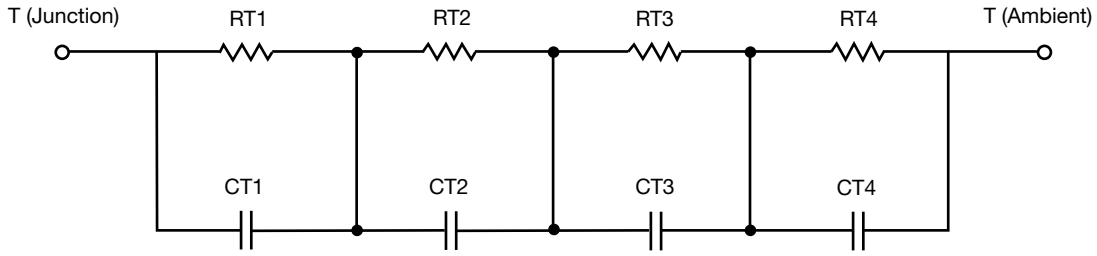
R-C Thermal Model Parameters

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

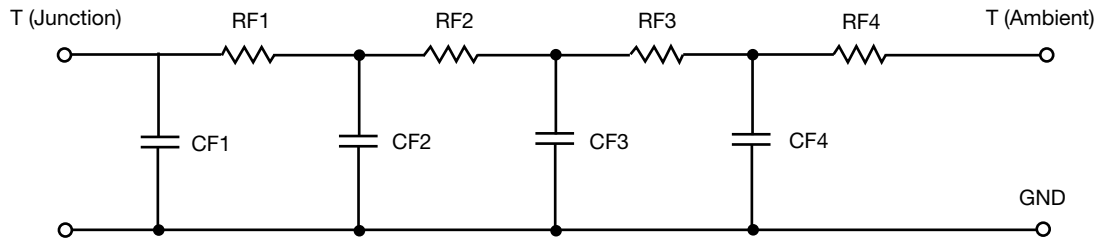


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	18.8434	N/A	5.7795
RT2	20.2812	N/A	43.6843
RT3	92.5762	N/A	16.1532
RT4	42.2817	N/A	12.3830
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	4.0347m	N/A	294.0093u
CT2	1.4063m	N/A	9.2598m
CT3	10.8676m	N/A	3.5812m
CT4	1.1151	N/A	141.8226m

Note
N/A indicates not applicable

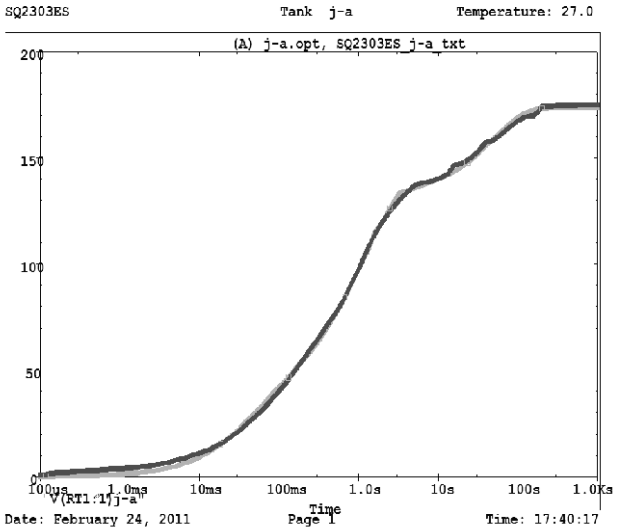
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

