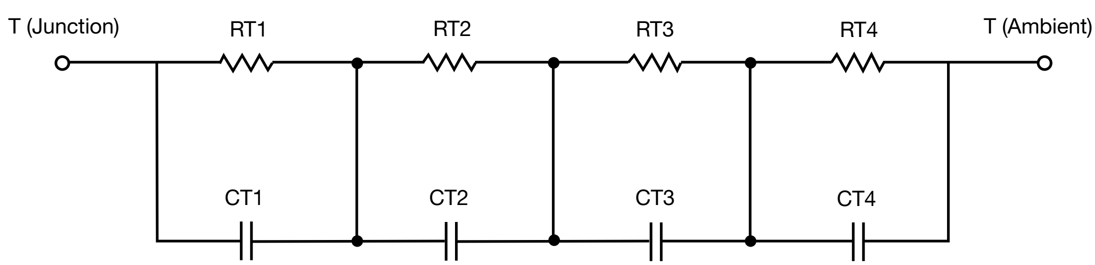
R-C Thermal Model Parameters

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

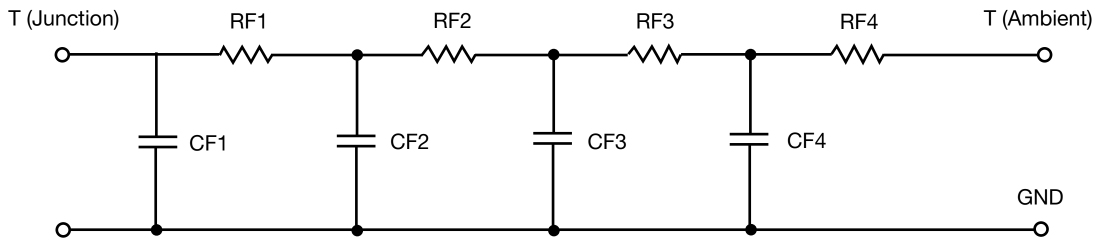


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.2685	N/A	7.6727
RT2	18.8038	N/A	11.0807
RT3	23.0138	N/A	1.4533
RT4	72.7249	N/A	17.6388
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.5622m	N/A	7.5524m
CT2	21.2061m	N/A	22.0055m
CT3	135.7019m	N/A	1.6130m
CT4	1.2598	N/A	77.5059m

Note
- n/a indicates not applicable

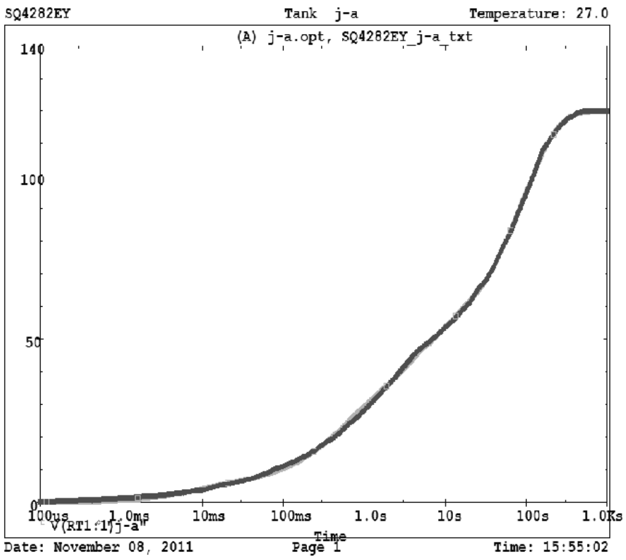
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

