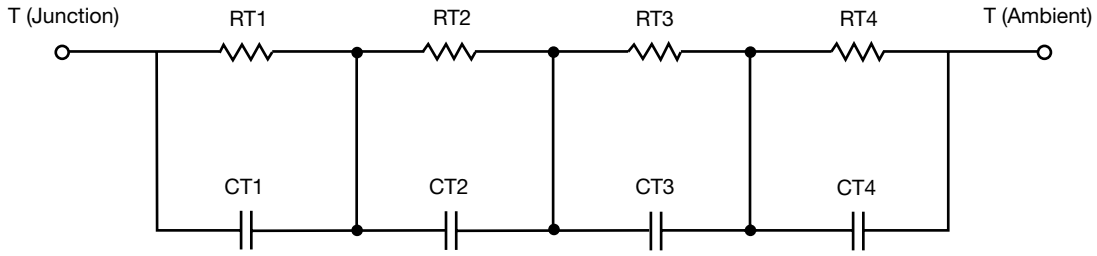
R-C Thermal Model Parameters

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

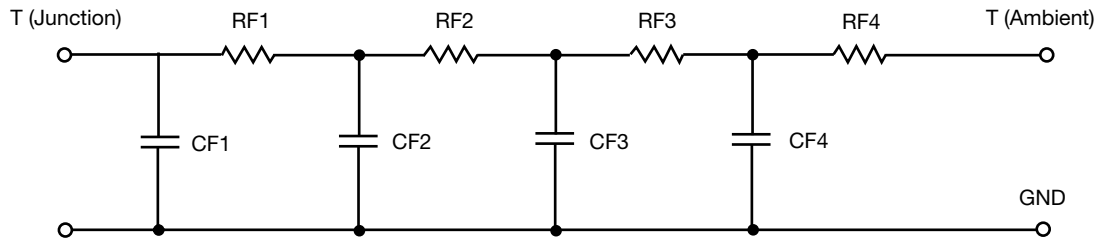


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	46.8012	N/A	16.7774
RT2	28.5540	N/A	35.1551
RT3	31.0087	N/A	9.9621
RT4	13.6361	N/A	23.1054
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.0029	N/A	4.5869m
CT2	44.1364m	N/A	2.1415m
CT3	3.7089m	N/A	305.8672u
CT4	169.5730u	N/A	24.7117m

Note
N/A indicates not applicable

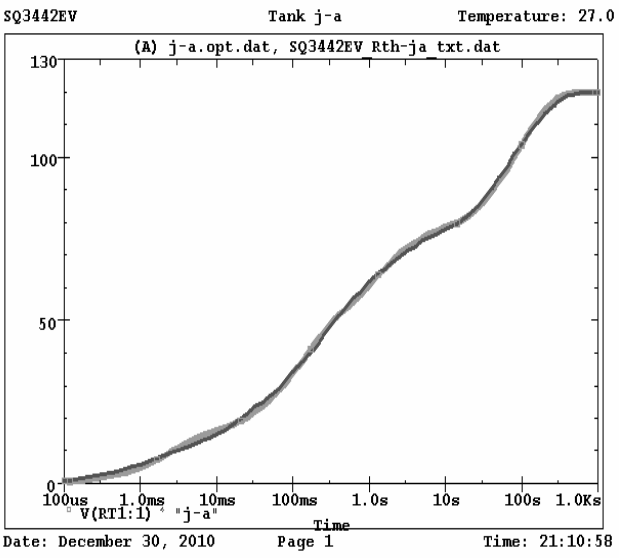
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

