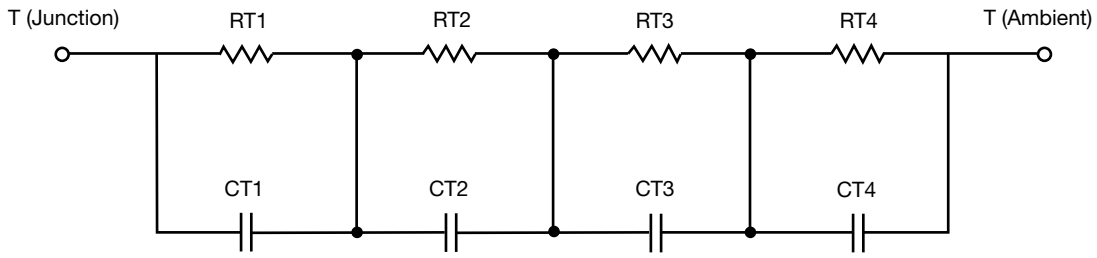
R-C Thermal Model Parameters

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

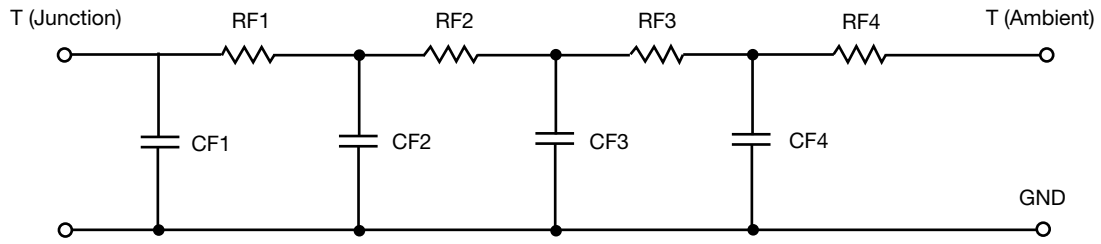


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	60.5879	N/A	9.0645
RT2	16.9111	N/A	2.7530
RT3	61.1822	N/A	7.5907
RT4	25.8081	N/A	30.5803
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.4472	N/A	4.1332m
CT2	268.9344m	N/A	279.0965u
CT3	6.2219m	N/A	235.1040m
CT4	1.1320m	N/A	12.4045m

Note
N/A indicates not applicable

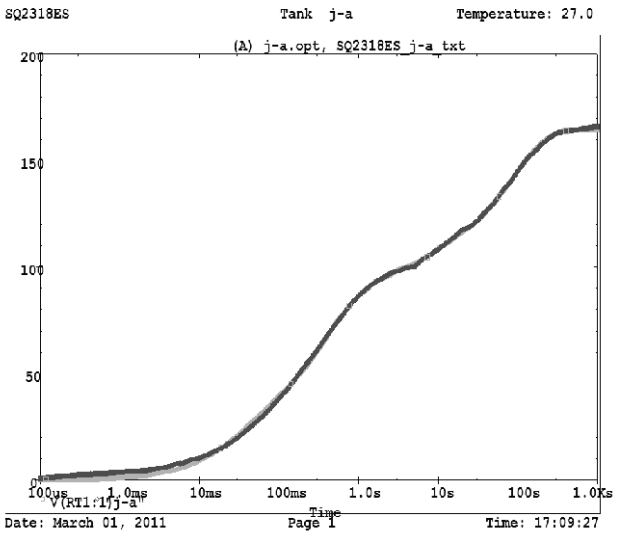
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.2458	N/A	4.5776
RF2	47.7806	N/A	19.6175
RF3	39.0015	N/A	23.0199
RF4	63.8436	N/A	3.2768
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	462.9800u	N/A	419.1650u
CF2	2.0270m	N/A	3.7791m
CF3	15.7875m	N/A	15.7277m
CF4	1.1631	N/A	1.0611

