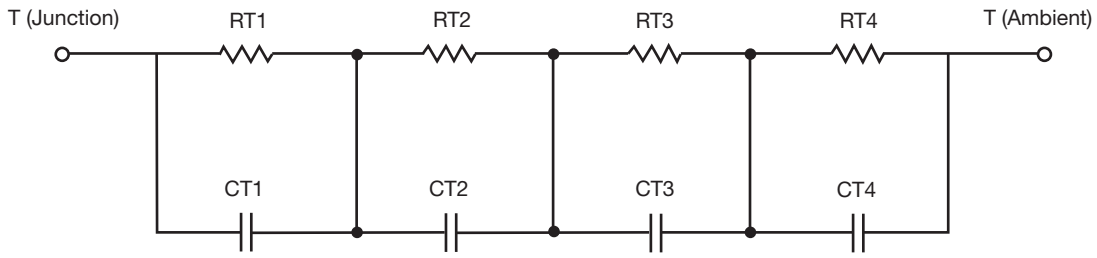
R-C Thermal Model Parameters

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

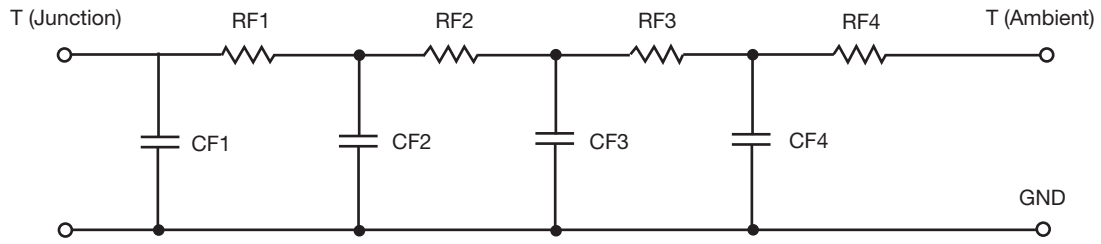


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	19.4262	N/A	2.2876
RT2	2.6594	N/A	7.1309
RT3	14.3508	N/A	5.4697
RT4	48.4862	N/A	1.0986
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	103.7115m	N/A	921.0614m
CT2	1.9841m	N/A	132.3787m
CT3	29.2391m	N/A	14.8206m
CT4	1.2078	N/A	1.3851m

Note
N/A indicates not applicable

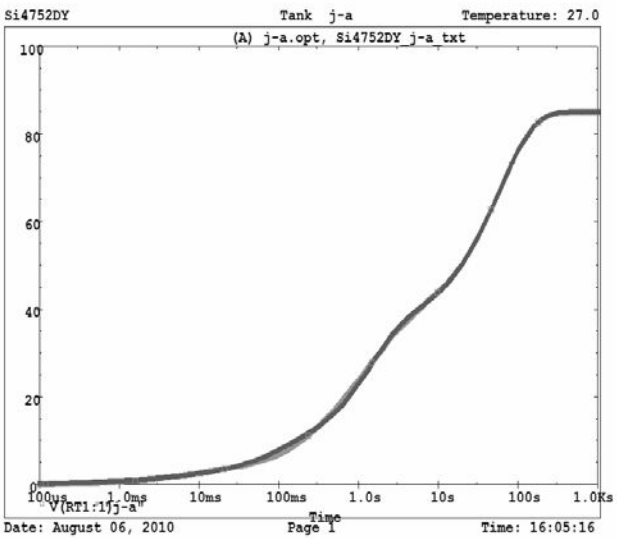
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

