R-C Thermal Model Parameters

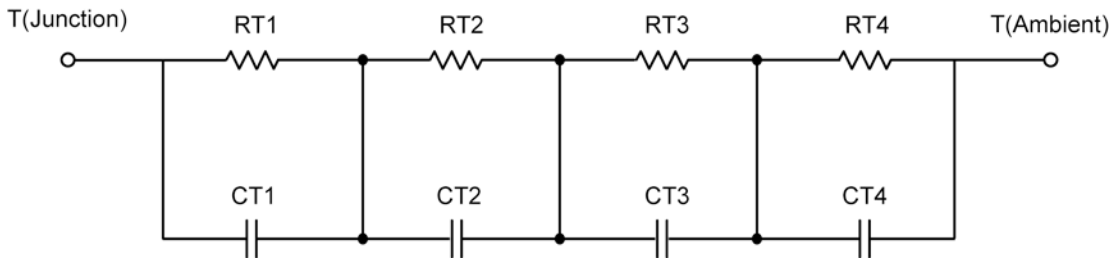
DESCRIPTION

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.

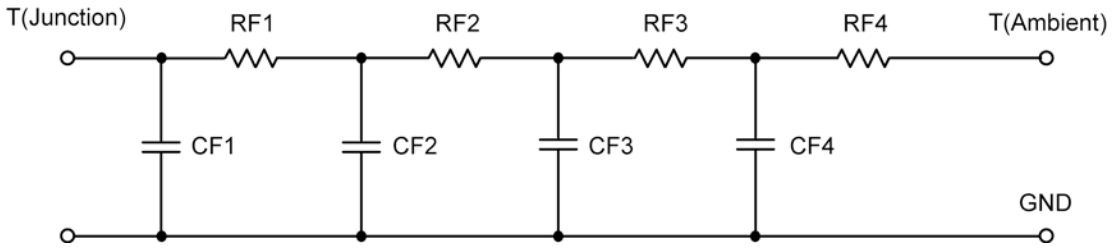
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	9.3175	467.3319 m	N/A
RT2	1.7290	793.1223 m	N/A
RT3	6.4796	656.8746 m	N/A
RT4	47.4739	82.6712 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	303.2258 m	3.2992 m	N/A
CT2	3.0667 m	20.4434 m	N/A
CT3	52.0372 m	23.0380 m	N/A
CT4	1.3756	2.5581 m	N/A

