R-C Thermal Model Parameters

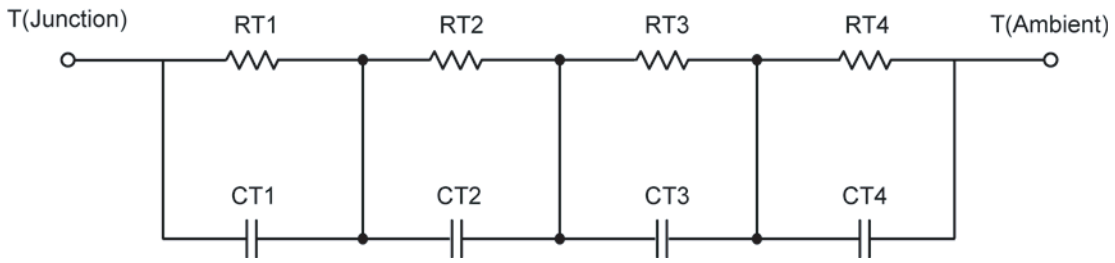
DESCRIPTION

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.

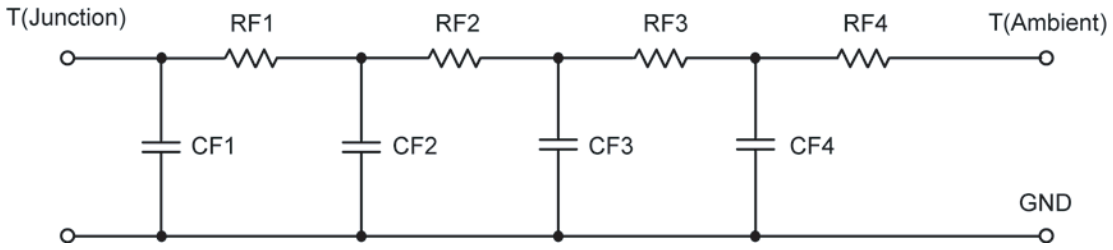
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	21.6841	N/A	13.9304
RT2	7.0702	N/A	4.7464
RT3	33.4730	N/A	13.4924
RT4	47.0954	N/A	7.8625
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	11.0131 m	N/A	6.4758 m
CT2	746.2615 u	N/A	479.1574 u
CT3	61.2112 m	N/A	49.7764 m
CT4	1.3769	N/A	280.2423 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

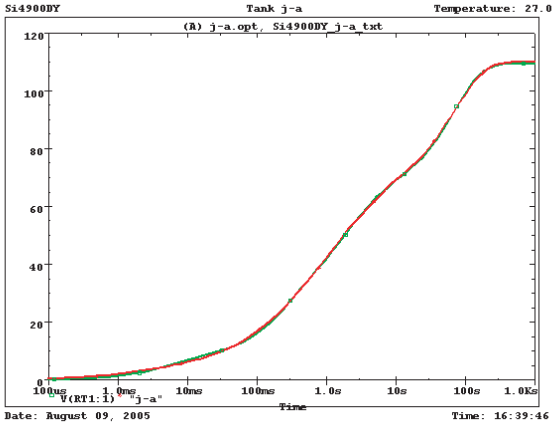


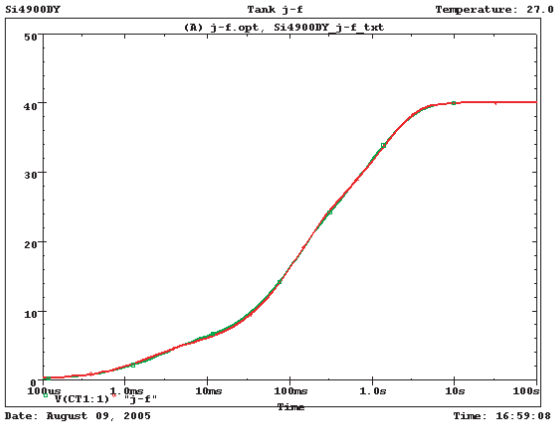
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.3489	N/A	5.9484
RF2	25.6210	N/A	17.9502
RF3	31.8235	N/A	8.9119
RF4	44.7814	N/A	7.0769
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	672.0478 u	N/A	457.3987 u
CF2	7.1850 m	N/A	5.6889 m
CF3	48.6044 m	N/A	56.7819 m
CF4	1.3569	N/A	76.8666 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


Si4900DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4900DY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: August 09, 2005
Time: 16:39:46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Tank j-f
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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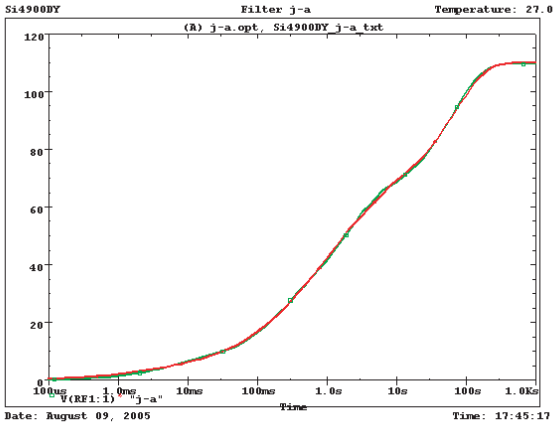
Time
Date: August 09, 2005
Time: 16:59:08


Si4900DY
Filter j-a
Temperature: 27.0
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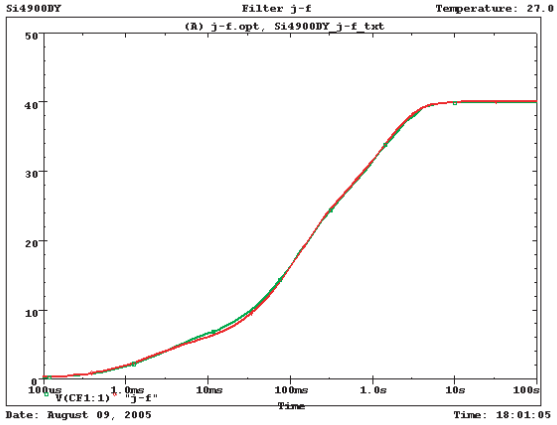
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: August 09, 2005
Time: 17:45:17


Si4900DY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4900DY_j-f_txt
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: August 09, 2005
Time: 18:01:05