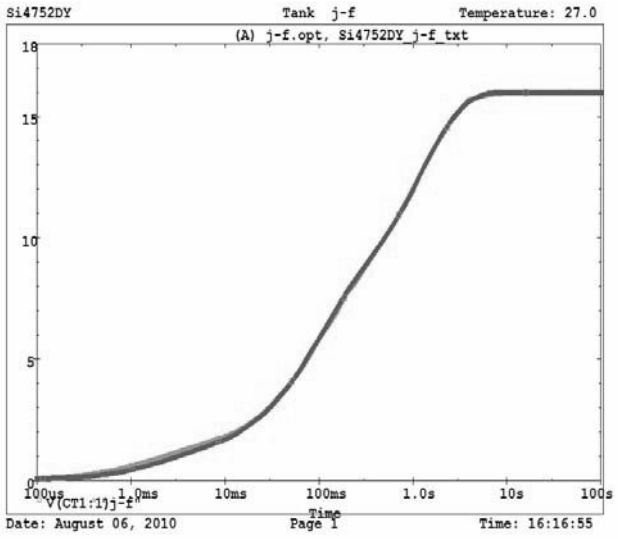
R-C THERMAL MODEL FOR FILTER CONFIGURATION

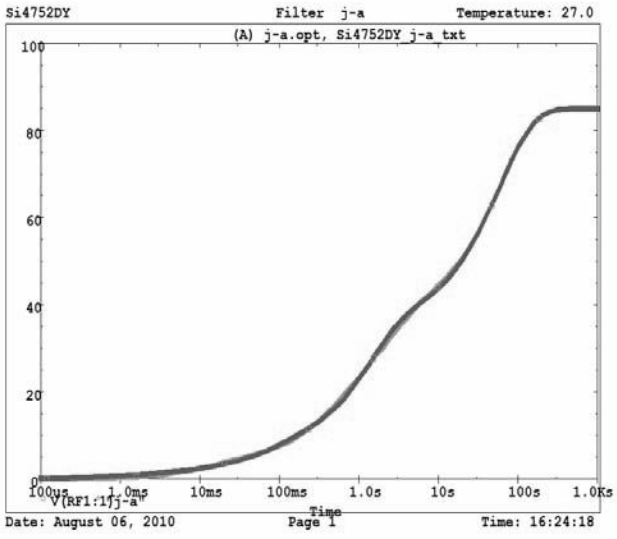


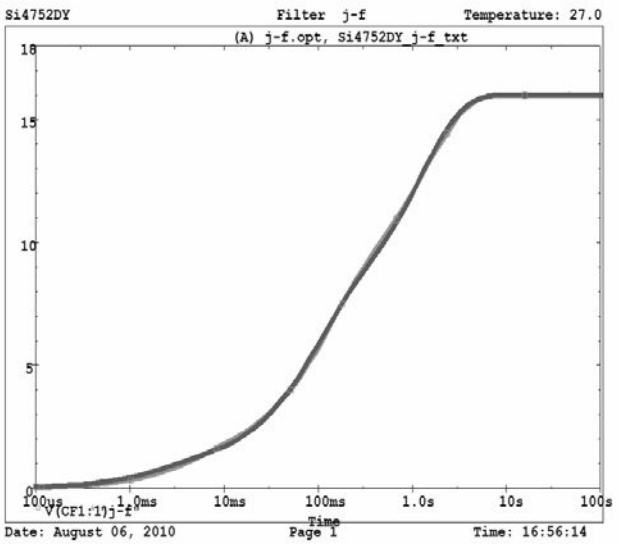
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.0268	N/A	1.9389
RF2	19.7341	N/A	7.1661
RF3	16.4398	N/A	3.9841
RF4	43.7356	N/A	2.8990
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	3.0162m	N/A	2.7761m
CF2	23.0834m	N/A	13.8586m
CF3	102.9806m	N/A	176.5502m
CF4	1.2386	N/A	1.7929m

Note
N/A indicates not applicable


Si4752DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4752DY_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: August 06, 2010
Page 1
Time: 16:05:16


Si4752DY
Tank j-f
Temperature: 27.0
(A) j-f.opt, Si4752DY_j-f_txt
18
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)j-f
Time
Date: August 06, 2010
Page 1
Time: 16:16:55


Si4752DY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4752DY_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: August 06, 2010
Page 1
Time: 16:24:18


Si4752DY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4752DY_j-f_txt
18
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: August 06, 2010
Page 1
Time: 16:56:14