Note
N/A indicates not applicable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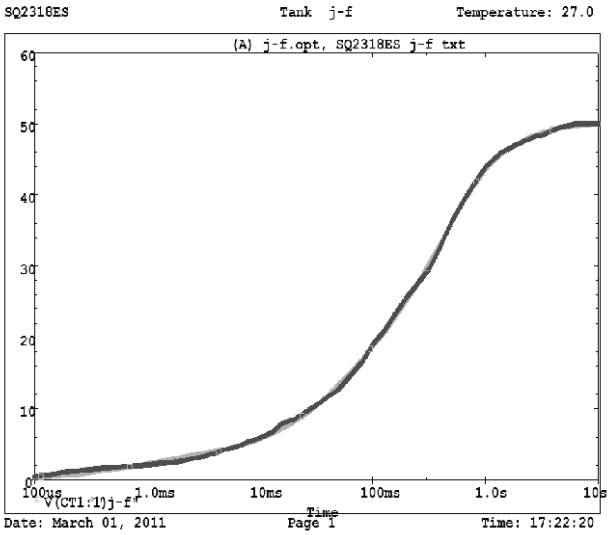
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQ2318ES_j-a_txt
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: March 01, 2011
Page 1
Time: 17:09:27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Tank j-f
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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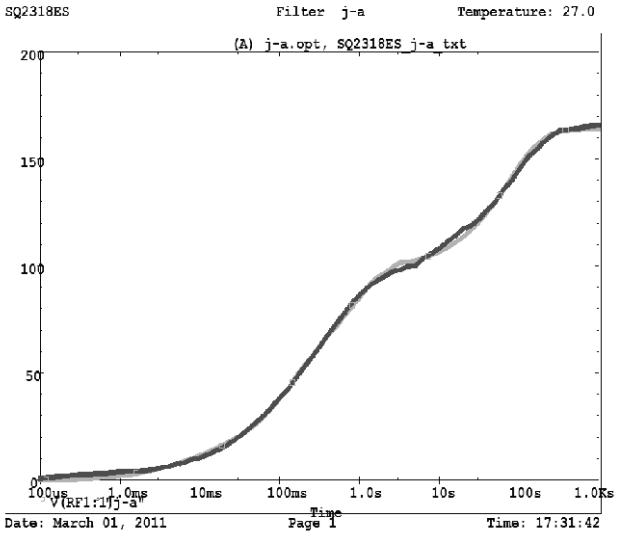
Time
Date: March 01, 2011
Page 1
Time: 17:22:20


SQ2318ES
Filter j-a
Temperature: 27.0
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150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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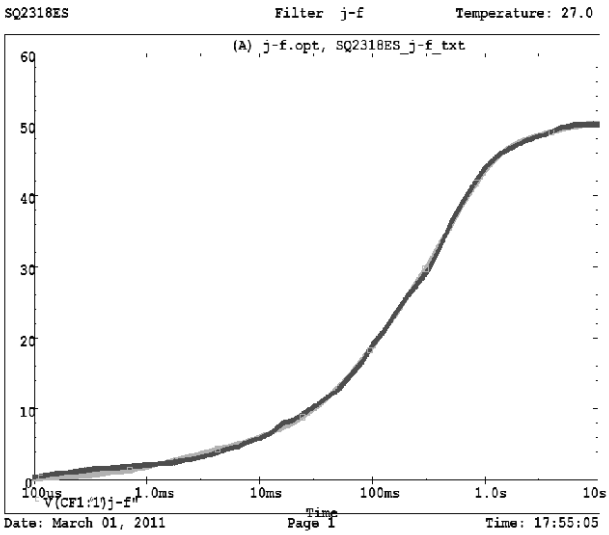
Time
Date: March 01, 2011
Page 1
Time: 17:31:42


SQ2318ES
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: March 01, 2011
Page 1
Time: 17:55:05