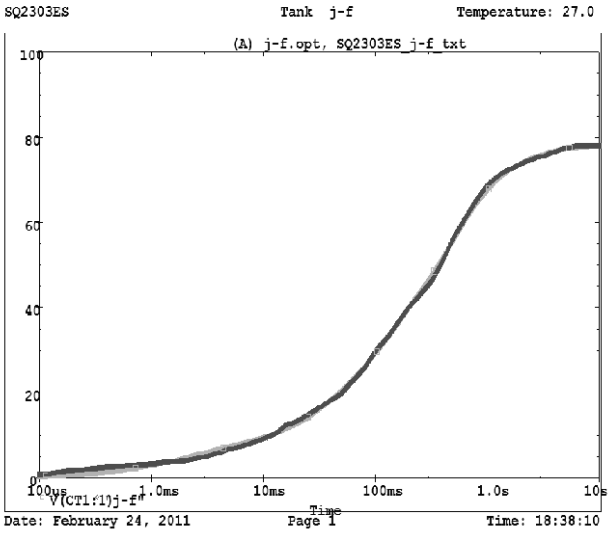
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	38.0901	N/A	15.8875
RF2	79.4985	N/A	45.3870
RF3	23.8196	N/A	7.2913
RF4	32.8188	N/A	8.9547
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	902.0891u	N/A	670.6896u
CF2	7.0268m	N/A	4.8678m
CF3	104.8448m	N/A	29.4479m
CF4	1.6600	N/A	65.6726m

Note
N/A indicates not applicable


SQ2303ES
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQ2303ES_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 24, 2011
Page 1
Time: 17:40:17


SQ2303ES
Tank j-f
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
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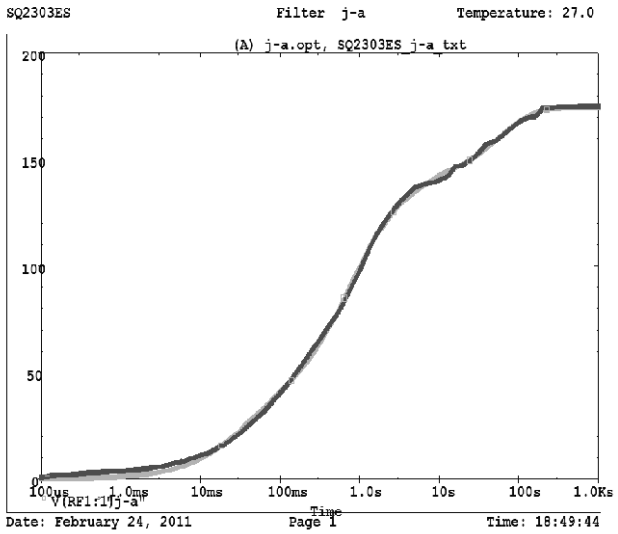
Time
Date: February 24, 2011
Page 1
Time: 18:38:10


SQ2303ES
Filter j-a
Temperature: 27.0
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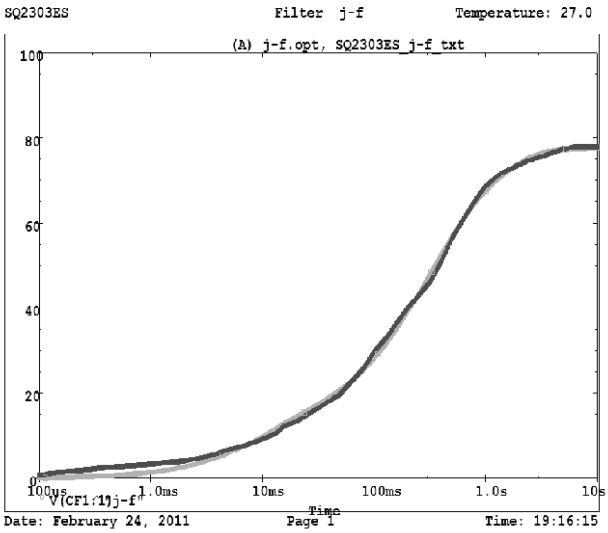
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: February 24, 2011
Page 1
Time: 18:49:44


SQ2303ES
Filter j-f
Temperature: 27.0
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100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: February 24, 2011
Page 1
Time: 19:16:15