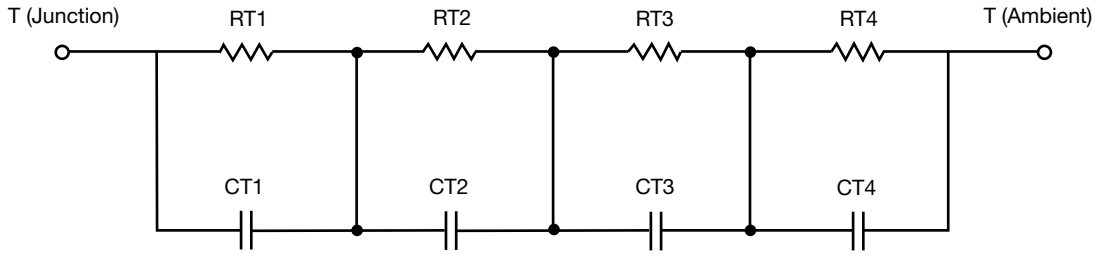
R-C Thermal Model Parameters

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

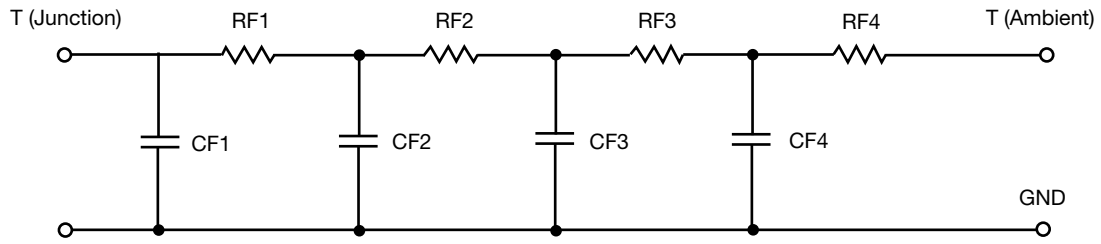


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.9182	N/A	16.5372
RT2	49.3315	N/A	6.4994
RT3	39.1225	N/A	5.2384
RT4	63.7608	N/A	21.5138
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	701.3796u	N/A	13.6525m
CT2	3.3754m	N/A	12.5600m
CT3	29.2682m	N/A	725.5550u
CT4	1.2486	N/A	38.9822m

Note
N/A indicates not applicable

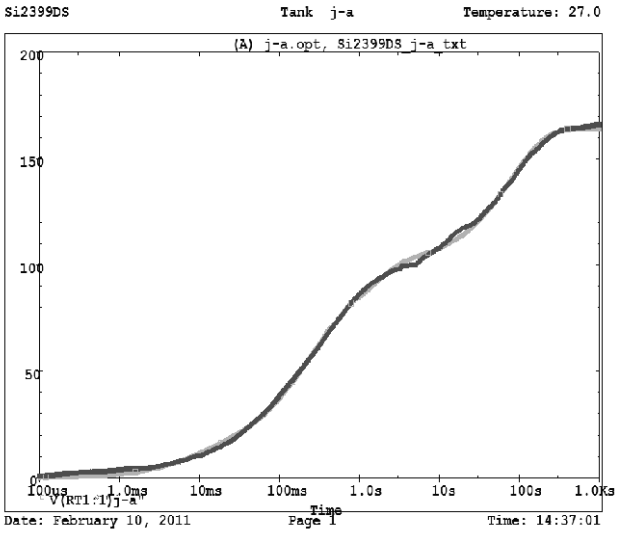
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

