R-C Thermal Model Parameters

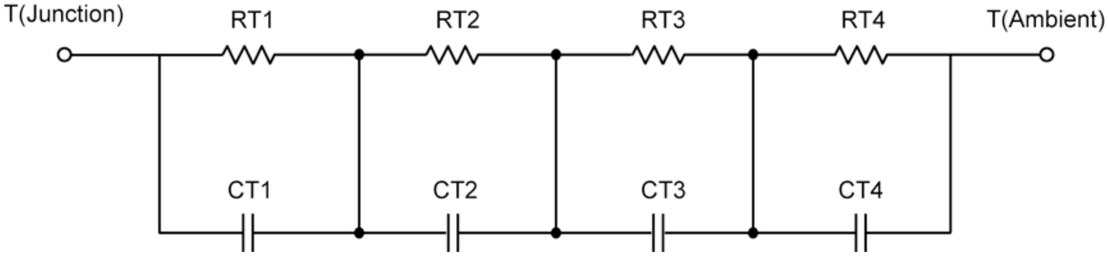
DESCRIPTION

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

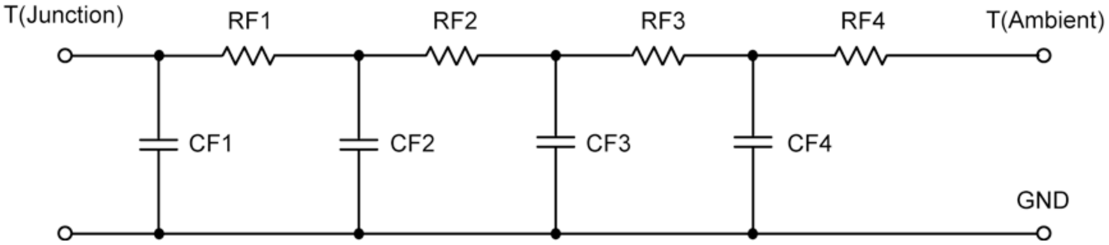


R-C VALUES FOR TANK CONFIGURATION

Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	15.1449	1.9512	N/A
RT2	5.8098	3.3199	N/A
RT3	6.7345	2.9021	N/A
RT4	32.3108	3.3268	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.0850	132.5103 u	N/A
CT2	314.1283 u	624.5588 u	N/A
CT3	53.8890 m	2.2256 m	N/A
CT4	3.4557	22.9367 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



