R-C Thermal Model Parameters

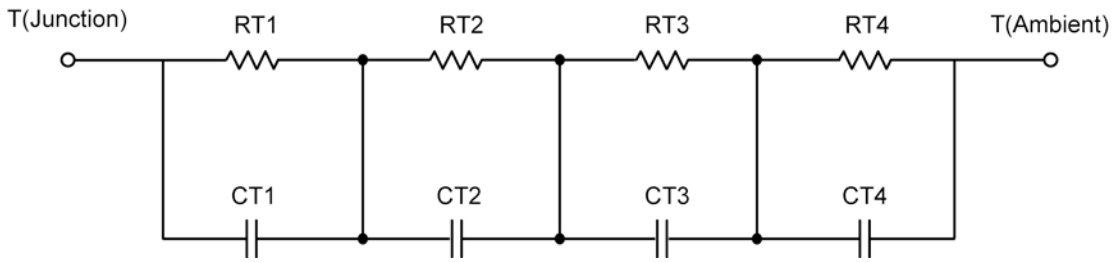
DESCRIPTION

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.

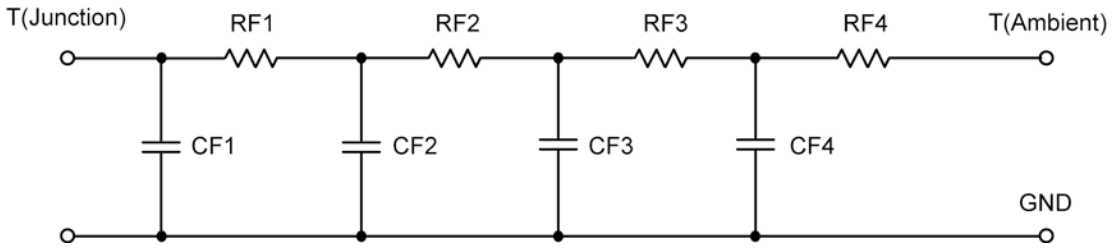
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RT1	800.8191 m	190.2121 m	1.3990 m
RT2	7.3171	290.1261 m	2.0175
RT3	10.5922	35.8761 m	460.5573 m
RT4	49.1350	483.7652 m	229.4611 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CT1	10.0497 m	2.8387 m	61.4100 u
CT2	588.1963 m	61.2894 m	31.1962 m
CT3	47.1217 m	347.3308 m	138.9868 m
CT4	1.4789	34.5324 m	2.7856 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

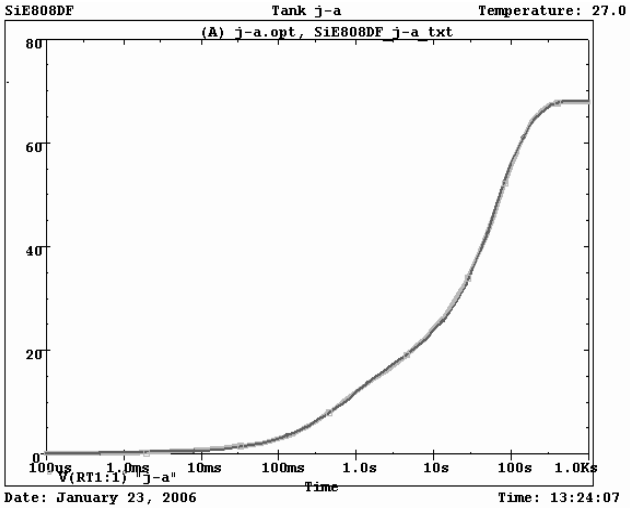


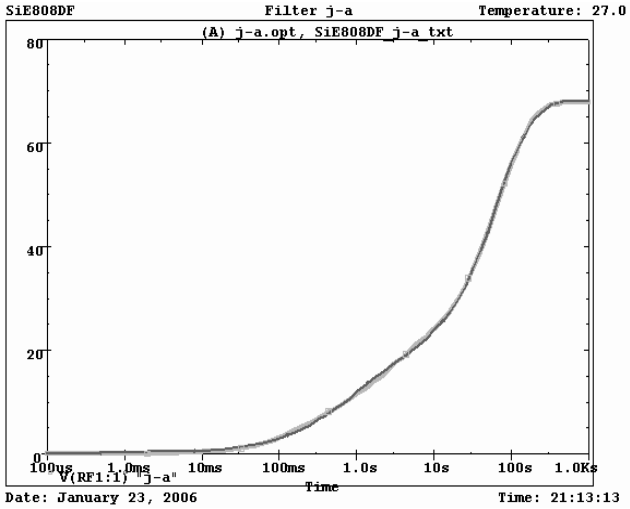
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RF1	8.6804	2.7978 m	213.0666 m
RF2	5.8765	244.0316 m	313.3212 m
RF3	5.9897	319.3498 m	815.5035 m
RF4	47.2176	435.0898 m	1.3629
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CF1	25.1275 m	768.4927 u	2.2504 m
CF2	145.2098 m	1.8305 m	12.5888 m
CF3	17.5646 m	19.3761 m	12.8985 m
CF4	1.2744	157.7795 u	60.1342 u

