R-C Thermal Model Parameters

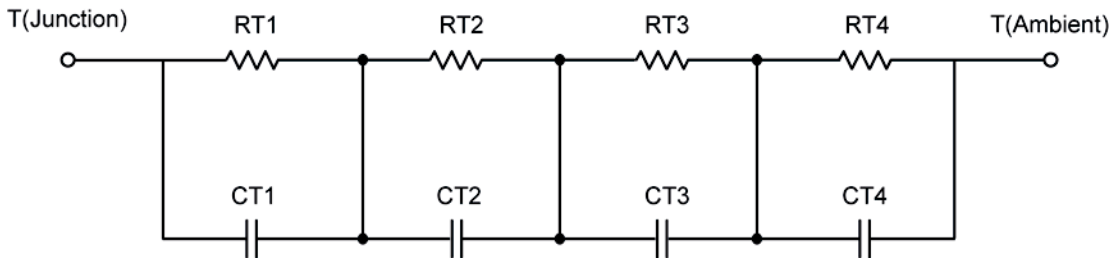
DESCRIPTION

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.

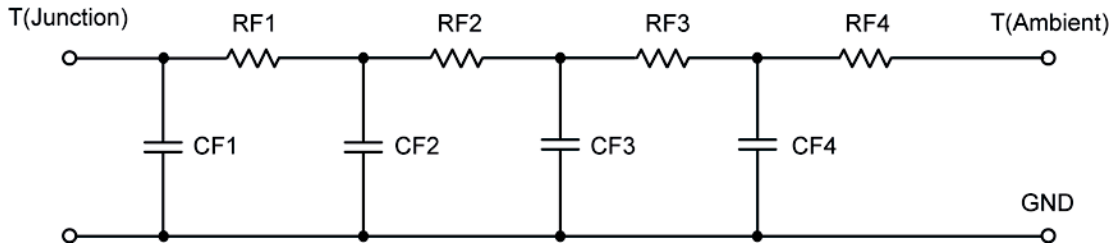
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.4243	N/A	9.2733
RT2	12.0158	N/A	2.8176
RT3	2.1446	N/A	890.2929 m
RT4	25.0707	N/A	7.0904
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	7.5455 m	N/A	1.1282 m
CT2	69.3500 m	N/A	254.0526 u
CT3	522.4490 u	N/A	2.8838
CT4	2.5535	N/A	4.5365 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