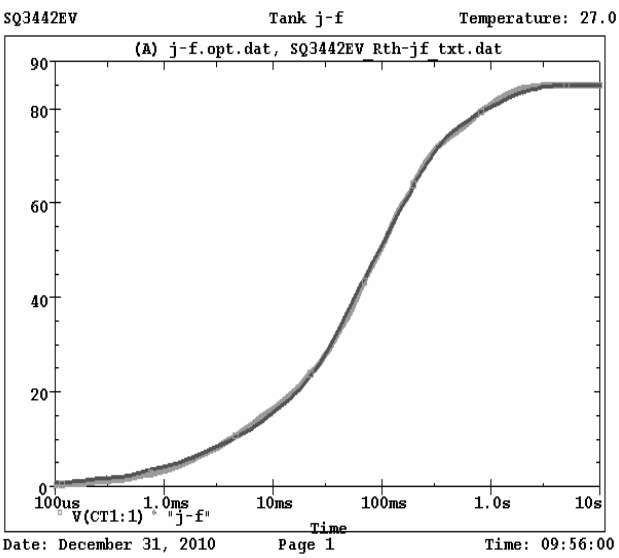
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.8388	N/A	14.6758
RF2	34.1110	N/A	37.5283
RF3	26.1611	N/A	17.0393
RF4	45.8891	N/A	15.7566
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	145.0744u	N/A	268.4372u
CF2	2.9359m	N/A	1.0663m
CF3	40.3934m	N/A	1.7269m
CF4	1.9718	N/A	31.2436m

Note
N/A indicates not applicable


SQ3442EV
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SQ3442EV Rth-ja_txt.dat
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: December 30, 2010
Page 1
Time: 21:10:58


SQ3442EV
Tank j-f
Temperature: 27.0
(A) j-f.opt.dat, SQ3442EV Rth-jf_txt.dat
90
80
60
40
20
0
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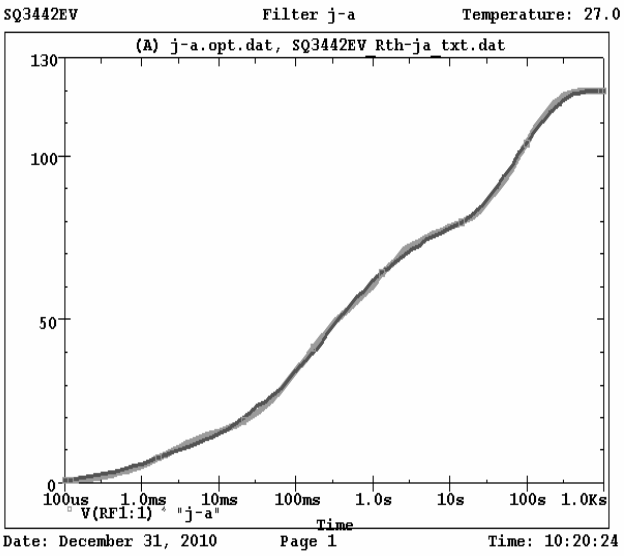
Time
Date: December 31, 2010
Page 1
Time: 09:56:00


SQ3442EV
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SQ3442EV Rth-ja_txt.dat
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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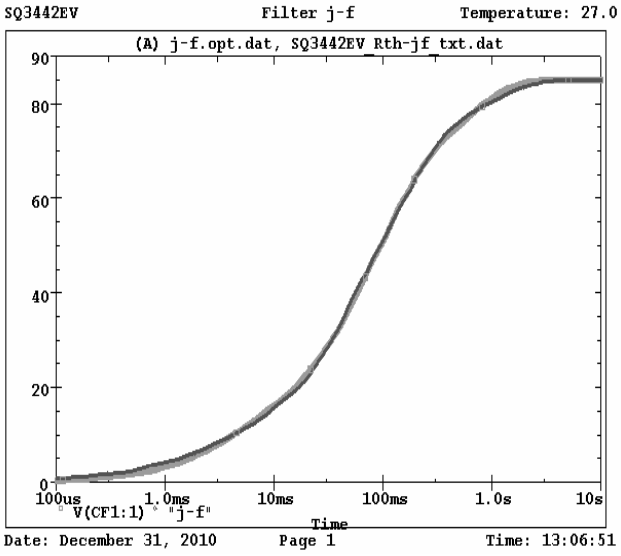
Time
Date: December 31, 2010
Page 1
Time: 10:20:24


SQ3442EV
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, SQ3442EV Rth-jf_txt.dat
90
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: December 31, 2010
Page 1
Time: 13:06:51