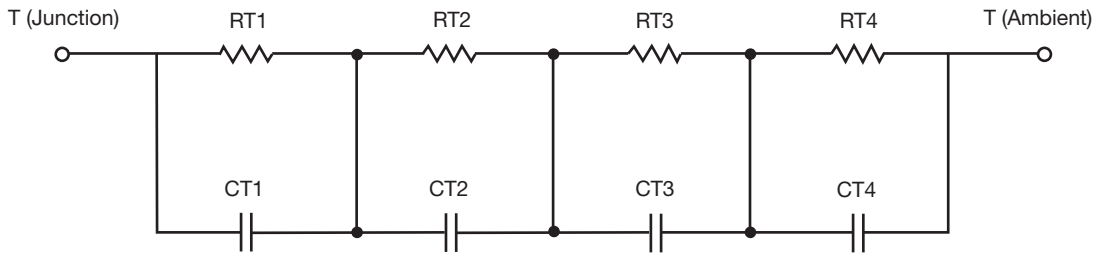
R-C Thermal Model Parameters

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

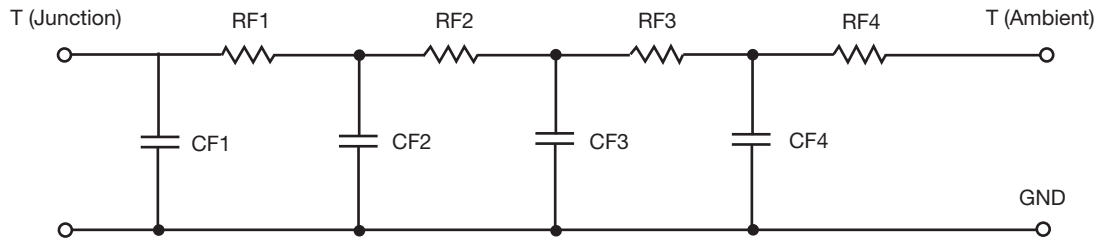


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	27.0649	N/A	19.0930
RT2	25.9226	N/A	15.9337
RT3	7.7216	N/A	3.4662
RT4	49.2909	N/A	6.5071
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	7.6488m	N/A	48.4816m
CT2	104.5666m	N/A	6.7573m
CT3	362.5060u	N/A	137.0604u
CT4	1.8976	N/A	1.9636m

Note
N/A indicates not applicable

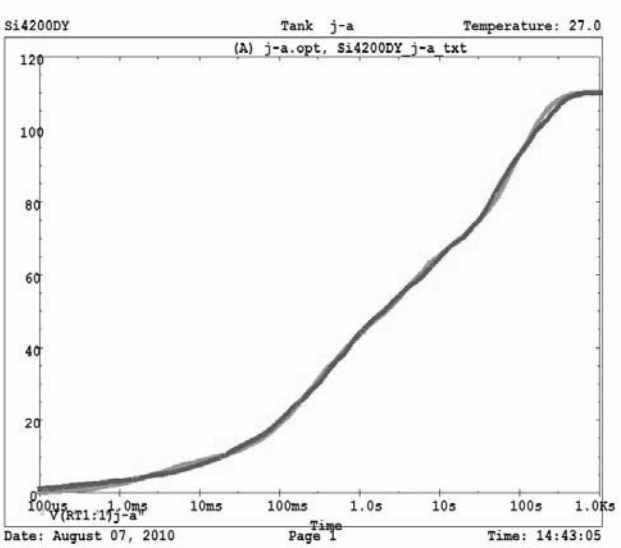
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

