R-C Thermal Model Parameters

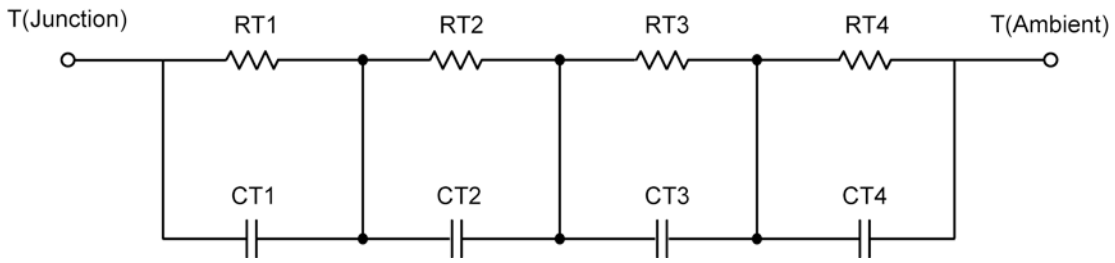
DESCRIPTION

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.

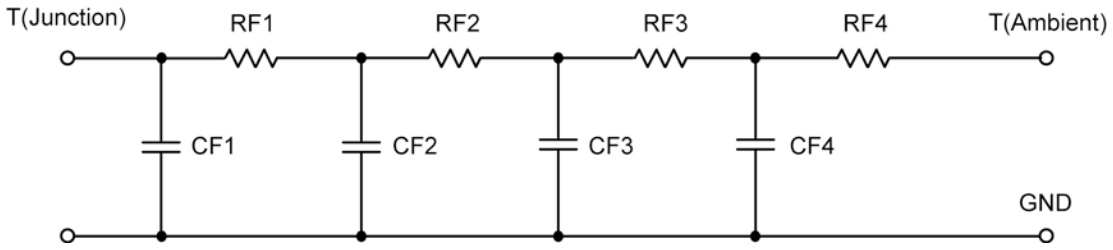
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.2575	123.0684 m	N/A
RT2	56.0753	544.2755 m	N/A
RT3	10.4703	845.5248 m	N/A
RT4	9.1969	887.1313 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	7.0187 m	2.0038 m	N/A
CT2	1.2577	1.6738 m	N/A
CT3	188.2348 m	18.2963 m	N/A
CT4	34.7791 m	14.7370 m	N/A

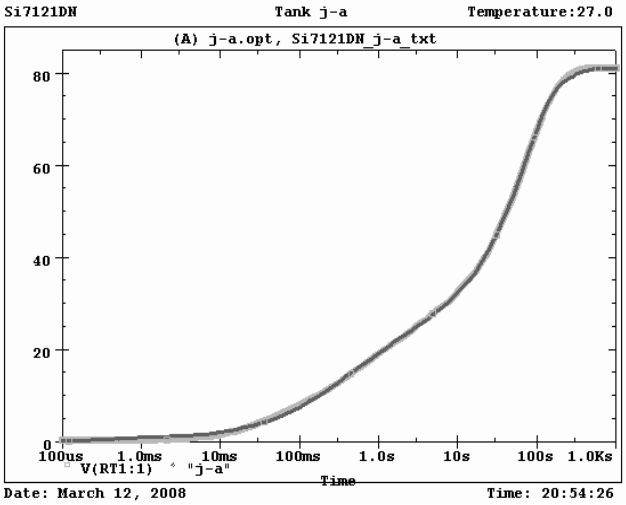
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

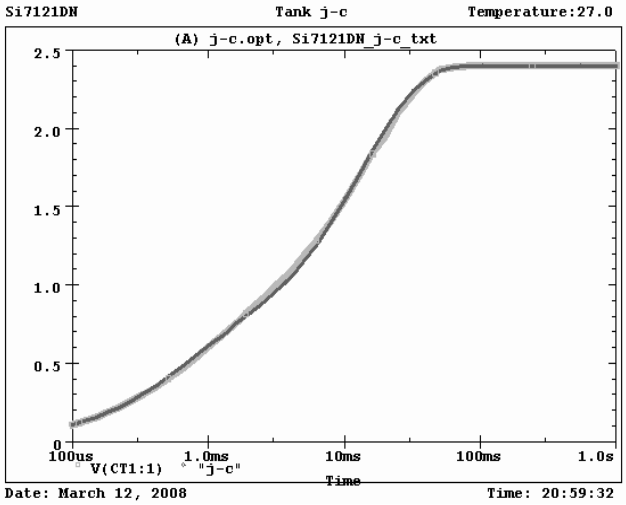
R-C THERMAL MODEL FOR FILTER CONFIGURATION

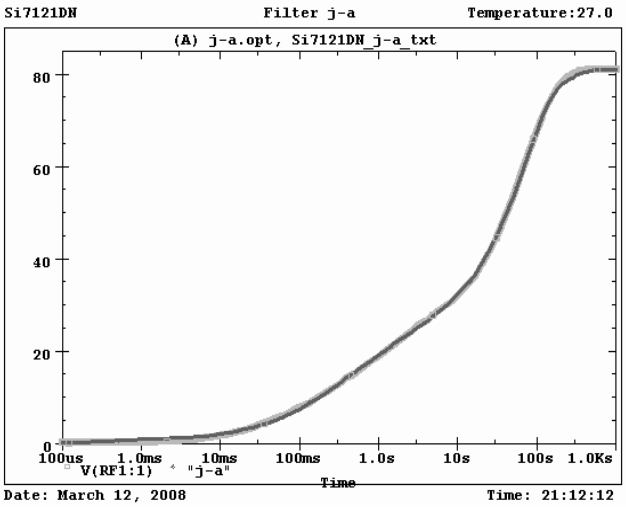


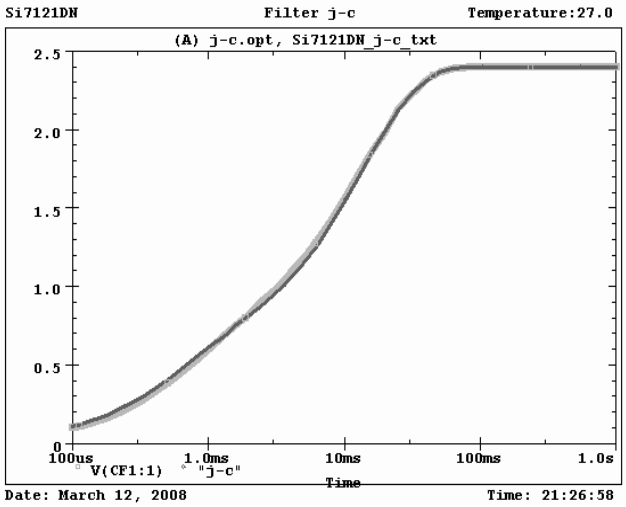
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.4954	793.6689 m	N/A
RF2	8.9736	635.1155 m	N/A
RF3	11.4096	512.7679 m	N/A
RF4	54.1214	458.4477 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	5.1700 m	965.8802 u	N/A
CF2	17.9553 m	6.3837 m	N/A
CF3	103.7497 m	887.2094 u	N/A
CF4	1.1433	4.4512 m	N/A

Note: NA indicates not applicable


Si7121DN
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7121DN_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: March 12, 2008
Time: 20:54:26


Si7121DN
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7121DN_j-c_txt
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date: March 12, 2008
Time: 20:59:32


Si7121DN
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7121DN_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: March 12, 2008
Time: 21:12:12


Si7121DN
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7121DN_j-c_txt
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date: March 12, 2008
Time: 21:26:58