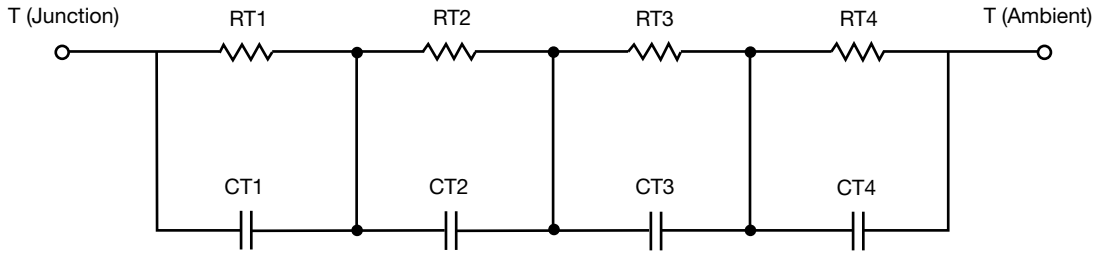
R-C Thermal Model Parameters

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

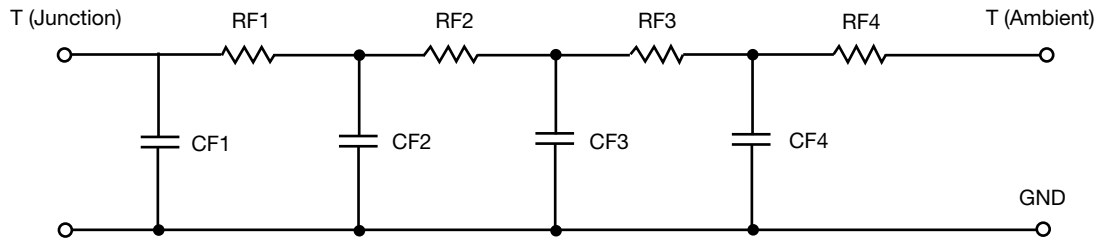


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	9.8491	N/A	7.7490
RT2	42.6563	N/A	26.4232
RT3	41.8008	N/A	10.7696
RT4	71.6938	N/A	4.9549
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	143.1562u	N/A	211.0863m
CT2	15.7258m	N/A	15.8714m
CT3	3.3587m	N/A	8.1167m
CT4	991.3470m	N/A	654.2942u

Note
N/A indicates not applicable

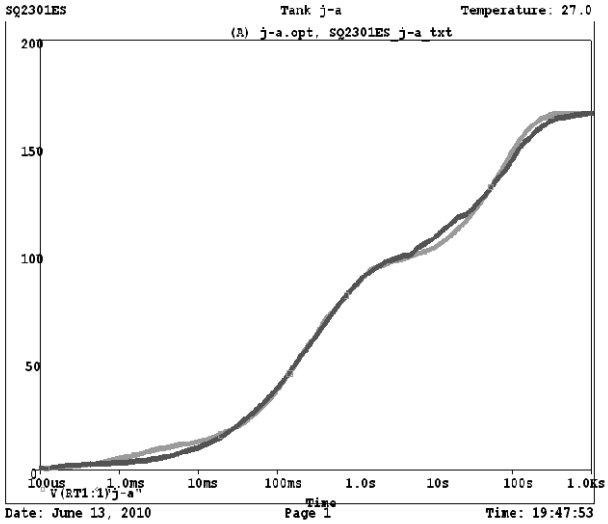
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	15.7856	N/A	13.3748
RF2	53.2710	N/A	21.0572
RF3	27.8023	N/A	10.9937
RF4	69.1411	N/A	4.4976
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	513.7126u	N/A	1.4669m
CF2	2.5363m	N/A	8.3839m
CF3	18.6939m	N/A	17.0885m
CF4	1.0435	N/A	279.9907m

Note
N/A indicates not applicable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Tank j-a
Temperature: 27.0
(A) j-a.opt, SQ2301ES_j-a_txt
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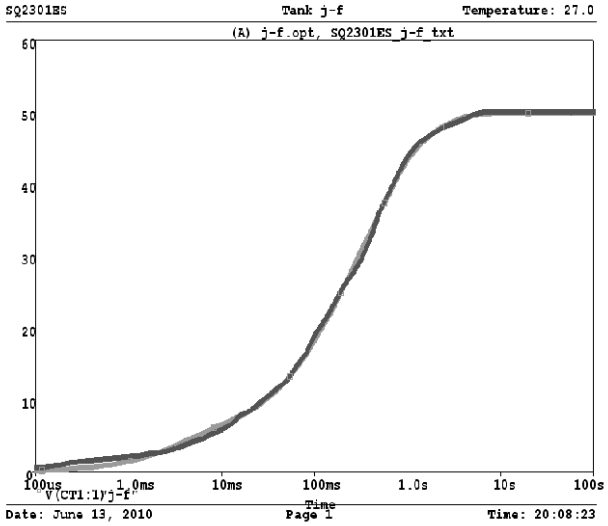
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0ks
V(RT1:1)/j-a"
Time
Date: June 13, 2010
Page 1
Time: 19:47:53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30
20
10
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100us
1.0ms
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10s
100s
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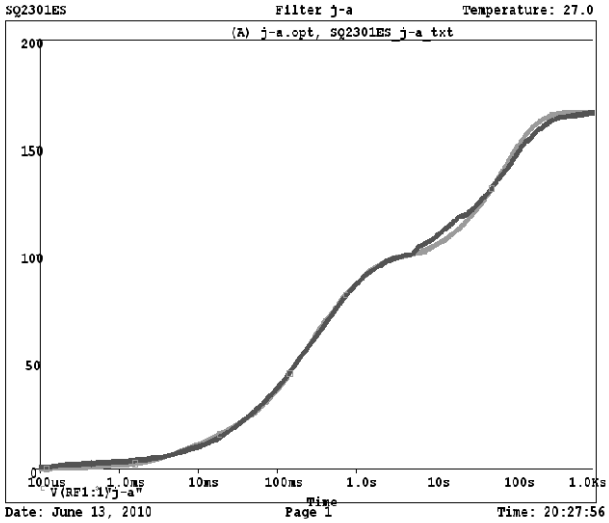
Page 1
Time: 20:08:23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50
0
100us
1.0ms
10ms
100ms
1.0s
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100s
1.0ks
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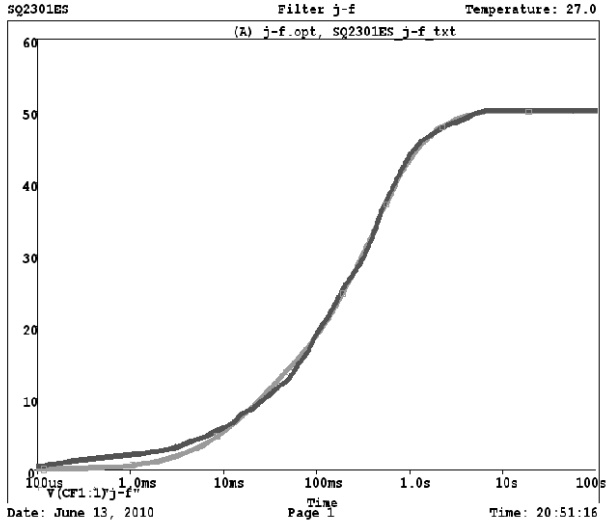
Time
Date: June 13, 2010
Page 1
Time: 20:27:56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Filter j-f
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)/j-f"
Time
Date: June 13, 2010
Page 1
Time: 20:51:16