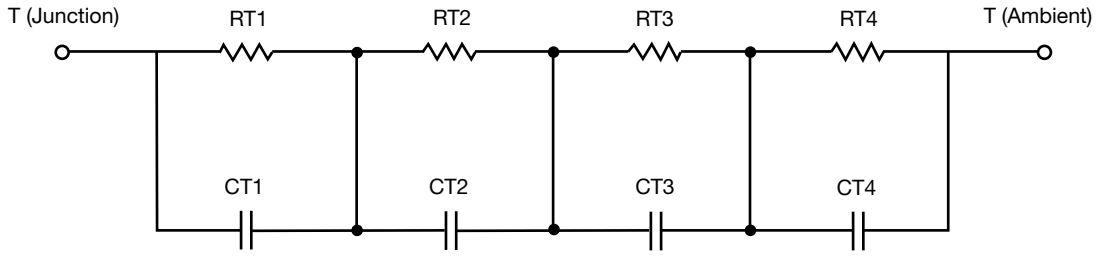
R-C Thermal Model Parameters

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

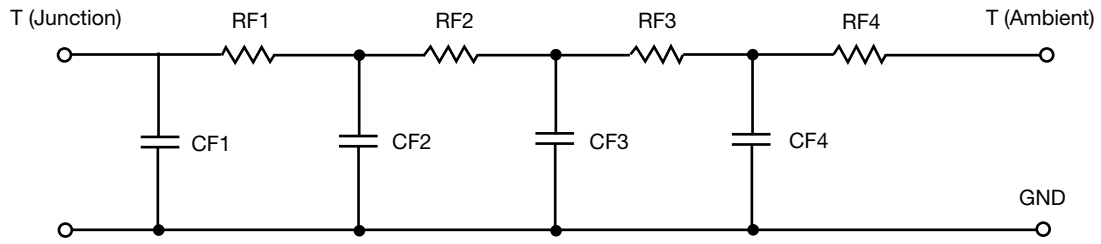


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	3.4867	N/A	9.4335
RT2	29.3576	N/A	12.2920
RT3	19.8447	N/A	2.5867
RT4	56.9742	N/A	5.7168
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	523.3208u	N/A	24.4976m
CT2	21.9389m	N/A	6.9444m
CT3	4.3200m	N/A	814.4720u
CT4	1.2849	N/A	4.2007m

Note
N/A indicates not applicable

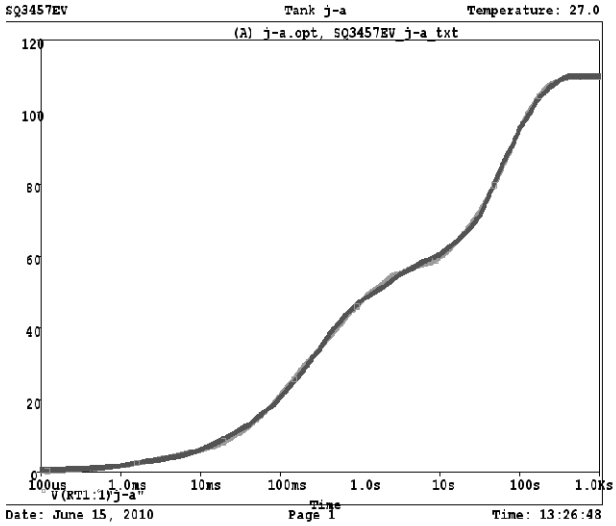
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.7378	N/A	3.4613
RF2	35.4713	N/A	11.8138
RF3	13.3380	N/A	13.1261
RF4	52.2536	N/A	1.5988
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	755.9575u	N/A	434.6060u
CF2	5.4676m	N/A	1.7428m
CF3	145.5982m	N/A	5.9444m
CF4	1.3421	N/A	162.4534m

Note
N/A indicates not applicable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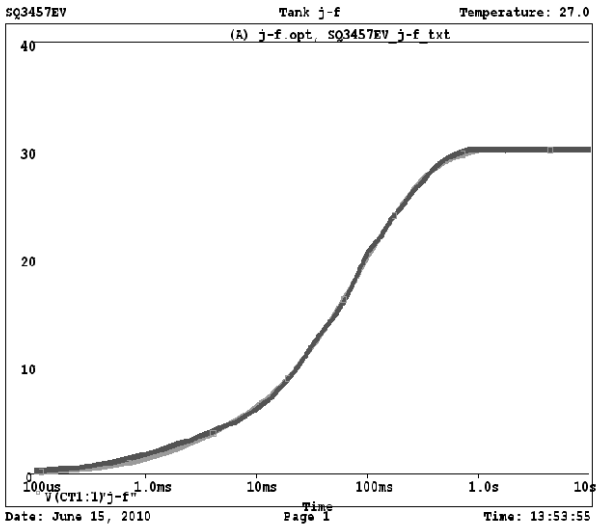
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQ3457EV_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)"j-a"
Time
Date: June 15, 2010
Page 1
Time: 13:26:48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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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Time
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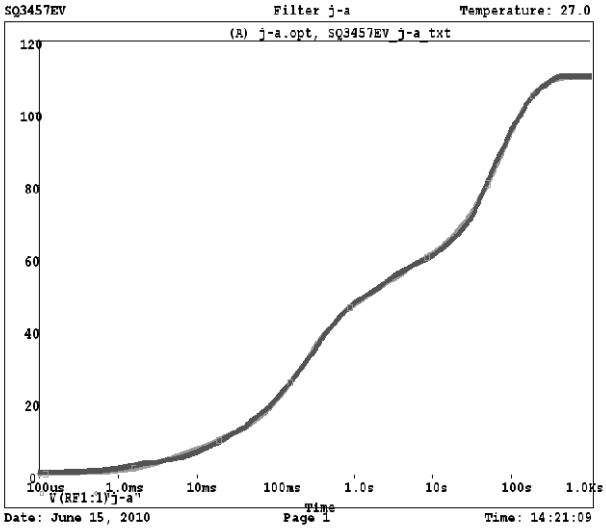
Page 1
Time: 13:53:55


SQ3457EV
Filter j-a
Temperature: 27.0
(A) j-a.opt, SQ3457EV_j-a_txt
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100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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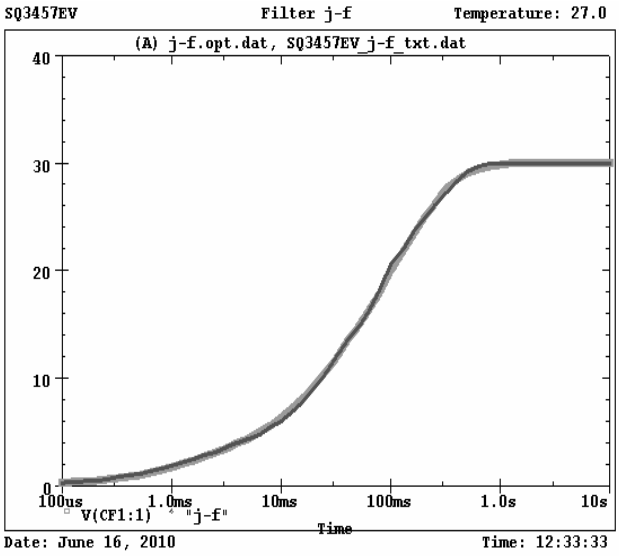
Time
Date: June 15, 2010
Page 1
Time: 14:21:09


SQ3457EV
Filter j-f
Temperature: 27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: June 16, 2010
Time: 12:33:33