R-C Thermal Model Parameters

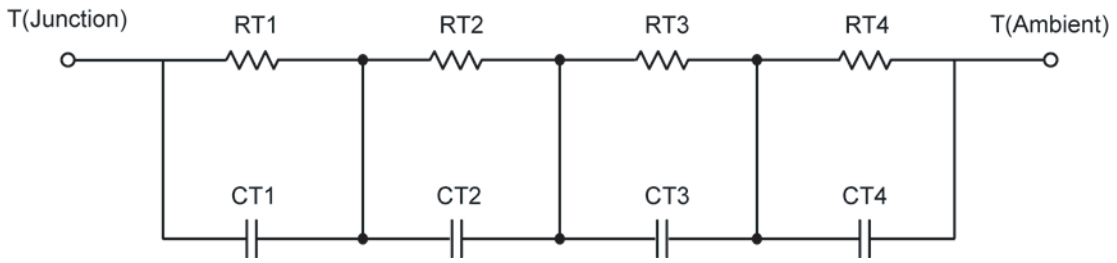
DESCRIPTION

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.

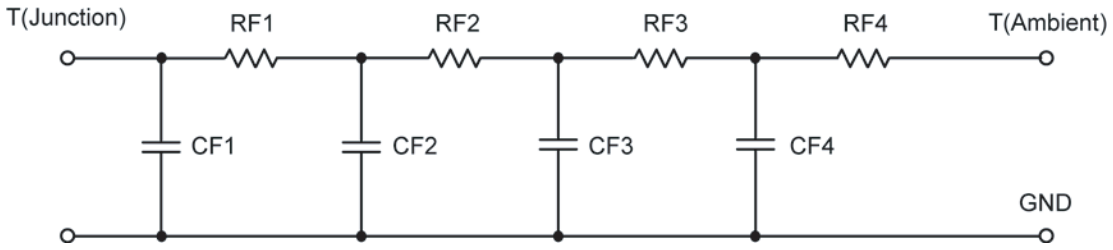
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	20.6695	N/A	6.7820
RT2	2.1357	N/A	533.7090 m
RT3	23.4290	N/A	7.5334
RT4	33.4871	N/A	4.1491
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	25.0230 m	N/A	71.2795 m
CT2	1.7123 m	N/A	903.0670 u
CT3	358.8393 m	N/A	10.2637 m
CT4	1.9282	N/A	739.5354 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

