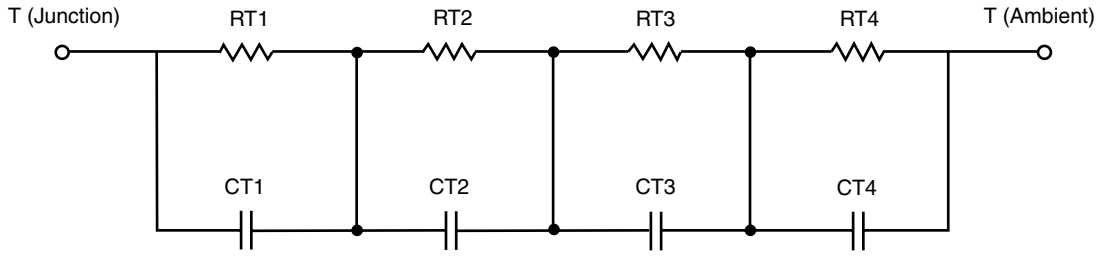
R-C Thermal Model Parameters

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

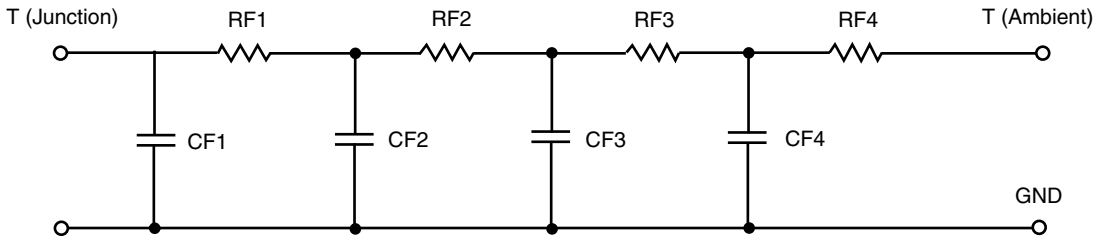


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.1445	1.2625	N/A
RT2	19.9992	756.0587 m	N/A
RT3	12.9882	1.6067	N/A
RT4	32.4905	568.8167 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	800.7029 u	9.7047 m	N/A
CT2	800.4347 m	231.7825 u	N/A
CT3	44.5832 m	2.7296 m	N/A
CT4	3.5730	59.9343 m	N/A

Note
N/A indicates not applicable

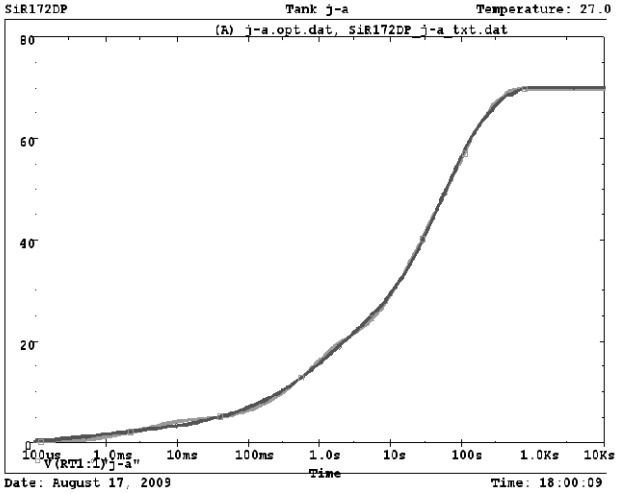
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

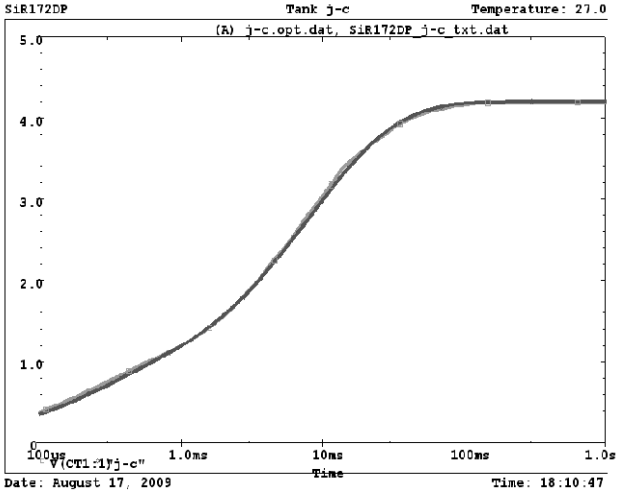
R-C THERMAL MODEL FOR FILTER CONFIGURATION

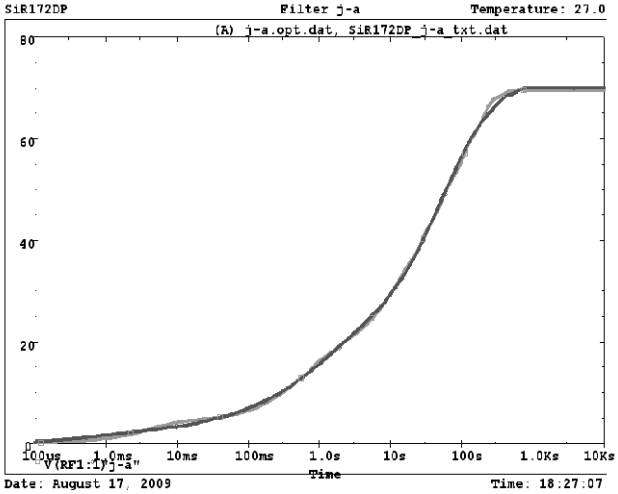


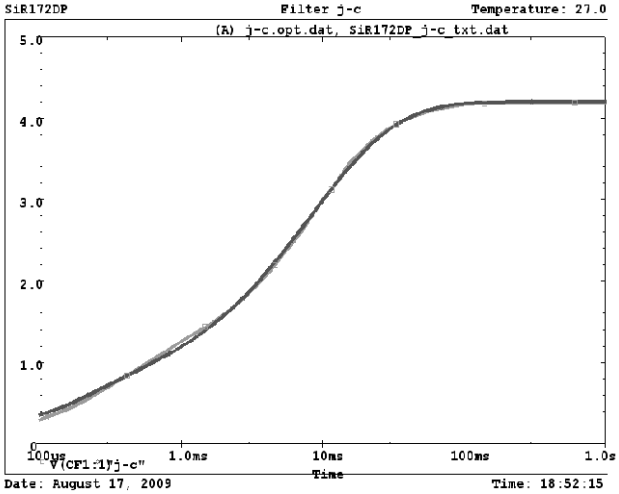
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.3843	1.2034	N/A
RF2	13.8729	2.5951	N/A
RF3	22.4450	355.5178 m	N/A
RF4	28.7972	36.4413 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	864.4478 u	297.1840 u	N/A
CF2	40.1066 m	2.7819 m	N/A
CF3	531.0055 m	66.3246 m	N/A
CF4	2.7495	31.4831 m	N/A

Note
N/A indicates not applicable


SiR172DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR172DP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
10Ks
V(RT1:1)j-a"
Time
Date: August 17, 2009
Time: 18:00:09


SiR172DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR172DP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c"
Time
Date: August 17, 2009
Time: 18:10:47


SiR172DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR172DP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
10Ks
V(RF1:1)j-a"
Time
Date: August 17, 2009
Time: 18:27:07


SiR172DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR172DP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c"
Time
Date: August 17, 2009
Time: 18:52:15