R-C Thermal Model Parameters

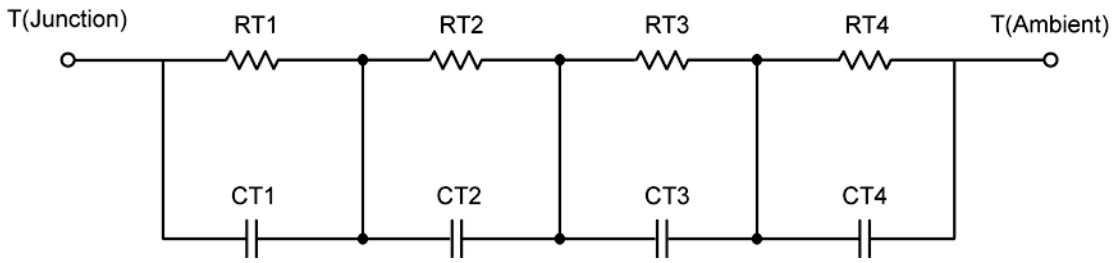
DESCRIPTION

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.

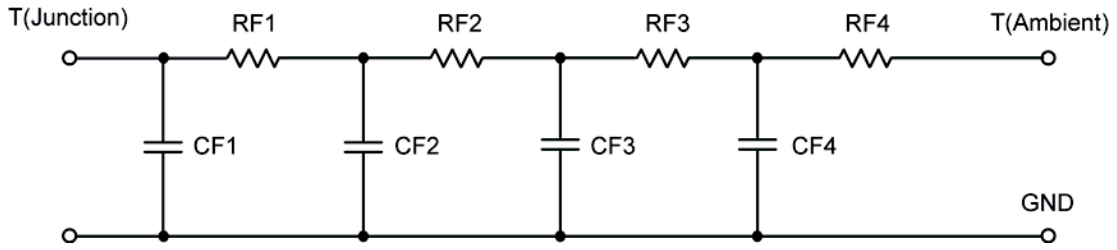
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.5504	N/A	6.9232
RT2	4.6966	N/A	1.0701
RT3	19.8626	N/A	6.5041
RT4	41.8904	N/A	6.5026
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	33.5652 m	N/A	12.4807 m
CT2	9.4594 m	N/A	1.8997 m
CT3	131.2610 m	N/A	354.6357 m
CT4	1.7592	N/A	70.1462 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

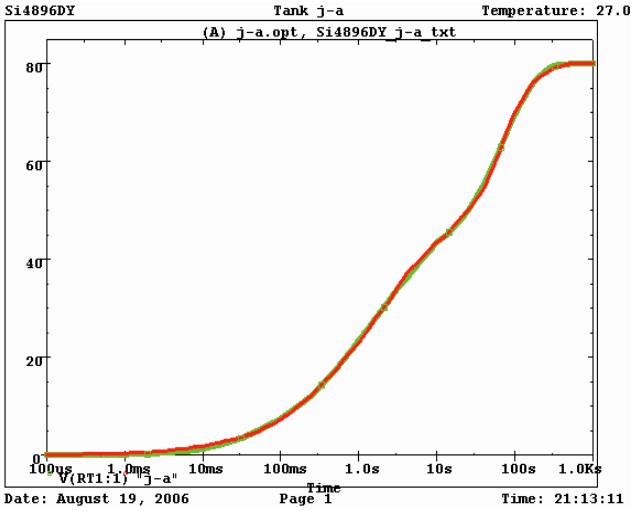


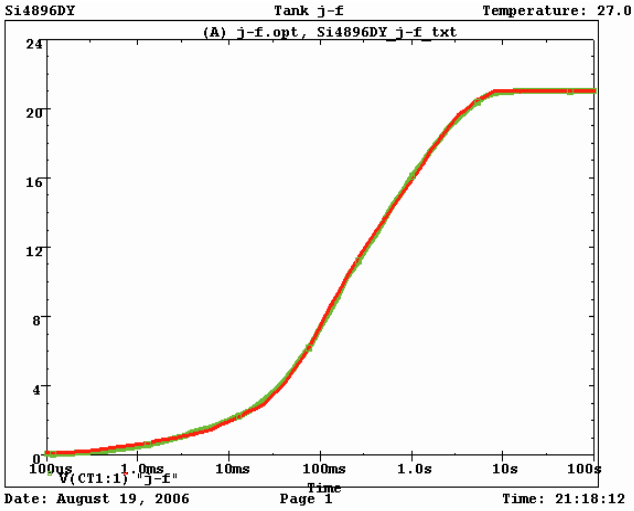
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.1369	N/A	1.5179
RF2	18.4924	N/A	9.1363
RF3	15.9491	N/A	5.2737
RF4	39.4216	N/A	5.0721
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.5209 m	N/A	1.7789 m
CF2	23.1577 m	N/A	8.4601 m
CF3	94.9034 m	N/A	65.1251 m
CF4	1.7177	N/A	268.3424 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


Si4896DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4896DY_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: August 19, 2006
Page 1
Time: 21:13:11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Tank j-f
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20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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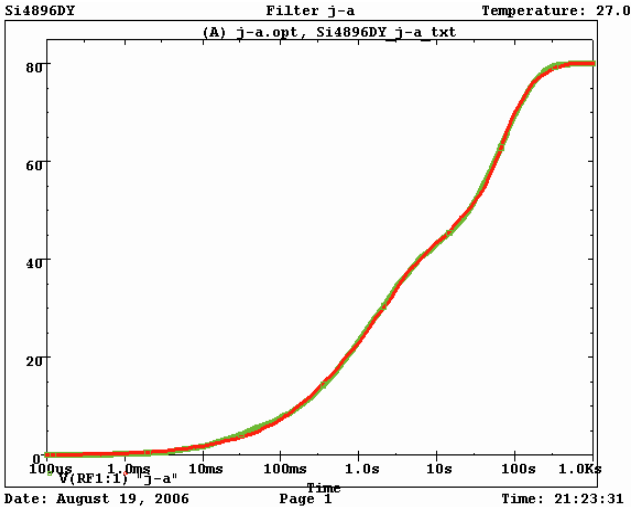
Time
Date: August 19, 2006
Page 1
Time: 21:18:12


Si4896DY
Filter j-a
Temperature: 27.0
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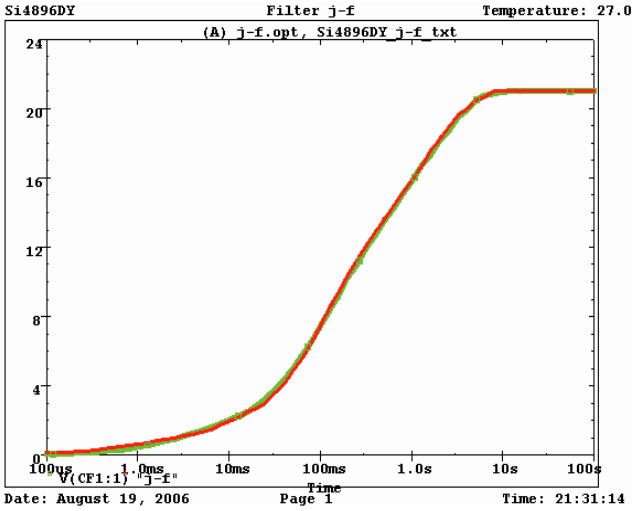
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: August 19, 2006
Page 1
Time: 21:23:31


Si4896DY
Filter j-f
Temperature: 27.0
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24
20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: August 19, 2006
Page 1
Time: 21:31:14