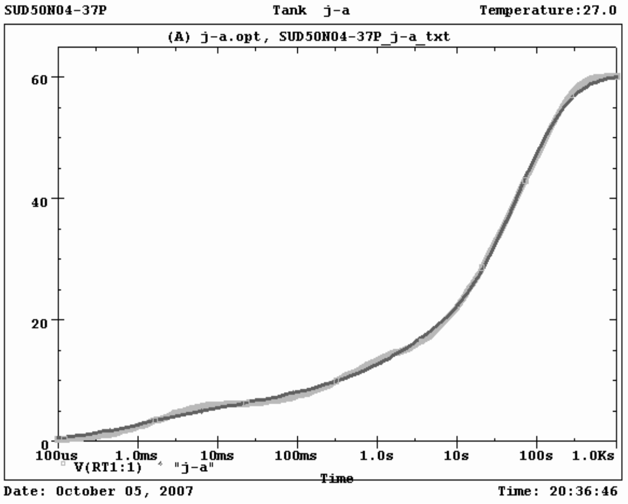
R-C VALUES FOR FILTER CONFIGURATION

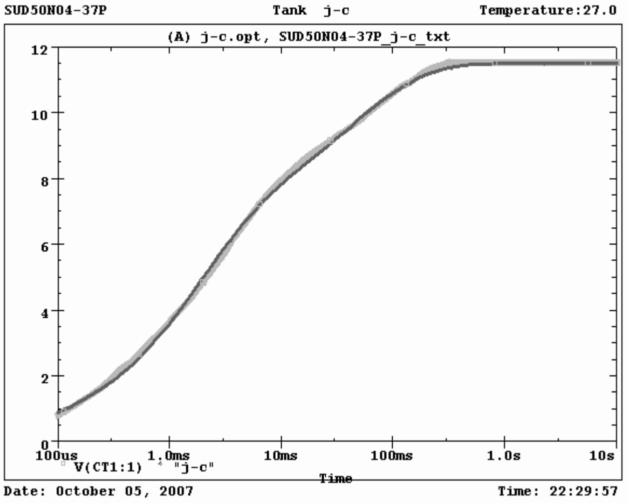
Junction to	Ambient	Case	Foot
Thermal Resistance (°C/W)			
RF1	6.1902	3.4844	N/A
RF2	7.8428	2.3678	N/A
RF3	22.7933	2.1738	N/A
RF4	23.1737	3.4740	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	342.0201 u	117.7446 u	N/A
CF2	63.0948 m	546.5290 u	N/A
CF3	801.7348 m	102.2644 u	N/A
CF4	3.6448	18.0658 m	N/A

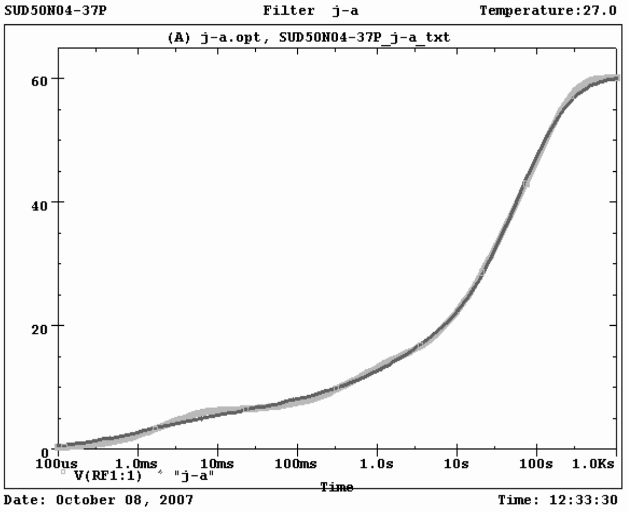
Note: NA indicates not applicable

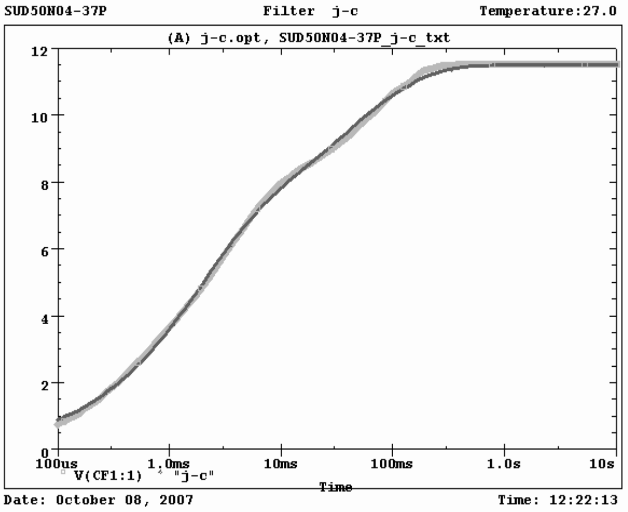
Reference:

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


SUD50N04-37P
Tank j-a
Temperature:27.0
(A) j-a.opt, SUD50N04-37P_j-a_txt
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: October 05, 2007
Time: 20:36:46


SUD50N04-37P
Tank j-c
Temperature:27.0
(A) j-c.opt, SUD50N04-37P_j-c_txt
12
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"j-c"
Time
Date: October 05, 2007
Time: 22:29:57


SUD50N04-37P
Filter j-a
Temperature:27.0
(A) j-a.opt, SUD50N04-37P_j-a_txt
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: October 08, 2007
Time: 12:33:30


SUD50N04-37P
Filter j-c
Temperature:27.0
(A) j-c.opt, SUD50N04-37P_j-c_txt
12
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-c"
Time
Date: October 08, 2007
Time: 12:22:13