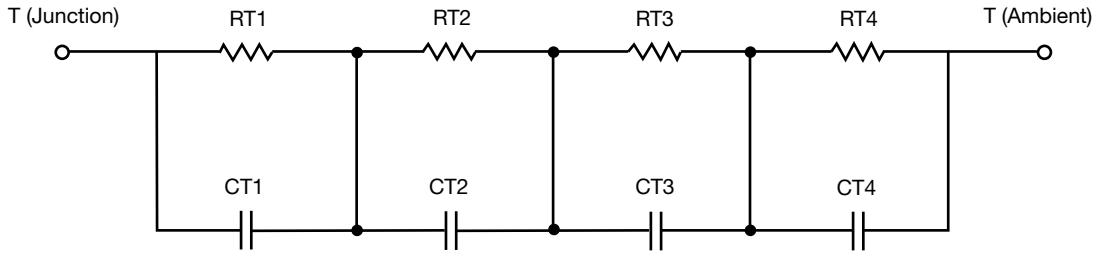
R-C Thermal Model Parameters

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

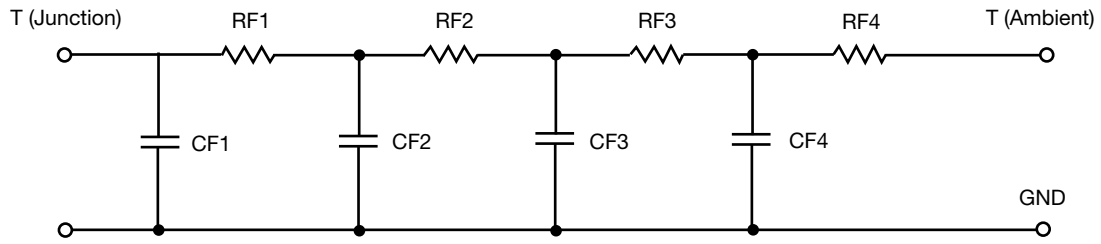


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.5738	N/A	4.4147
RT2	15.9170	N/A	11.5125
RT3	20.3574	N/A	7.0107
RT4	43.8970	N/A	2.0296
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.4648m	N/A	110.8651m
CT2	15.4855m	N/A	91.1446m
CT3	143.6564m	N/A	8.3411m
CT4	1.5061	N/A	910.9644u

Note
N/A indicates not applicable

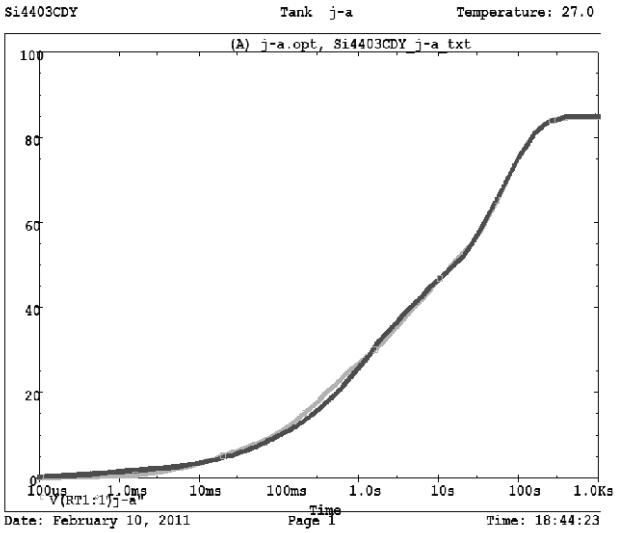
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

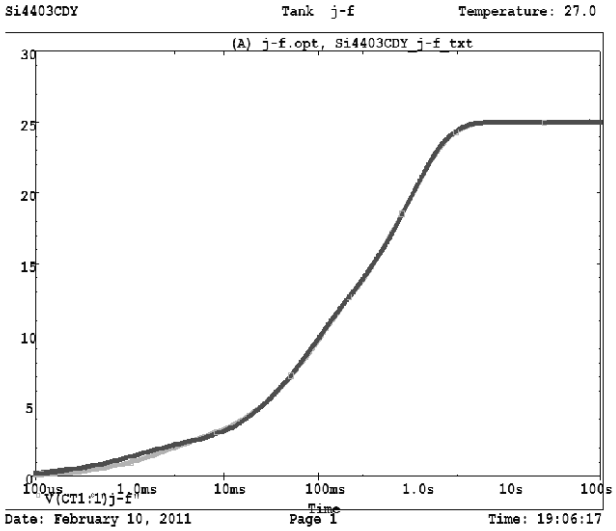
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.0329	N/A	2.5783
RF2	21.4254	N/A	9.8042
RF3	16.3327	N/A	7.4635
RF4	39.9605	N/A	5.1540
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.2462m	N/A	703.9573u
CF2	22.6127m	N/A	7.2530m
CF3	142.2152m	N/A	64.9287m
CF4	1.4588	N/A	1.7235m

Note
N/A indicates not applicable


Si4403CDY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4403CDY_j-a_txt
100
80
60
40
20
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: 18:44:23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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
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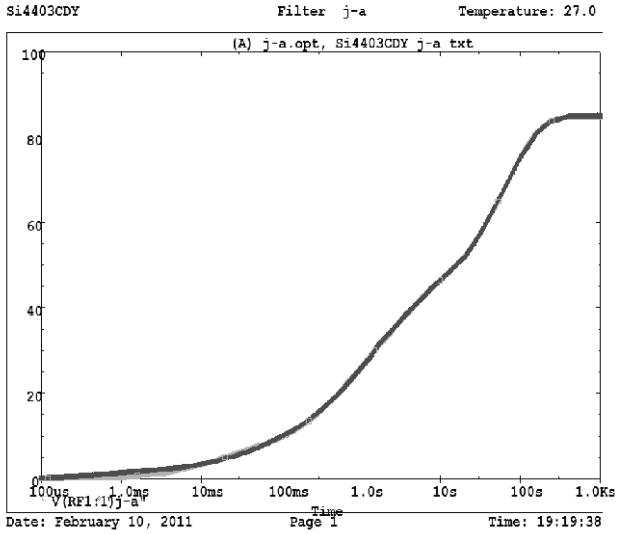
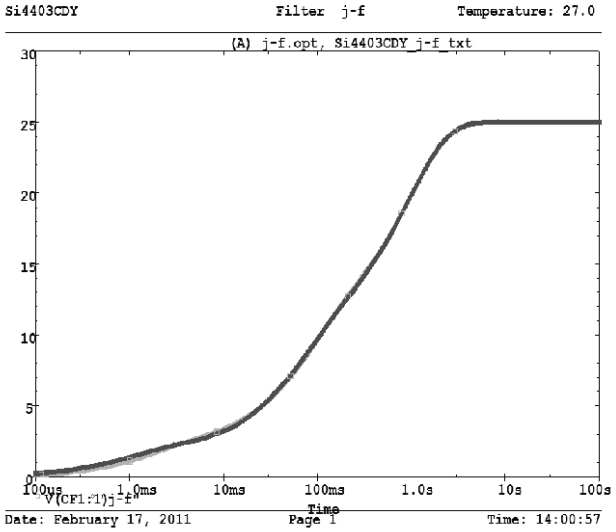
Time
Date: February 10, 2011
Page 1
Time: 19:06:17


Si4403CDY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4403CDY_j-a_txt
100
80
60
40
20
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: 19:19:38


Si4403CDY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4403CDY_j-f_txt
30
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: February 17, 2011
Page 1
Time: 14:00:57