R-C Thermal Model Parameters

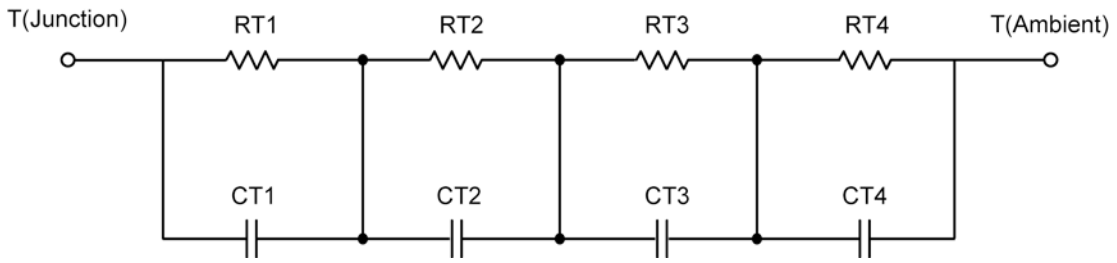
DESCRIPTION

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.

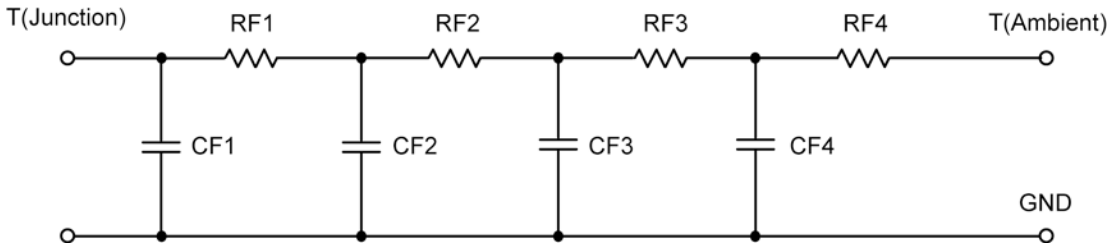
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.9109	N/A	8.3851
RT2	5.7578	N/A	3.0446
RT3	20.0946	N/A	3.4945
RT4	48.2367	N/A	11.0758
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	27.4871 m	N/A	5.7116 m
CT2	972.2157 u	N/A	371.7560 u
CT3	78.5434 m	N/A	584.3406 m
CT4	1.3216	N/A	79.9109 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

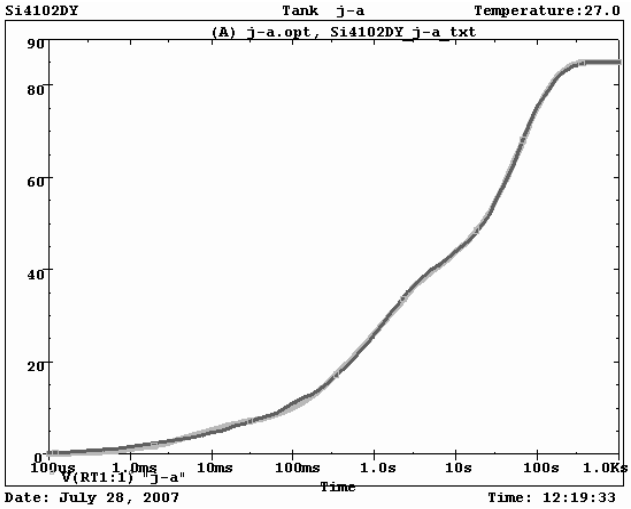


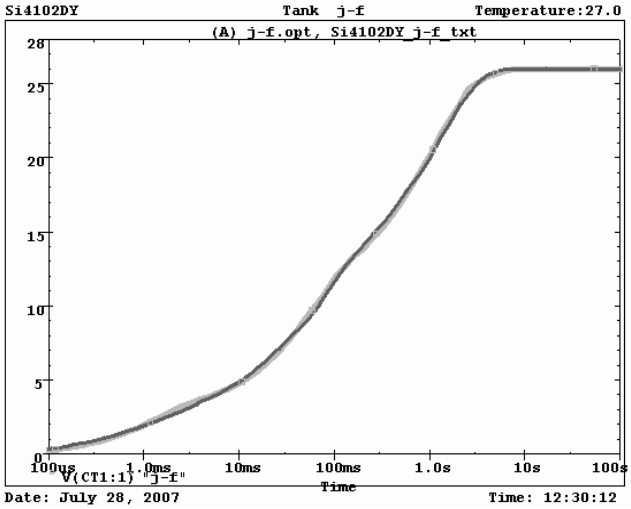
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.9569	N/A	3.4059
RF2	17.8674	N/A	8.8403
RF3	14.4525	N/A	7.8206
RF4	45.7232	N/A	5.9332
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.0544 m	N/A	362.1665 u
CF2	21.6130 m	N/A	4.4996 m
CF3	70.0102 m	N/A	50.6465 m
CF4	1.3011	N/A	130.1162 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


Si4102DY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4102DY_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: July 28, 2007
Time: 12:19:33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Tank j-f
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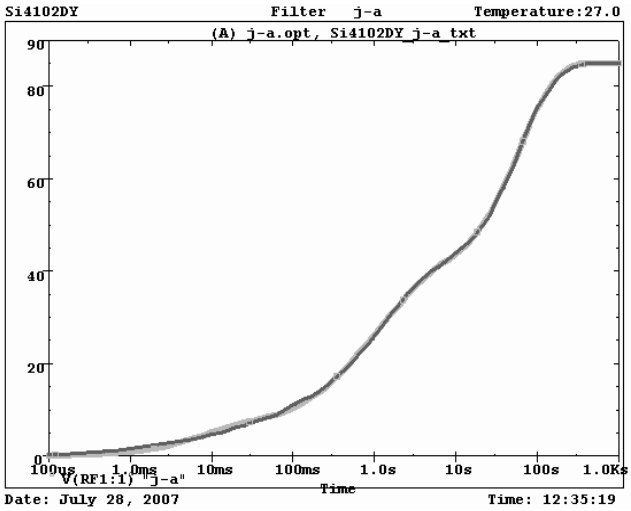
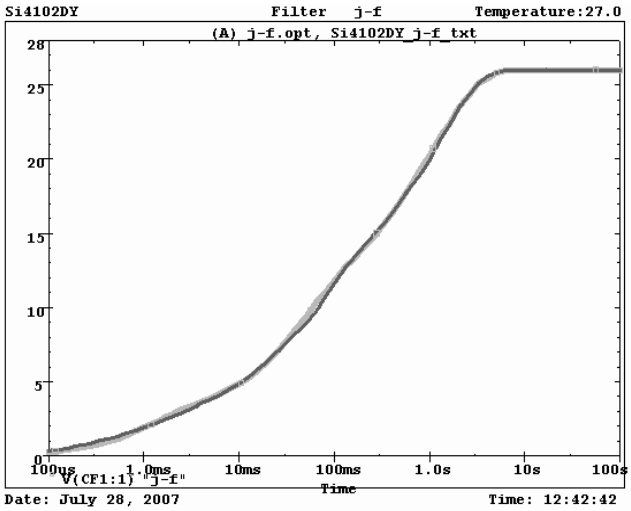
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1) "j-f"
Time
Date: July 28, 2007
Time: 12:30:12


Si4102DY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4102DY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: July 28, 2007
Time: 12:35:19


Si4102DY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4102DY_j-f_txt
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: July 28, 2007
Time: 12:42:42