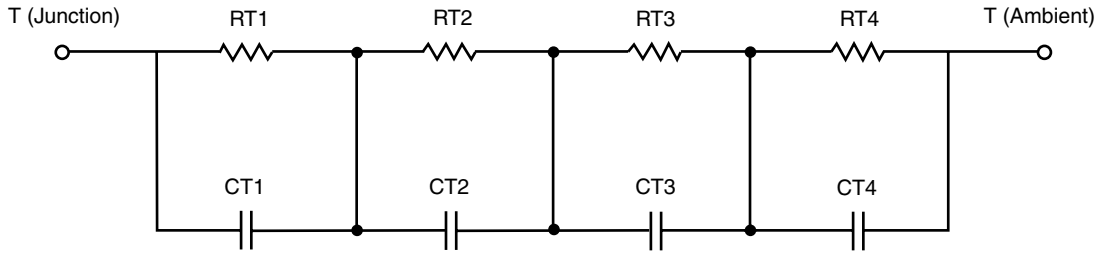
R-C Thermal Model Parameters

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

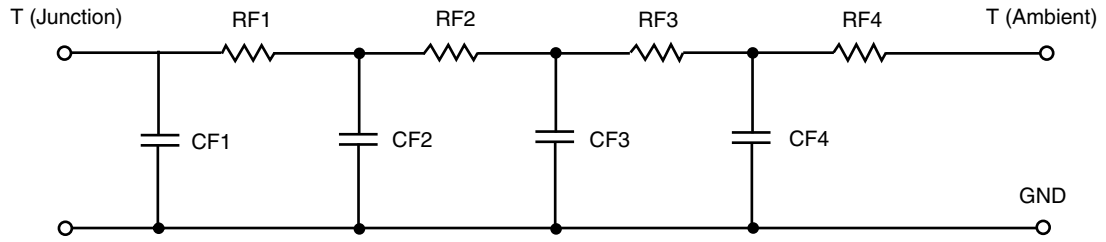


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.5169	N/A	2.2335
RT2	40.1679	N/A	1.5319
RT3	28.0713	N/A	2.7823
RT4	11.2439	N/A	2.9523
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	126.8896 u	N/A	617.7577 u
CT2	2.4688	N/A	65.0530 u
CT3	1.2928 m	N/A	2.3875 m
CT4	188.9509 m	N/A	611.1140 u

Note
N/A indicates not applicable

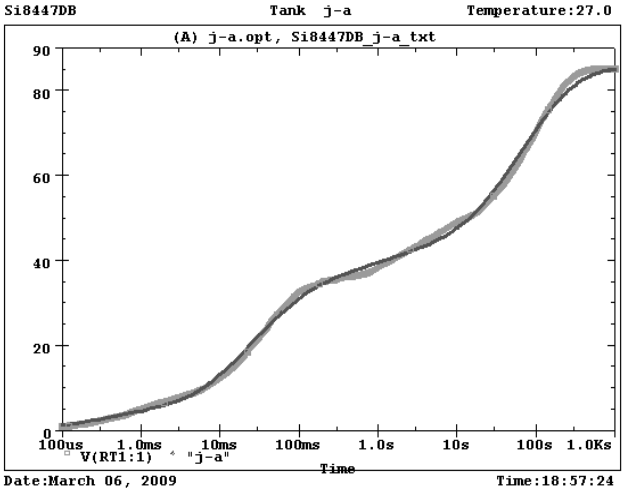
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

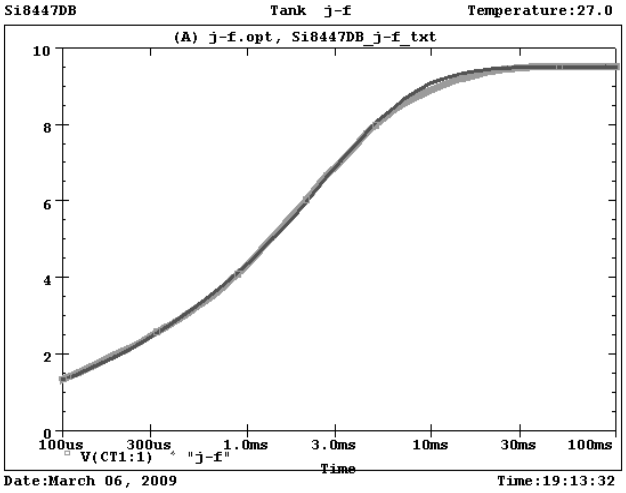
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	11.0165	N/A	3.1611
RF2	24.3371	N/A	2.4414
RF3	11.1651	N/A	2.1043
RF4	38.4813	N/A	1.7932
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	223.3944 u	N/A	71.7225 u
CF2	1.7041 m	N/A	257.3113 u
CF3	232.6263 m	N/A	369.3748 u
CF4	2.2784	N/A	332.9593 u

Note
N/A indicates not applicable


Si8447DB
Tank j-a
Temperature:27.0
(A) j-a.opt, Si8447DB_j-a_txt
90
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date:March 06, 2009
Time:18:57:24


Si8447DB
Tank j-f
Temperature:27.0
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10
8
6
4
2
0
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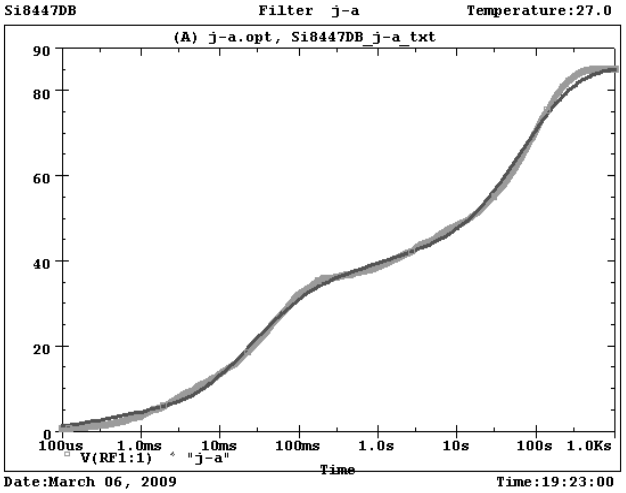
Si8447DB
Filter j-a
Temperature:27.0
(A) j-a.opt, Si8447DB_j-a_txt
90
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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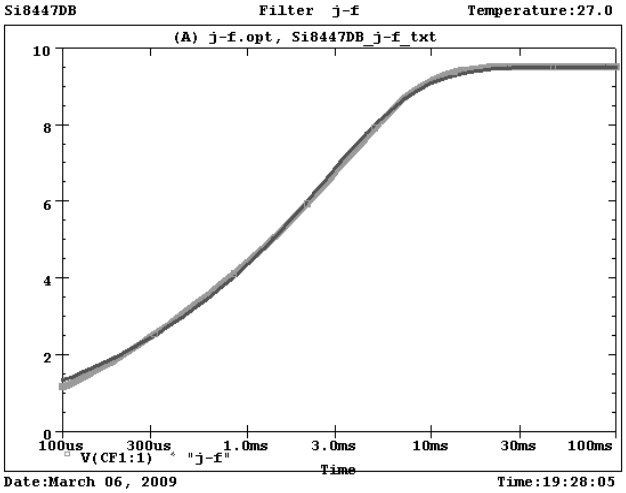
Time
Date:March 06, 2009
Time:19:23:00


Si8447DB
Filter j-f
Temperature:27.0
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10
8
6
4
2
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "j-f"
Time
Date:March 06, 2009
Time:19:28:05