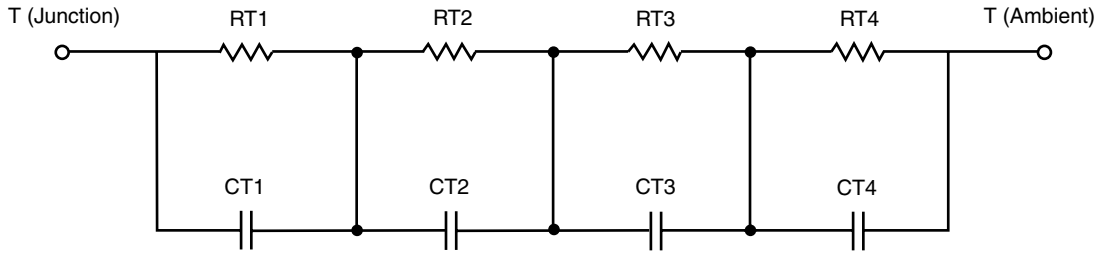
R-C Thermal Model Parameters

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

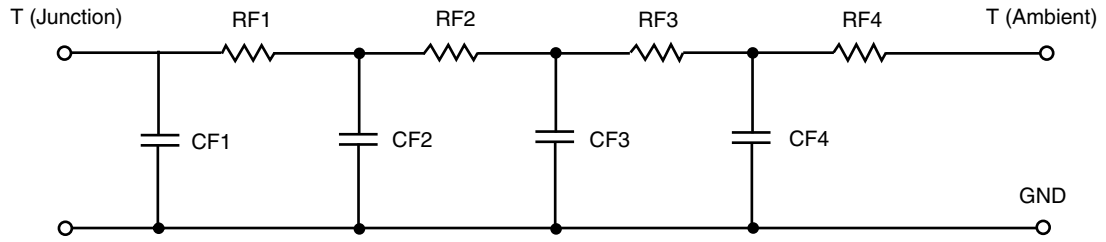


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	12.3498	N/A	12.7452
RT2	35.6279	N/A	20.8236
RT3	41.6187	N/A	20.8313
RT4	40.4036	N/A	20.3366
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	187.6991 u	N/A	65.6989 u
CT2	4.0499 m	N/A	653.3579 u
CT3	20.6870 m	N/A	4.1253 m
CT4	1.7507	N/A	1.8300 m

Note
N/A indicates not applicable

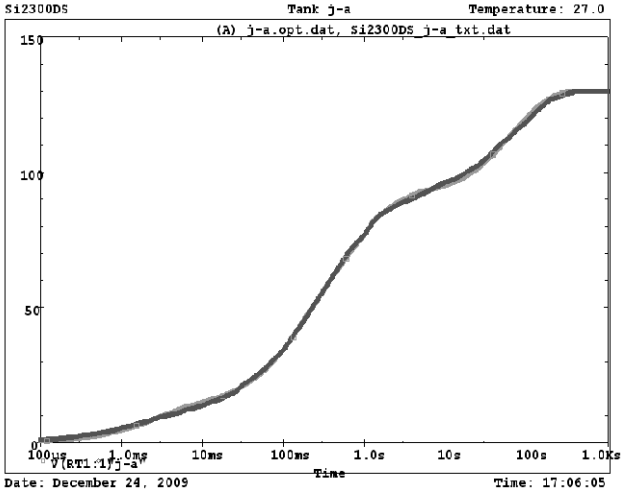
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

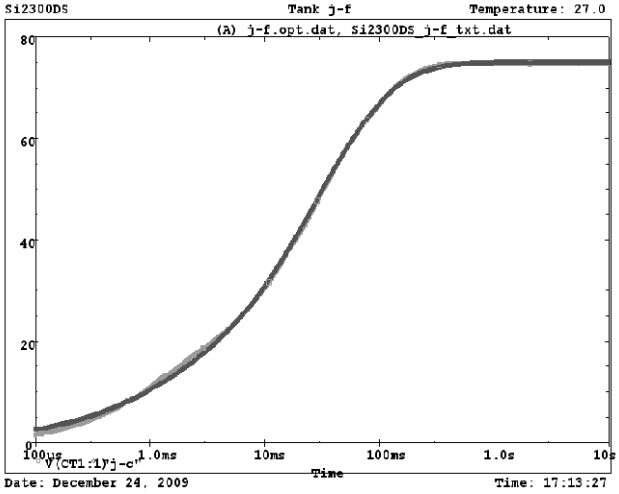
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.2793	N/A	16.4588
RF2	47.0412	N/A	30.2740
RF3	31.2679	N/A	23.6650
RF4	38.4116	N/A	4.7044
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	174.4226 u	N/A	60.6897 u
CF2	3.0928 m	N/A	363.2633 u
CF3	24.2604 m	N/A	943.2779 u
CF4	1.8894	N/A	51.2933 m

Note
N/A indicates not applicable


Si2300DS
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si2300DS_j-a_txt.dat
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: December 24, 2009
Time: 17:06:05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Tank j-f
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
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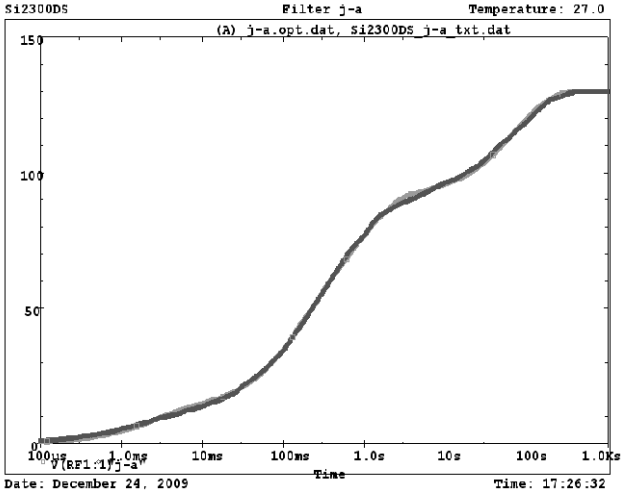
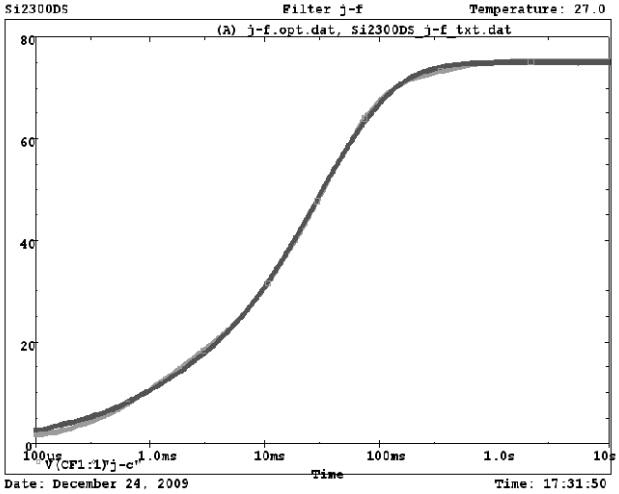
Time
Date: December 24, 2009
Time: 17:13:27


Si2300DS
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si2300DS_j-a_txt.dat
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: December 24, 2009
Time: 17:26:32


Si2300DS
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, Si2300DS_j-f_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: December 24, 2009
Time: 17:31:50