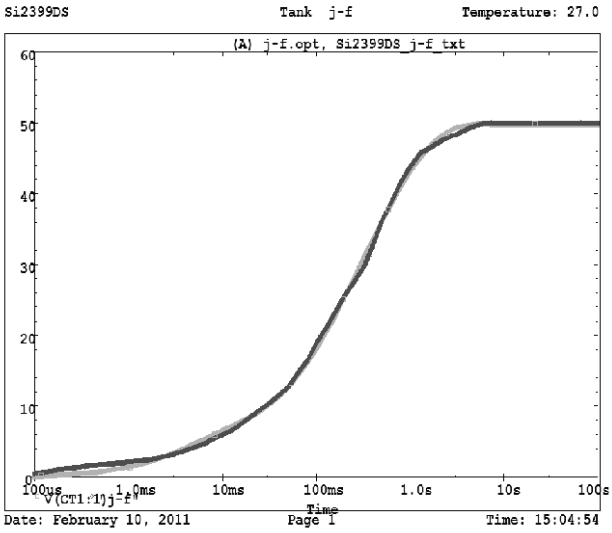
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	23.3999	N/A	3.6830
RF2	54.6392	N/A	21.2037
RF3	25.3561	N/A	7.2087
RF4	60.8998	N/A	17.5212
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	704.5131u	N/A	277.0501u
CF2	3.3536m	N/A	3.6224m
CF3	51.0737m	N/A	18.5373m
CF4	1.2759	N/A	2.1818m

Note
N/A indicates not applicable


Si2399DS
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si2399DS_j-a_txt
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: February 10, 2011
Page 1
Time: 14:37:01


Si2399DS
Tank j-f
Temperature: 27.0
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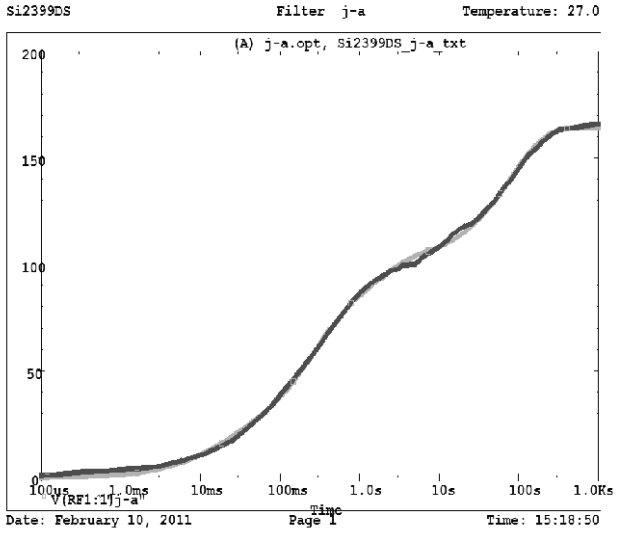
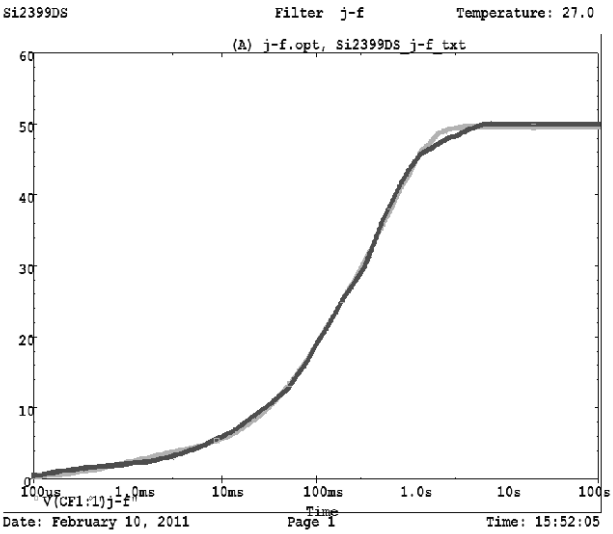
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)j-f
Time
Date: February 10, 2011
Page 1
Time: 15:04:54


Si2399DS
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si2399DS_j-a_txt
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: February 10, 2011
Page 1
Time: 15:18:50


Si2399DS
Filter j-f
Temperature: 27.0
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60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: February 10, 2011
Page 1
Time: 15:52:05