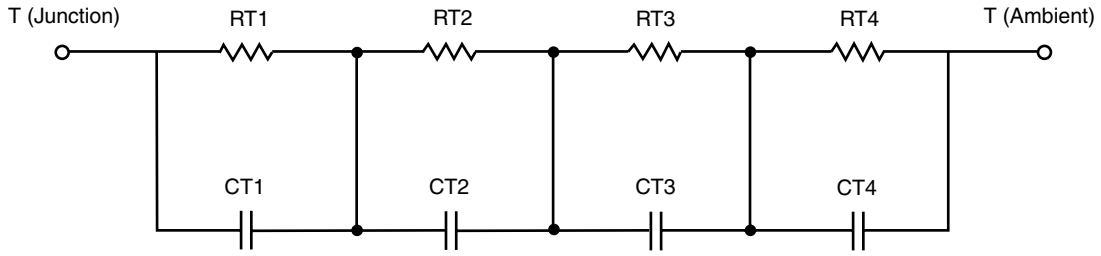
R-C Thermal Model Parameters

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

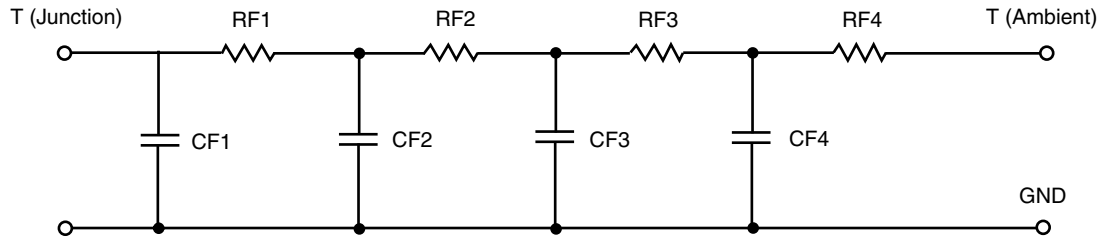


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.6244	N/A	8.0193
RT2	15.8208	N/A	9.5768
RT3	19.1414	N/A	5.3310
RT4	44.1586	N/A	2.0794
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.0525 m	N/A	177.3099 m
CT2	28.5645 m	N/A	43.4363 m
CT3	140.0930 m	N/A	8.5133 m
CT4	1.4752	N/A	526.5978 u

Note
N/A indicates not applicable

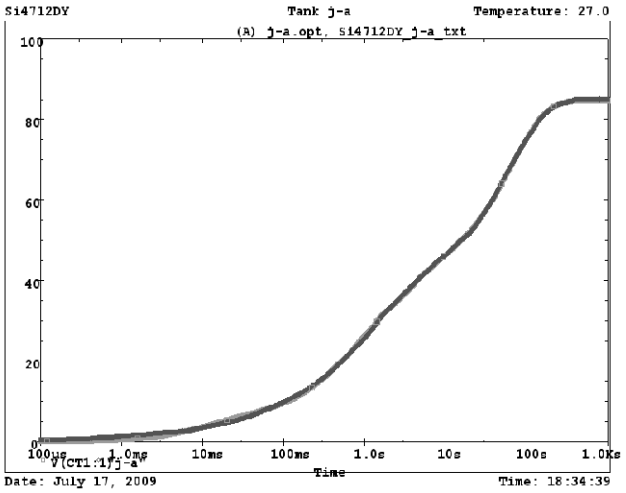
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

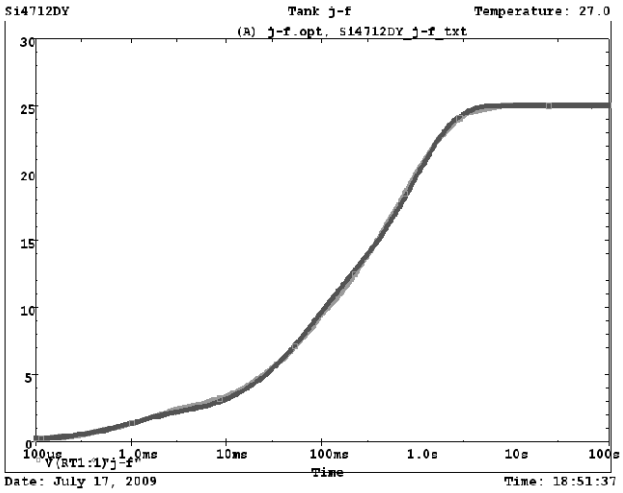
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.3086	N/A	2.7487
RF2	21.6649	N/A	8.6873
RF3	17.9242	N/A	8.9298
RF4	40.1023	N/A	4.6562
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.4069 m	N/A	713.8635 u
CF2	19.0318 m	N/A	7.2569 m
CF3	132.6740 m	N/A	43.5949 m
CF4	1.5081	N/A	131.4399 m

Note
N/A indicates not applicable


Si4712DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4712DY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CT1:1)j-a
Time
Date: July 17, 2009
Time: 18:34:39


Si4712DY
Tank j-f
Temperature: 27.0
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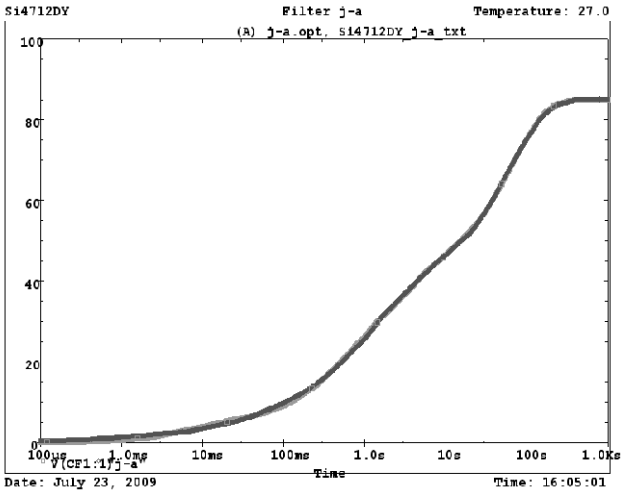
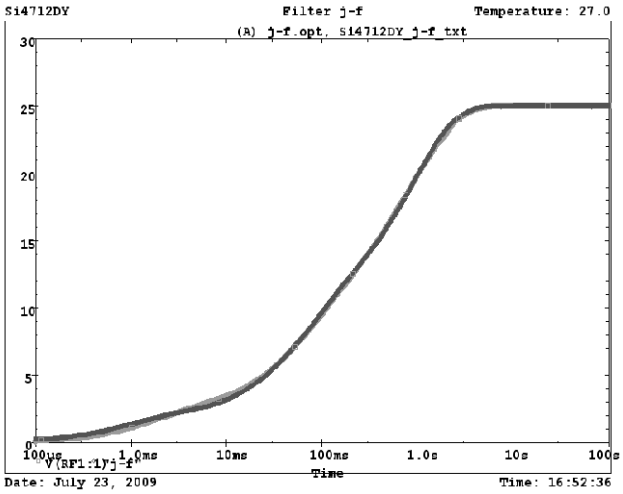
30
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RT1:1)j-f
Time
Date: July 17, 2009
Time: 18:51:37


Si4712DY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4712DY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CF1:1)j-a
Time
Date: July 23, 2009
Time: 16:05:01


Si4712DY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4712DY_j-f_txt
30
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RF1:1)j-f
Time
Date: July 23, 2009
Time: 16:52:36