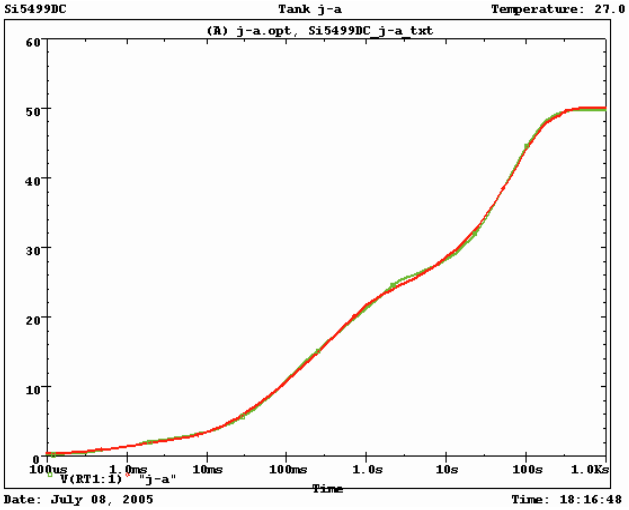


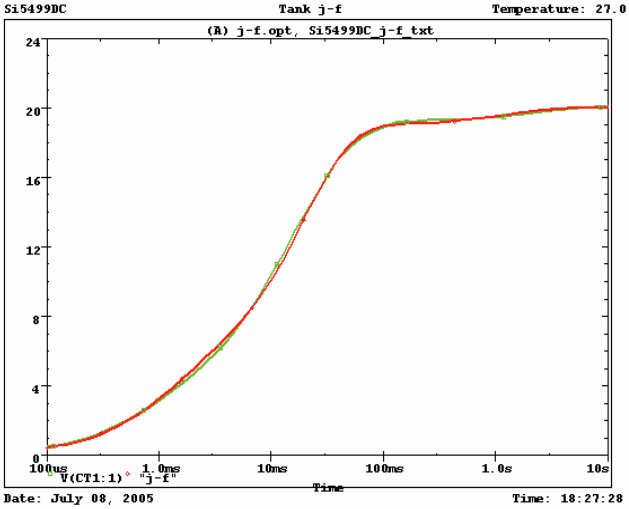
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.3046	N/A	4.1709
RF2	12.6154	N/A	12.1067
RF3	10.5498	N/A	2.7273
RF4	24.2231	N/A	996.1180 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	409.6697 u	N/A	172.6501 u
CF2	6.2604 m	N/A	842.7430 u
CF3	76.6856 m	N/A	6.8355 m
CF4	2.5913	N/A	1.3016

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


Si5499DC
Tank j-a
Temperature: 27.0
(R) j-a.opt, Si5499DC_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: July 08, 2005
Time: 18:16:48


Si5499DC
Tank j-f
Temperature: 27.0
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20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
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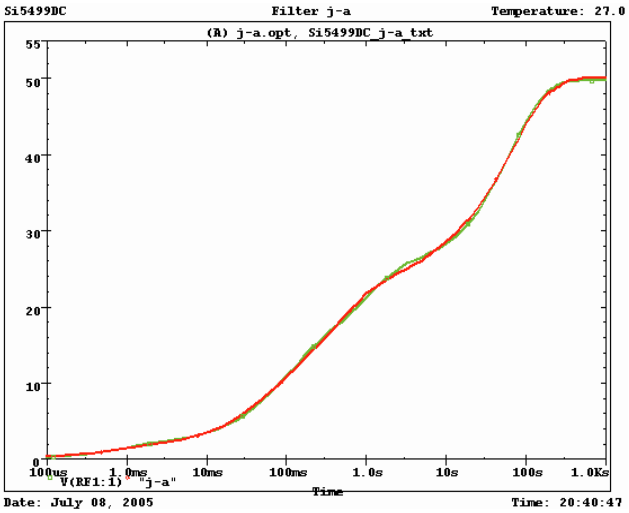
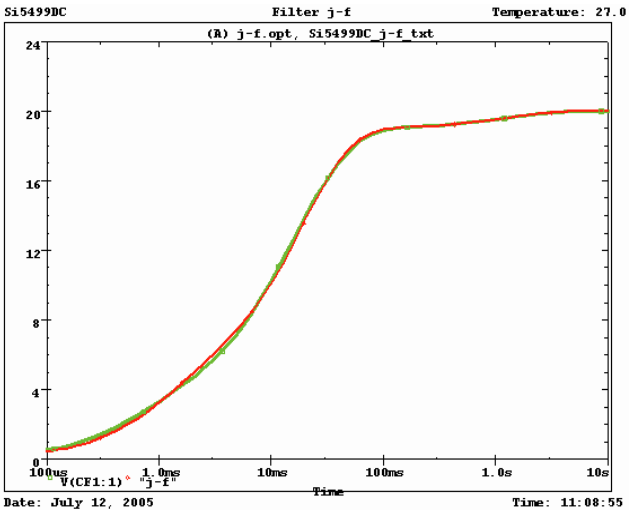
Time
Date: July 08, 2005
Time: 18:27:28


Si5499DC
Filter j-a
Temperature: 27.0
(R) j-a.opt, Si5499DC_j-a_txt
55
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: July 08, 2005
Time: 20:40:47


Si5499DC
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
V(CF1:1) "j-f"
Time
Date: July 12, 2005
Time: 11:08:55