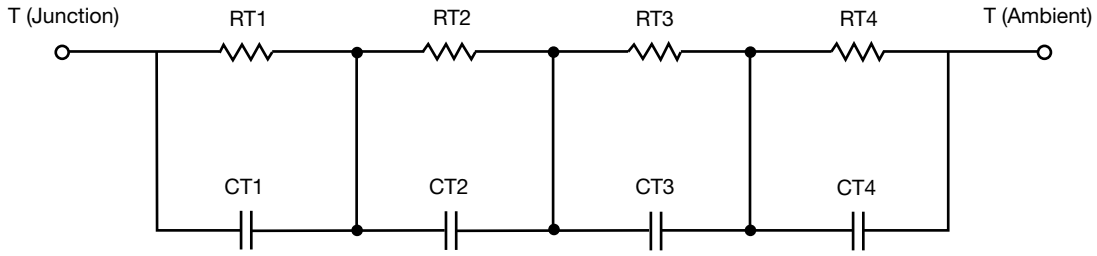
R-C Thermal Model Parameters

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

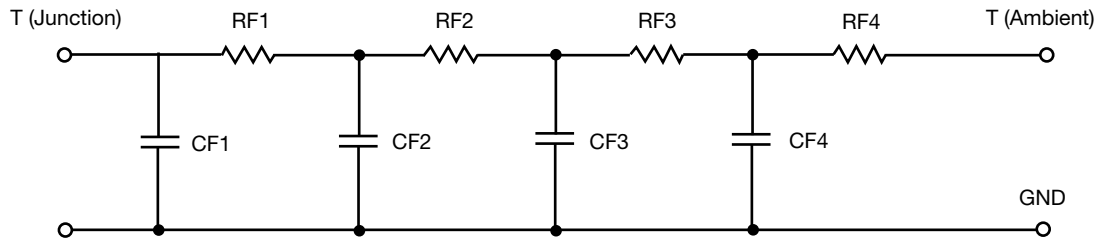


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	7.1324	N/A	13.7167
RT2	25.6763	N/A	9.5288
RT3	20.2759	N/A	7.8818
RT4	56.7503	N/A	3.0455
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	788.8910u	N/A	99.1289m
CT2	16.9867m	N/A	5.2711m
CT3	92.0684m	N/A	31.5327m
CT4	1.3489	N/A	409.4948u

Note
N/A indicates not applicable

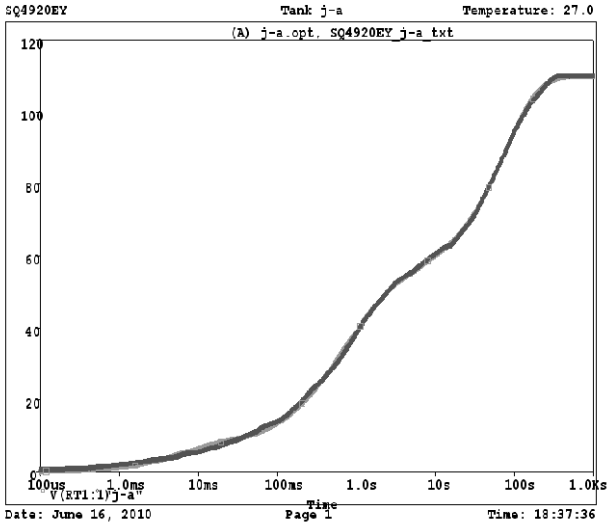
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

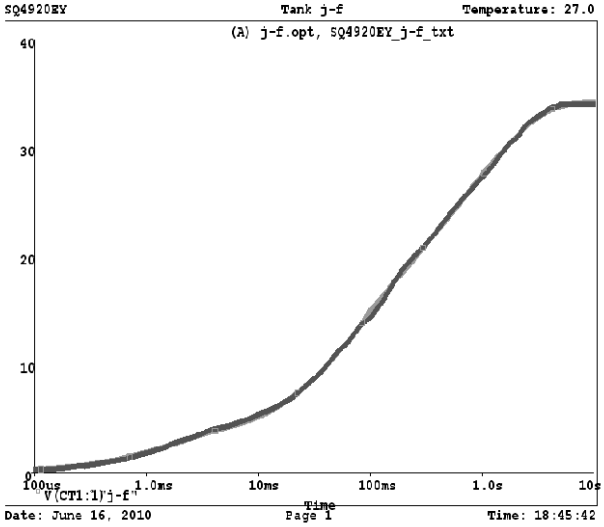
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.4751	N/A	5.0061
RF2	42.2256	N/A	15.1073
RF3	33.3939	N/A	5.7967
RF4	24.8982	N/A	8.0632
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	915.0927u	N/A	519.7168u
CF2	17.4412m	N/A	5.6930m
CF3	1.0086	N/A	68.2303m
CF4	1.3607	N/A	15.7951m

Note
N/A indicates not applicable


SQ4920EY
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQ4920EY_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 16, 2010
Page 1
Time: 18:37:36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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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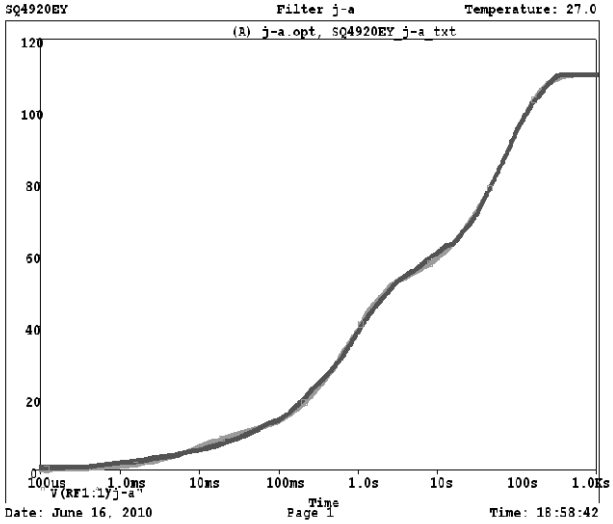
Time
Date: June 16, 2010
Page 1
Time: 18:45:42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Filter j-a
Temperature: 27.0
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100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0ks
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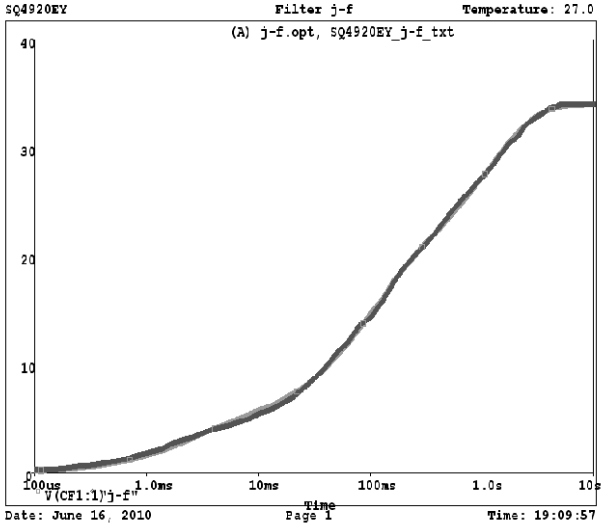
Time
Date: June 16, 2010
Page 1
Time: 18:58:42


SQ4920EY
Filter j-f
Temperature: 27.0
(A) j-f.opt, SQ4920EY_j-f_txt
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)/j-f
Time
Date: June 16, 2010
Page 1
Time: 19:09:57