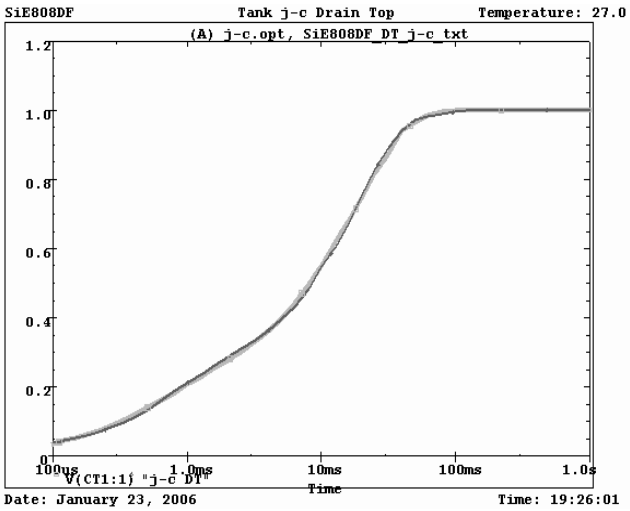
Note: NA indicates not applicable

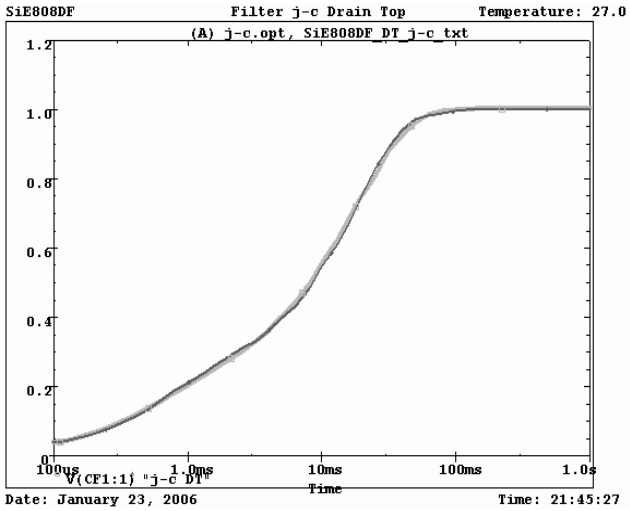
Reference:

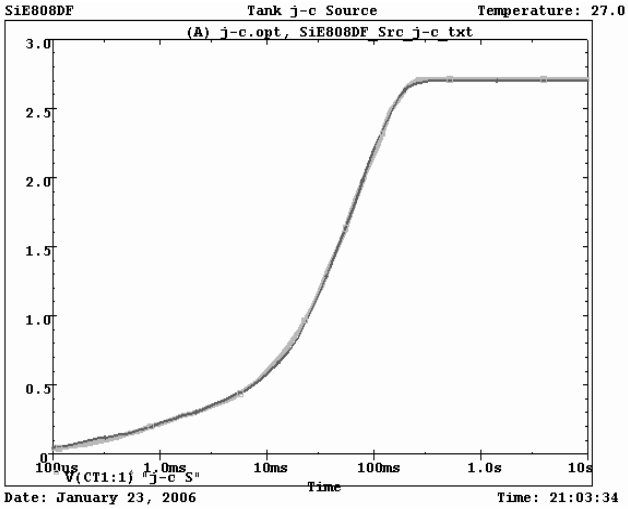
[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya, IEEE / SEMITHERM 2002

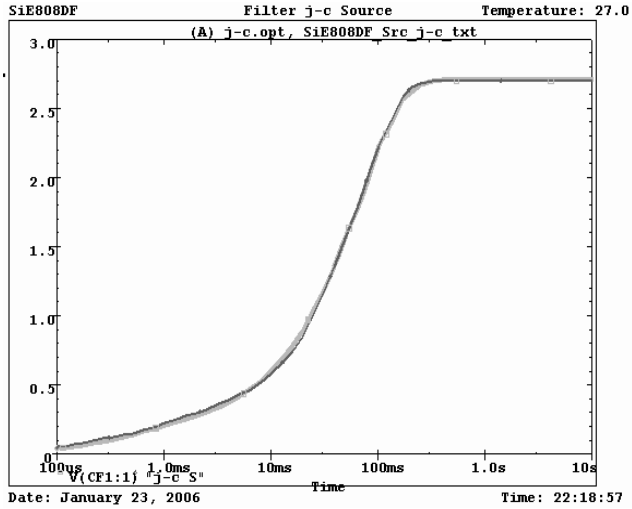

SiE808DF
Tank j-a
Temperature: 27.0
(A) j-a.opt, SiE808DF_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: January 23, 2006
Time: 13:24:07


SiE808DF
Filter j-a
Temperature: 27.0
(A) j-a.opt, SiE808DF_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: January 23, 2006
Time: 21:13:13


SiE808DF
Tank j-c Drain Top
Temperature: 27.0
(A) j-c.opt, SiE808DF_DT_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1) "j-c DT"
Time
Date: January 23, 2006
Time: 19:26:01


SiE808DF
Filter j-c Drain Top
Temperature: 27.0
(A) j-c.opt, SiE808DF_DT_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1) "j-c DT"
Time
Date: January 23, 2006
Time: 21:45:27


SiE808DF
Tank j-c Source
Temperature: 27.0
(A) j-c.opt, SiE808DF_Src_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1) "j-c S"
Time
Date: January 23, 2006
Time: 21:03:34


SiE808DF
Filter j-c Source
Temperature: 27.0
(A) j-c.opt, SiE808DF_Src_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-c S"
Time
Date: January 23, 2006
Time: 22:18:57