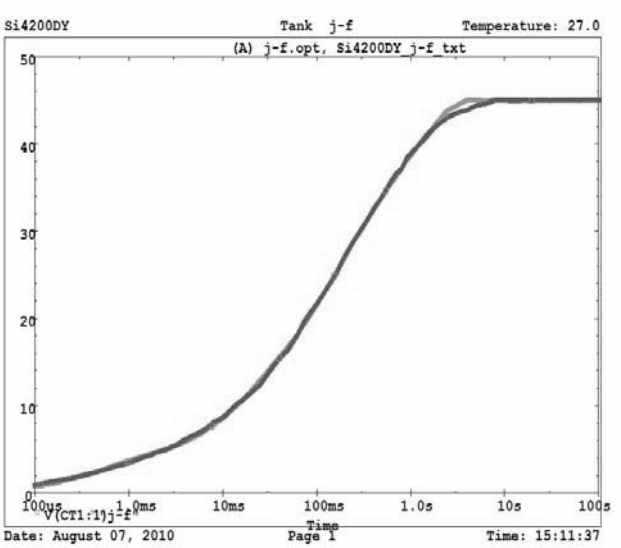
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.5029	N/A	5.0442
RF2	30.0367	N/A	13.6446
RF3	25.2253	N/A	17.4983
RF4	45.2351	N/A	8.8129
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	415.3426u	N/A	156.3599u
CF2	7.4216m	N/A	1.9461m
CF3	113.7811m	N/A	10.5641m
CF4	1.9996	N/A	137.5572m

Note
N/A indicates not applicable


Si4200DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4200DY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: August 07, 2010
Page 1
Time: 14:43:05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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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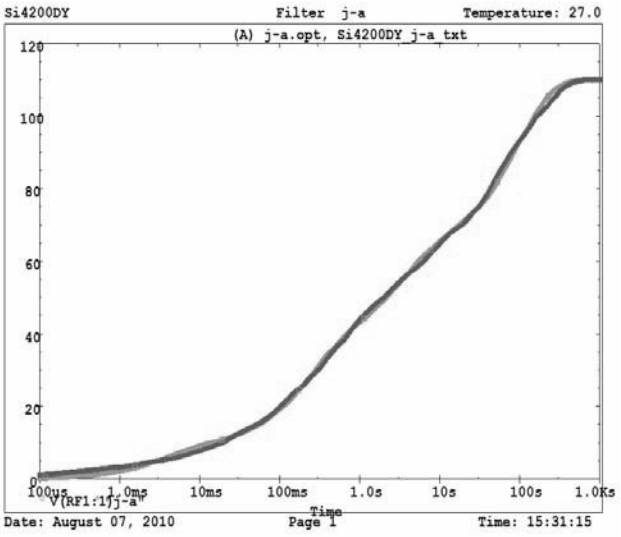
Time
Date: August 07, 2010
Page 1
Time: 15:11:37


Si4200DY
Filter j-a
Temperature: 27.0
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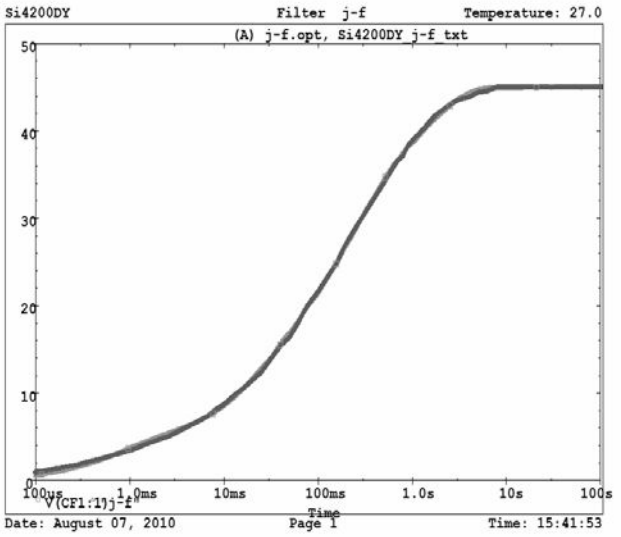
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: August 07, 2010
Page 1
Time: 15:31:15


Si4200DY
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: August 07, 2010
Page 1
Time: 15:41:53