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

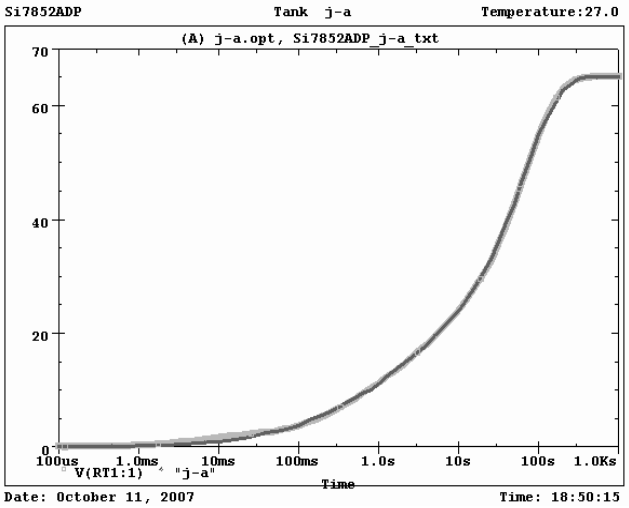


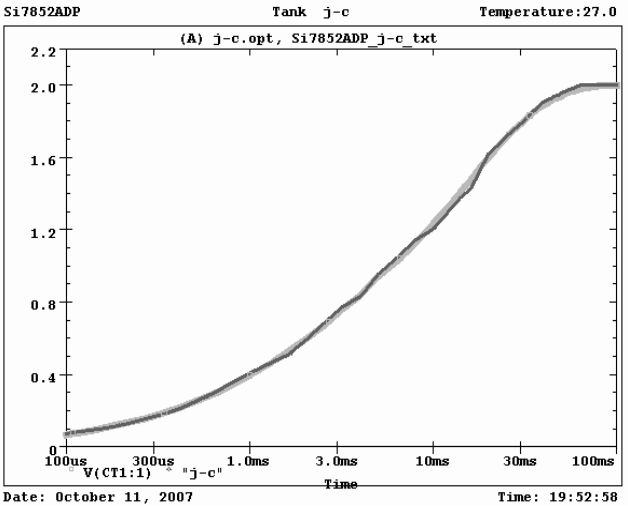
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.0535	422.3661 m	N/A
RF2	10.7203	598.8721 m	N/A
RF3	18.7708	970.7546 m	N/A
RF4	31.4554	8.0072 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	9.7862 m	1.3980 m	N/A
CF2	68.9511 m	2.9248 m	N/A
CF3	565.2801 m	11.2432 m	N/A
CF4	1.5967	108.3211 m	N/A

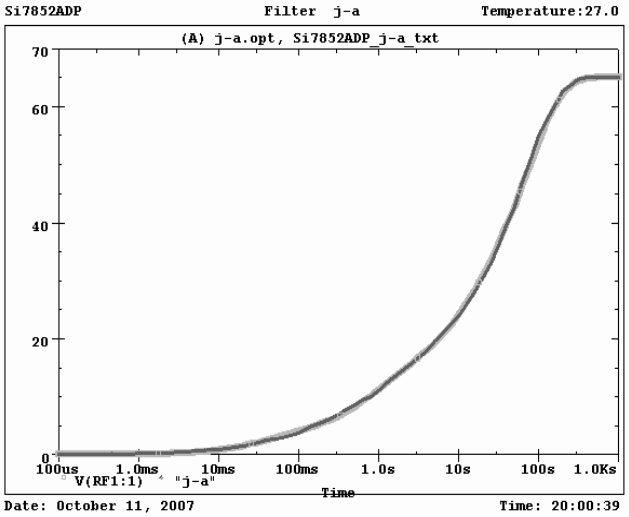
Note: NA indicates not applicable

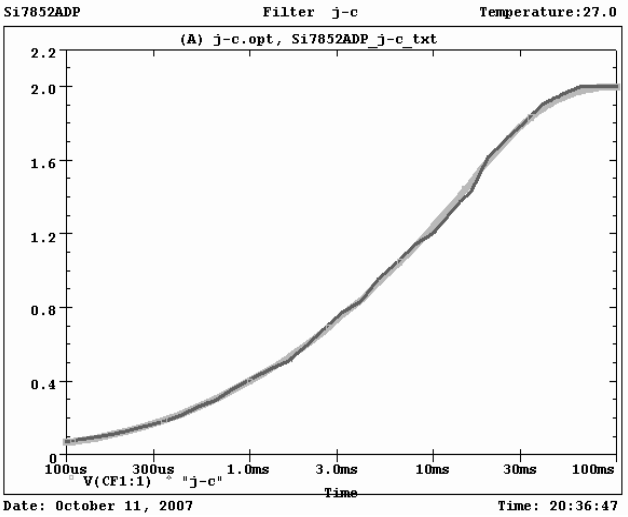
Reference:

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


Si7852ADP
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7852ADP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: October 11, 2007
Time: 18:50:15


Si7852ADP
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7852ADP_j-c_txt
2.2
2.0
1.6
1.2
0.8
0.4
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1) "j-c"
Time
Date: October 11, 2007
Time: 19:52:58


Si7852ADP
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7852ADP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: October 11, 2007
Time: 20:00:39


Si7852ADP
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7852ADP_j-c_txt
2.2
2.0
1.6
1.2
0.8
0.4
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1) "j-c"
Time
Date: October 11, 2007
Time: 20:36:47