R-C Thermal Model Parameters

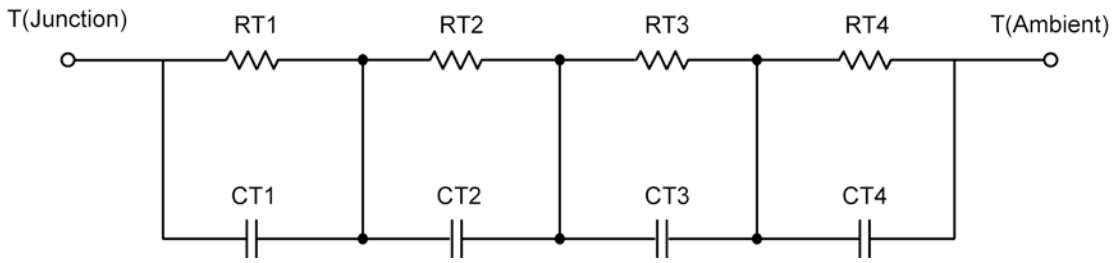
DESCRIPTION

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.

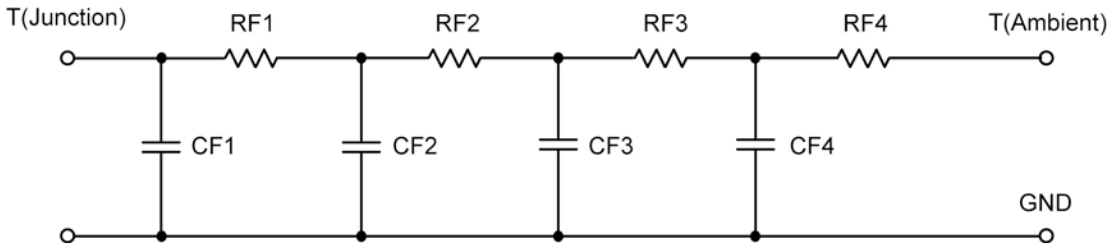
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	N/A	5.5547 m	N/A
RT2	N/A	208.9586 m	N/A
RT3	N/A	885.1853 m	N/A
RT4	N/A	300.3013 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	N/A	2.7646 m	N/A
CT2	N/A	2.1503 m	N/A
CT3	N/A	13.5314 m	N/A
CT4	N/A	62.2423 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

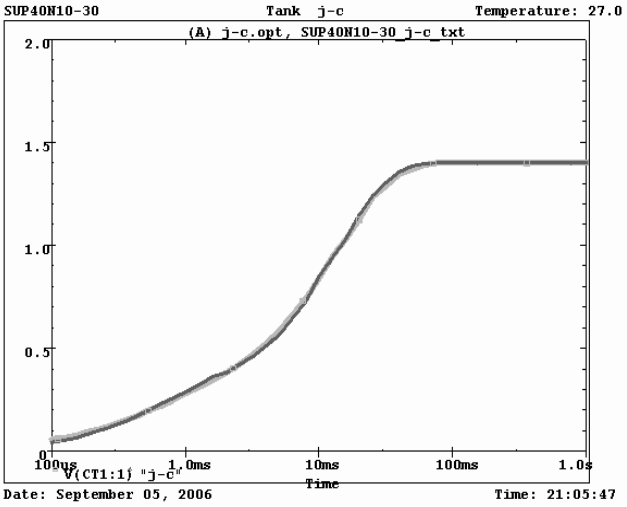


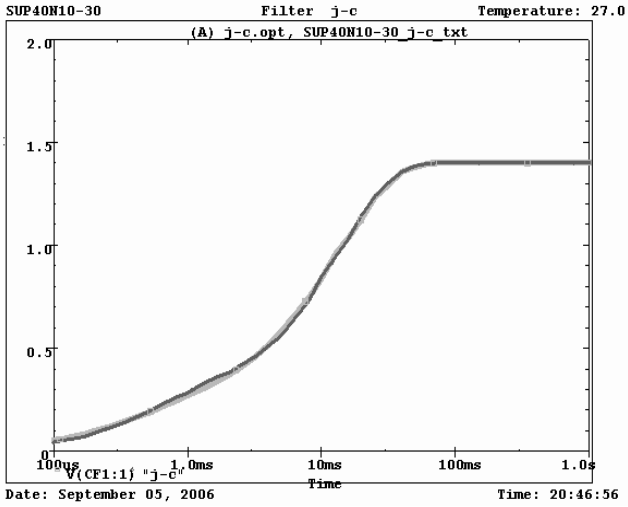
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	N/A	276.6813 m	N/A
RF2	N/A	385.4543 m	N/A
RF3	N/A	466.7089 m	N/A
RF4	N/A	271.1554 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	N/A	1.6920 m	N/A
CF2	N/A	9.0055 m	N/A
CF3	N/A	1.6728 m	N/A
CF4	N/A	489.4702 u	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


SUP40N10-30
Tank j-c
Temperature: 27.0
(A) j-c.opt, SUP40N10-30_j-c_txt
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1) "j-c"
Time
Date: September 05, 2006
Time: 21:05:47


SUP40N10-30
Filter j-c
Temperature: 27.0
(A) j-c.opt, SUP40N10-30_j-c_txt
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1) "j-c"
Time
Date: September 05, 2006
Time: 20:46:56