R-C Thermal Model Parameters

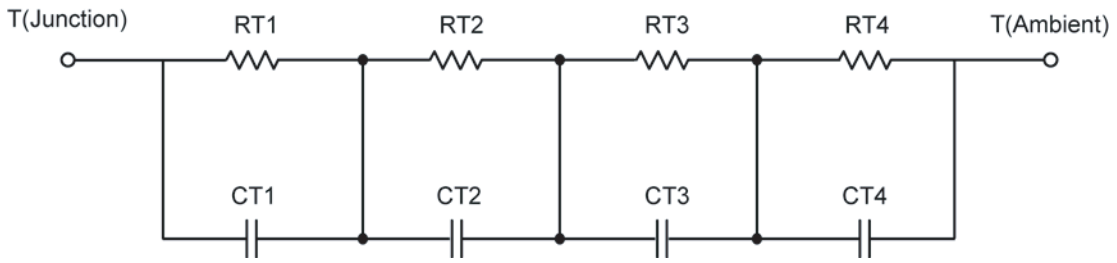
DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "A Simple Method of Generating Thermal Models for a Power MOSFET"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse Transient Thermal Impedance curves for the MOSFET.

R-C values for the electrical circuit in the Foster/Tank and Cauer/Filter configurations are included.

Note:
For a detailed explanation of implementing these values in P-SPICE, refer to Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform.

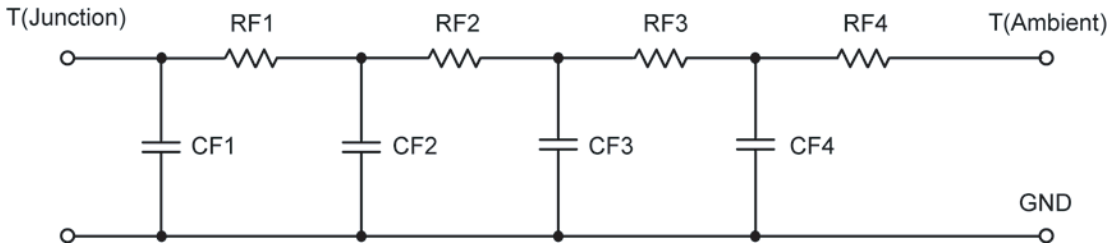
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.2599	N/A	12.1099
RT2	4.7039	N/A	1.8151
RT3	21.6204	N/A	4.3990
RT4	40.4158	N/A	5.6760
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	43.6643 m	N/A	142.6877 m
CT2	4.8035 m	N/A	481.3369 u
CT3	411.6817 m	N/A	9.4824 m
CT4	3.3774	N/A	37.2536 m

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

R-C THERMAL MODEL FOR FILTER CONFIGURATION

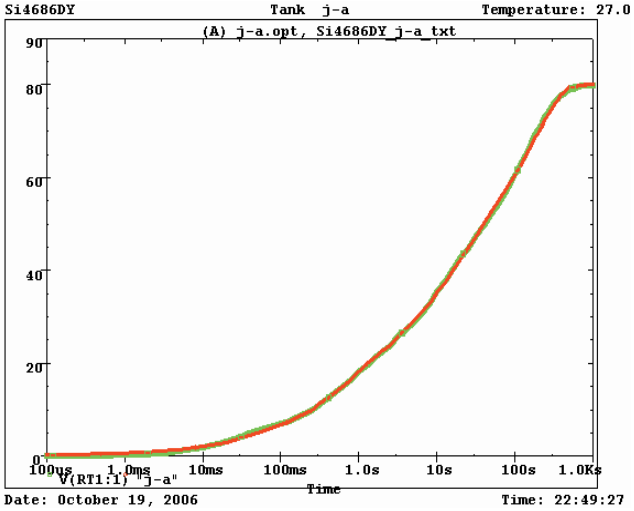


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.9882	N/A	2.4465
RF2	16.7624	N/A	7.3578
RF3	25.8275	N/A	8.3729
RF4	31.4219	N/A	5.8228
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.8233 m	N/A	483.9257 u
CF2	37.3844 m	N/A	8.0507 m
CF3	496.3225 m	N/A	48.4346 m
CF4	4.1250	N/A	266.9178 m