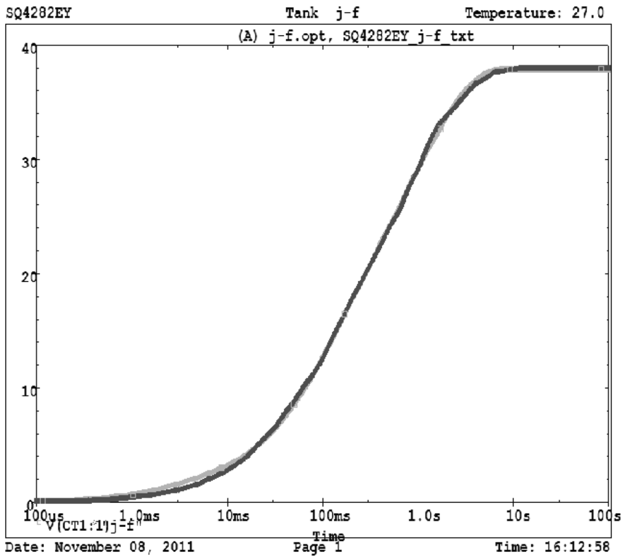
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.9160	N/A	2.9892
RF2	22.7340	N/A	15.5574
RF3	23.6782	N/A	10.0433
RF4	67.3127	N/A	9.2549
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.3578m	N/A	1.2430m
CF2	15.8951m	N/A	4.9632m
CF3	110.8631m	N/A	32.2879m
CF4	1.2277	N/A	72.1045m

Note
- n/a indicates not applicable


SQ4282EY
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQ4282EY_j-a_txt
140
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a"
Time
Date: November 08, 2011
Page 1
Time: 15:55:02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Tank j-f
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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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Page 1
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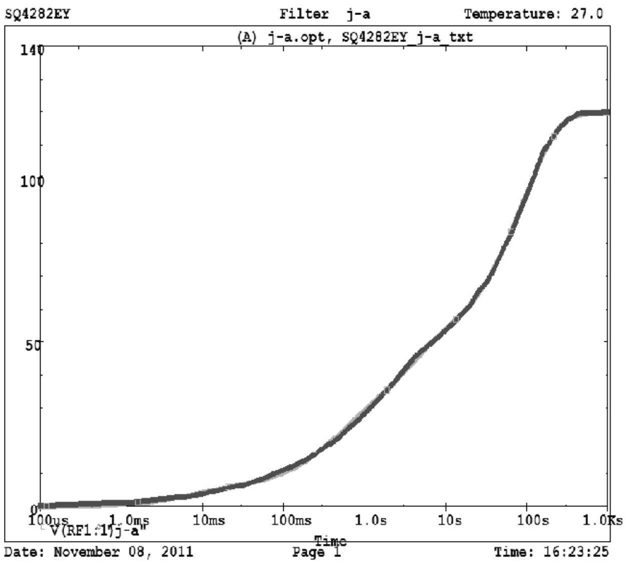
SQ4282EY
Filter j-a
Temperature: 27.0
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100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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Page 1
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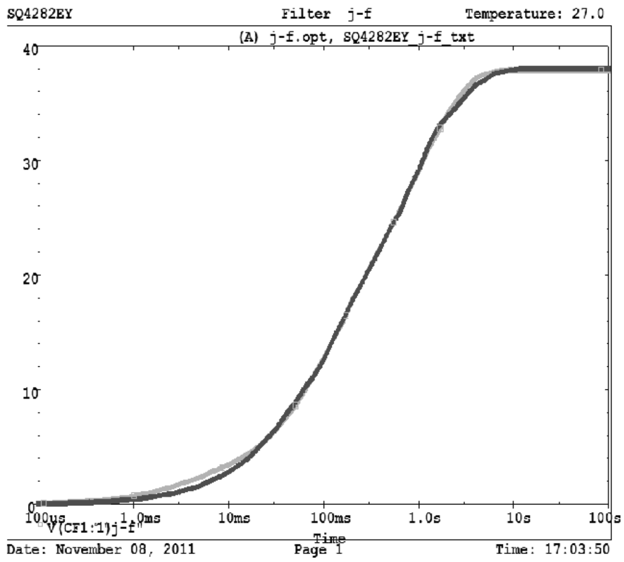
SQ4282EY
Filter j-f
Temperature: 27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f"
Time
Date: November 08, 2011
Page 1
Time: 17:03:50