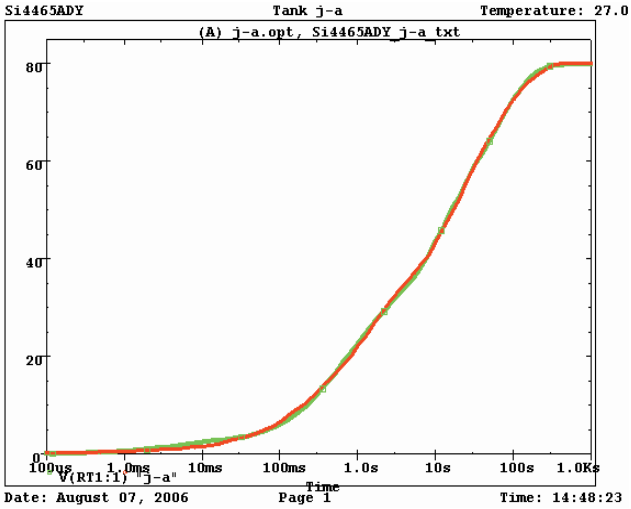


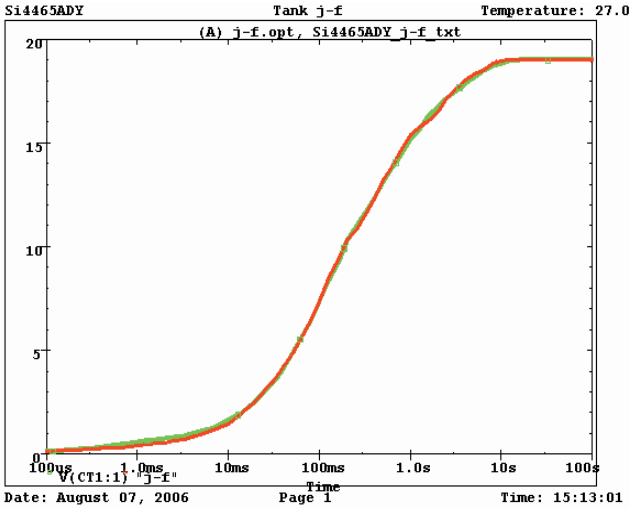
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.8432	N/A	3.8300
RF2	20.5851	N/A	8.8945
RF3	25.7815	N/A	4.8422
RF4	24.4480	N/A	1.3472
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	8.1411 m	N/A	5.0276 m
CF2	31.5787 m	N/A	9.4290 m
CF3	346.1198 m	N/A	247.8448 m
CF4	2.0902	N/A	800.0707 u

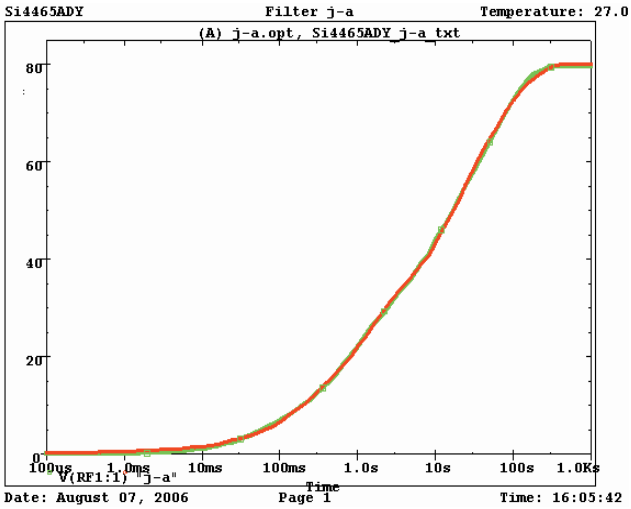
Note: NA indicates not applicable

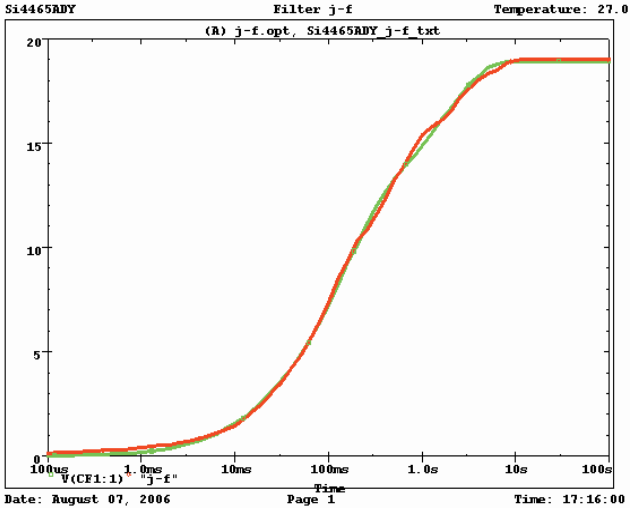
Reference:

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


Si4465ADY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4465ADY_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 07, 2006
Page 1
Time: 14:48:23


Si4465ADY
Tank j-f
Temperature: 27.0
(A) j-f.opt, Si4465ADY_j-f_txt
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1) "j-f"
Time
Date: August 07, 2006
Page 1
Time: 15:13:01


Si4465ADY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4465ADY_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: August 07, 2006
Page 1
Time: 16:05:42


Si4465ADY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4465ADY_j-f_txt
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: August 07, 2006
Page 1
Time: 17:16:00