Note: NA indicates not applicable

Reference:

[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya, IEEE / SEMITHERM 2002


Si4686DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4686DY_j-a_txt
90
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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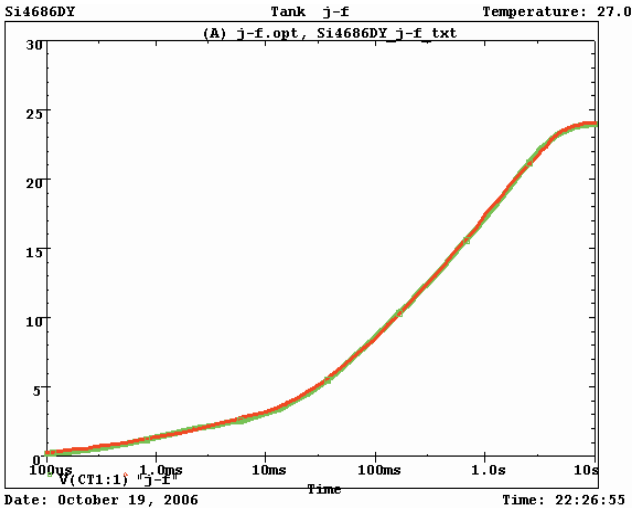
Time
Date: October 19, 2006
Time: 22:49:27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Tank j-f
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25
20
15
10
5
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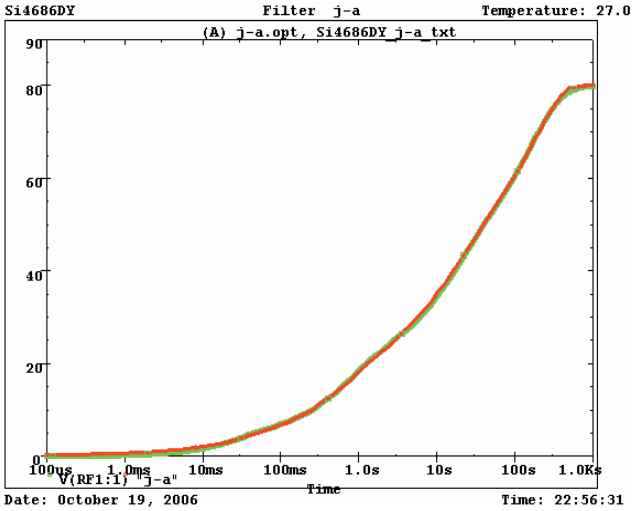
Si4686DY
Filter j-a
Temperature: 27.0
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80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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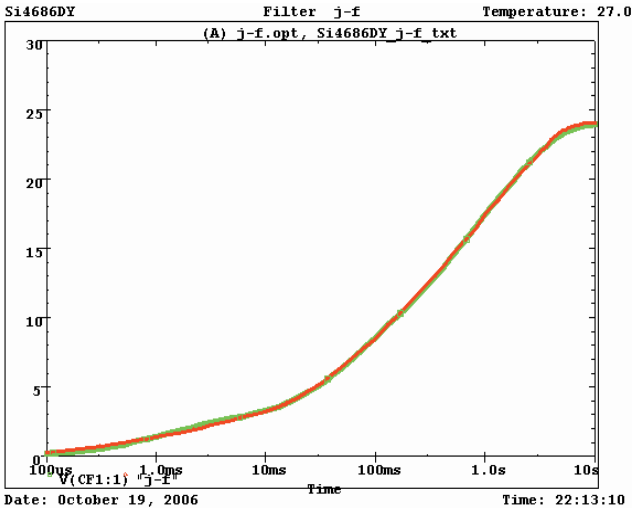
Time: 22:56:31


Si4686DY
Filter j-f
Temperature: 27.0
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30
25
20
15
10
5
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
Date: October 19, 2006
Time: 22:13:10