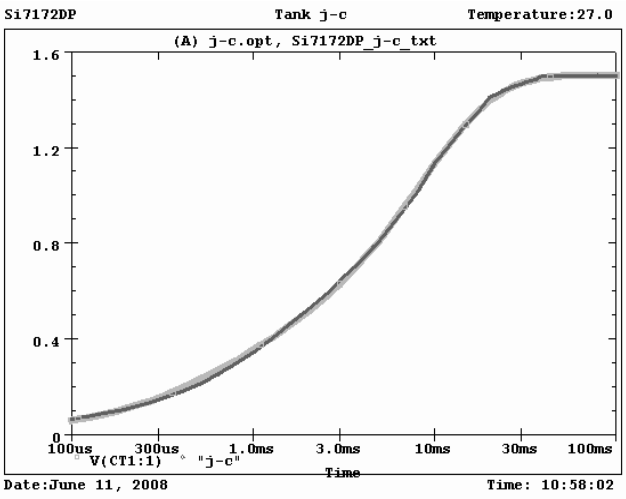
R-C THERMAL MODEL FOR FILTER CONFIGURATION

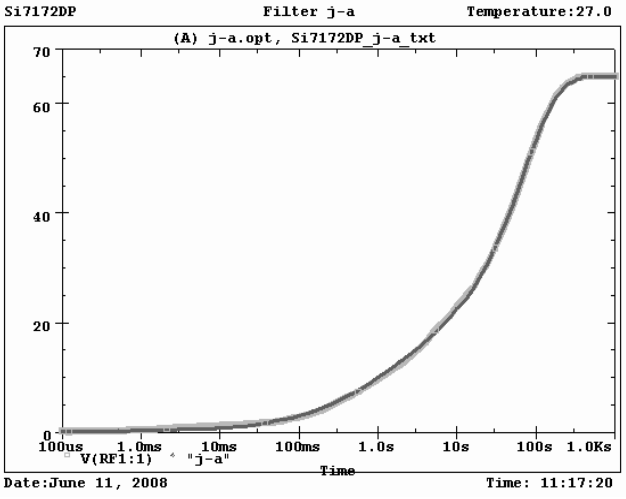


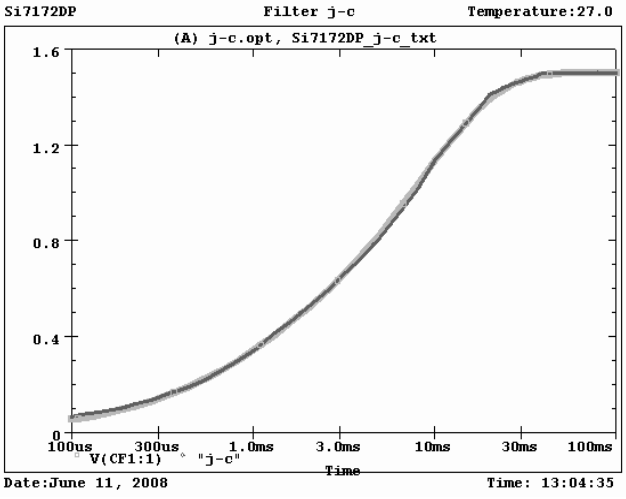
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.0206	400.8320 m	N/A
RF2	7.8136	214.8692 m	N/A
RF3	13.1439	98.0585 m	N/A
RF4	43.0219	786.2403 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.1696 m	1.7674 m	N/A
CF2	46.0070 m	2.7808 m	N/A
CF3	234.6585 m	28.5047 u	N/A
CF4	1.3521	4.9884 m	N/A

Note
NA indicates not applicable


Si7172DP
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7172DP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:June 11, 2008
Time: 10:20:46


Si7172DP
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7172DP_j-c_txt
1.6
1.2
0.8
0.4
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)
"j-c"
Time
Date:June 11, 2008
Time: 10:58:02


Si7172DP
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7172DP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:June 11, 2008
Time: 11:17:20


Si7172DP
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7172DP_j-c_txt
1.6
1.2
0.8
0.4
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)
"j-c"
Time
Date:June 11, 2008
Time: 13:04:35