R-C Thermal Model Parameters

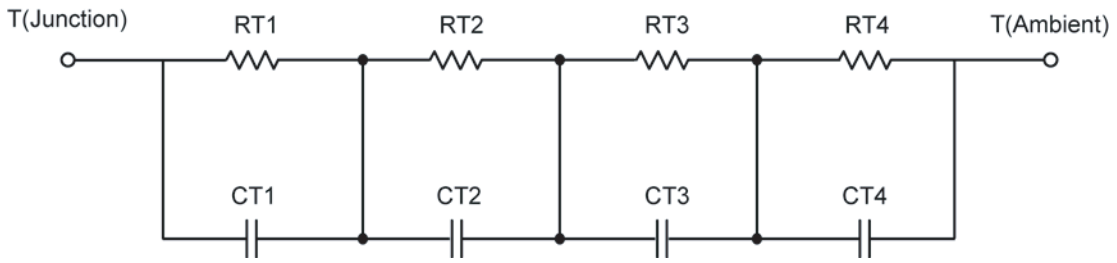
DESCRIPTION

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.

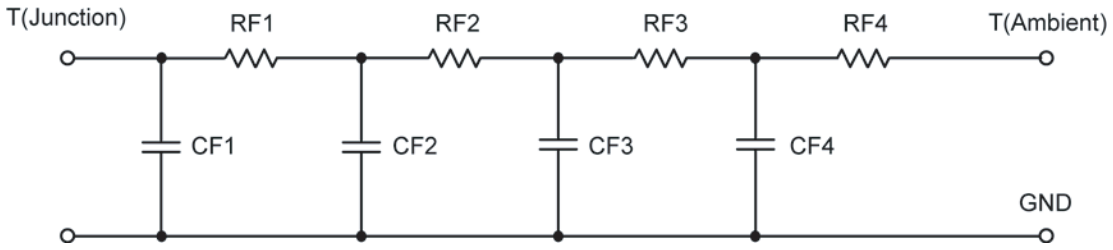
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	8.2097	N/A	5.9095
RT2	5.6187	N/A	1.1458
RT3	25.3777	N/A	2.1362
RT4	45.7939	N/A	12.8085
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	903.8016 m	N/A	11.8245 m
CT2	4.5883 m	N/A	2.6354 m
CT3	39.4360 m	N/A	38.7429 m
CT4	1.3741	N/A	91.9240 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

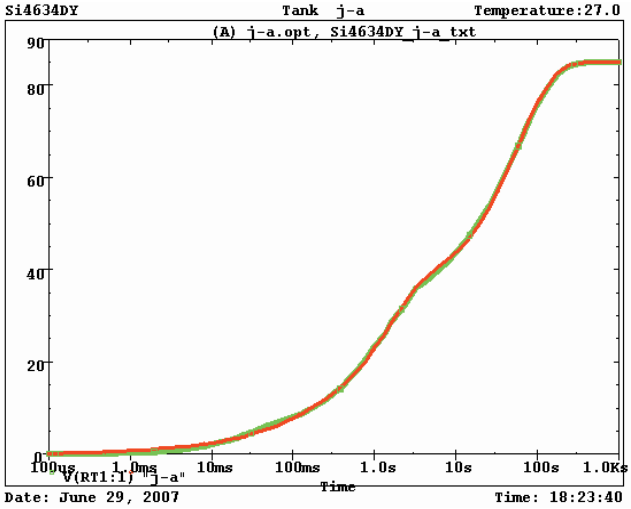


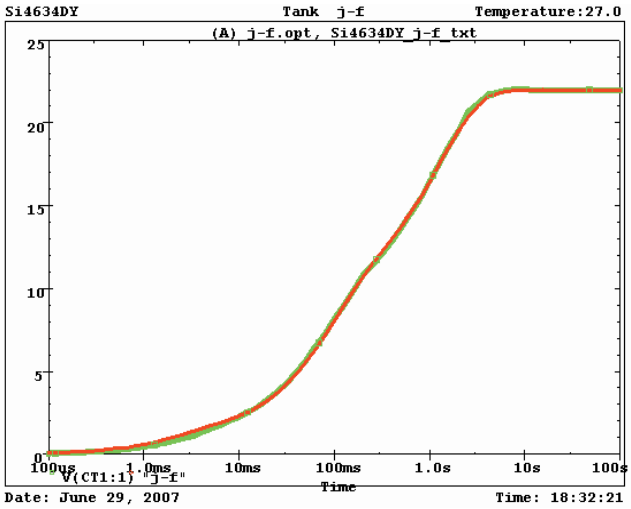
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.7780	N/A	1.2921
RF2	28.1670	N/A	8.1662
RF3	34.0994	N/A	5.8190
RF4	13.9556	N/A	6.7227
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	5.4213 m	N/A	1.5249 m
CF2	38.4831 m	N/A	6.3236 m
CF3	968.9754 m	N/A	40.8340 m
CF4	2.2971	N/A	138.9300 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


Si4634DY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4634DY_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: June 29, 2007
Time: 18:23:40


Si4634DY
Tank j-f
Temperature:27.0
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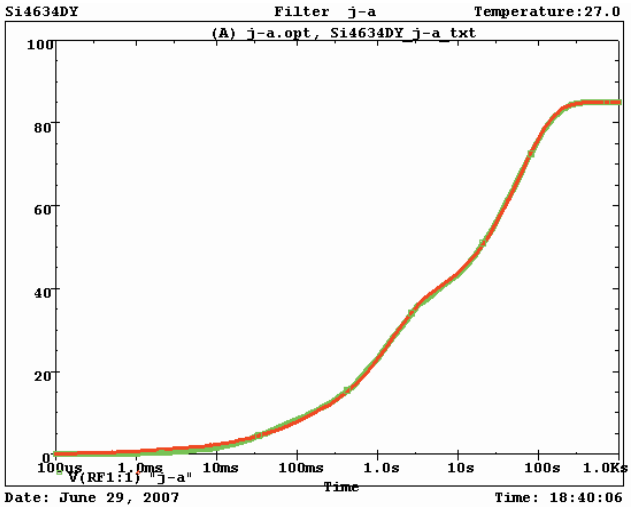
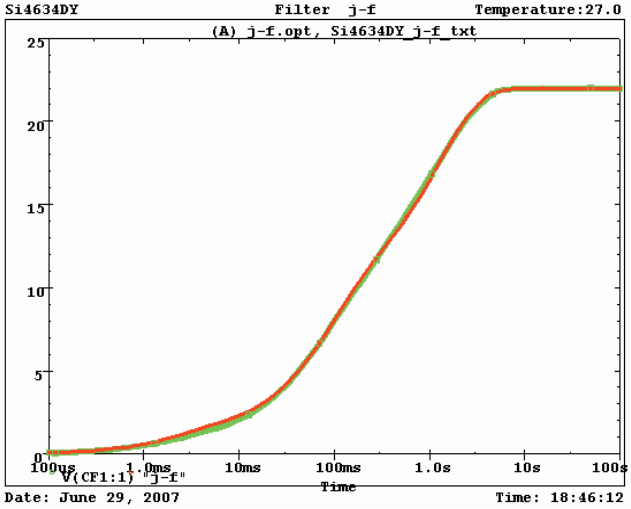
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1) "j-f"
Time
Date: June 29, 2007
Time: 18:32:21


Si4634DY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4634DY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: June 29, 2007
Time: 18:40:06


Si4634DY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4634DY_j-f_txt
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: June 29, 2007
Time: 18:46:12