R-C Thermal Model Parameters

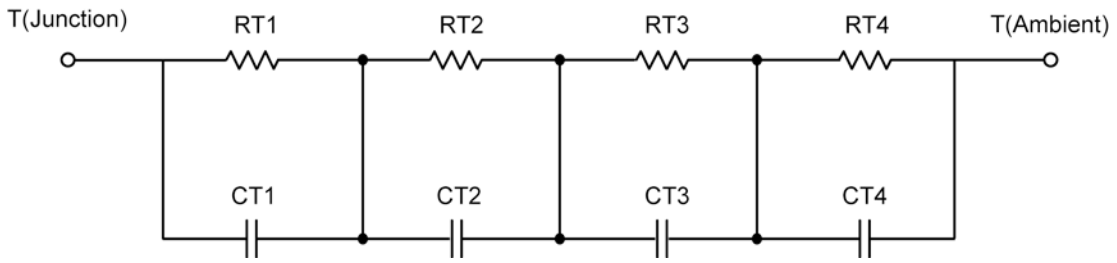
DESCRIPTION

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.

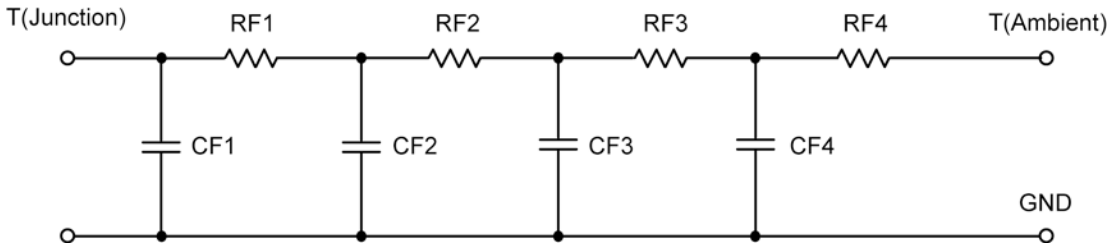
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RT1	800.8191 m	13.7052 m	239.2233 m
RT2	7.3171	516.9776 m	2.4371
RT3	10.5922	286.2836 m	21.5624 m
RT4	49.1350	182.6087 m	4.3831 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CT1	10.0497 m	253.9448 u	1.7223 m
CT2	588.1963 m	31.9162 m	27.9777 m
CT3	47.1217 m	69.2346 m	1.0998
CT4	1.4789	3.3324 m	6.1924 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

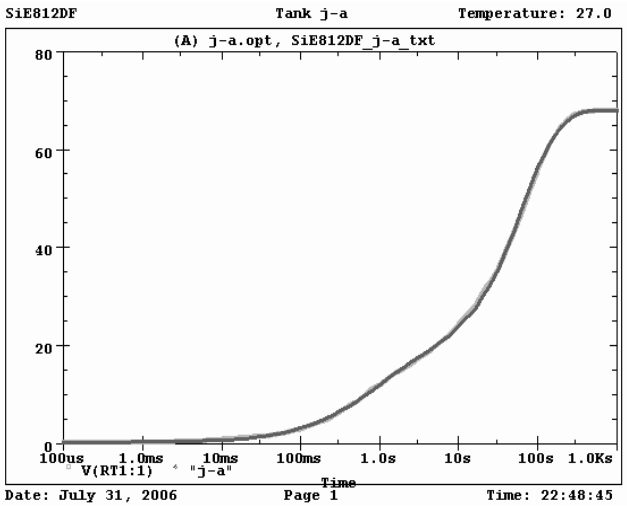


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
RF1	8.6804	311.1249 m	290.1786 m
RF2	5.8765	964.2920 n	1.2842
RF3	5.9897	5.0643 m	1.0355
RF4	47.2176	679.7321 m	93.5467 m
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case Drain Top**	**Case Source**
CF1	25.1275 m	3.2342 m	1.6895 m
CF2	145.2098 m	4.8515 m	25.2933 m
CF3	17.5646 m	15.5525 m	2.7409 m
CF4	1.2744	2.8720 m	277.7597 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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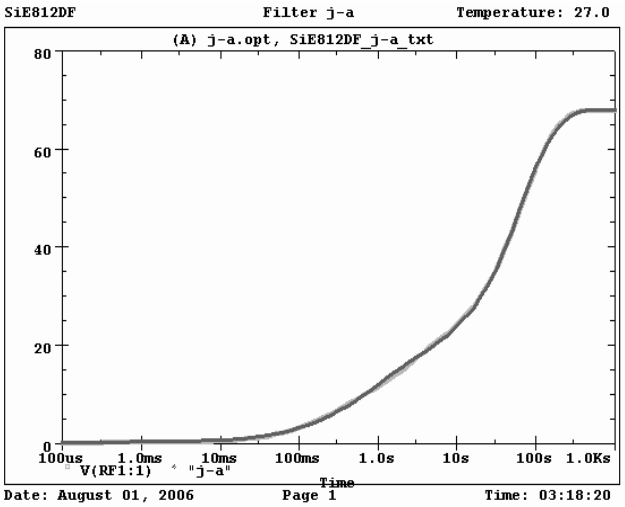
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: July 31, 2006
Page 1
Time: 22:48:45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Filter j-a
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10ms
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Time
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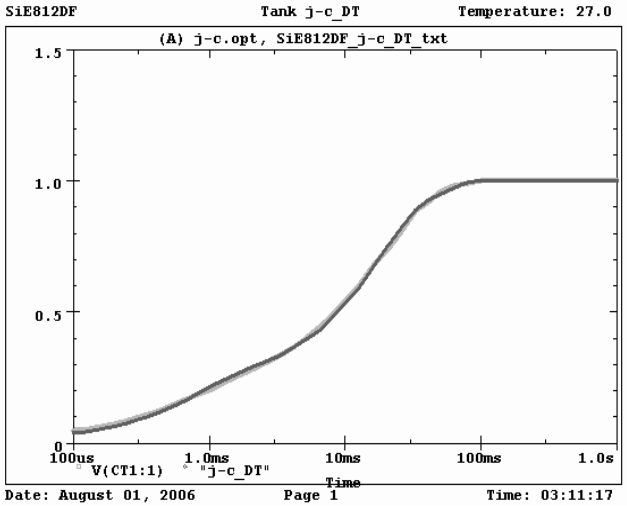
Page 1
Time: 03:18:20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100ms
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Time
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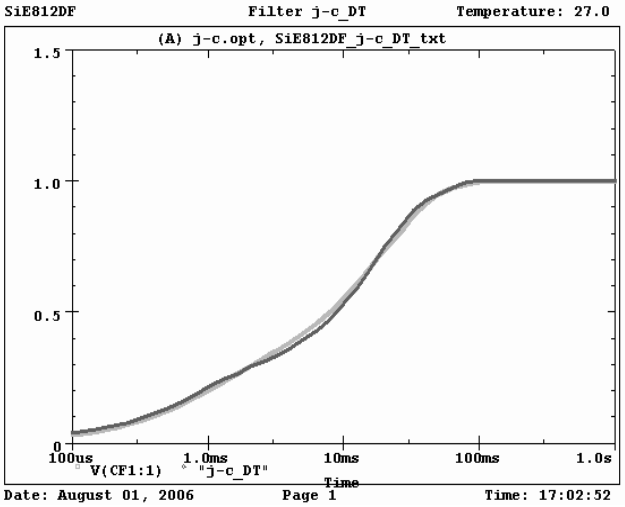
Page 1
Time: 03:11:17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Filter j-c_DT
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Time
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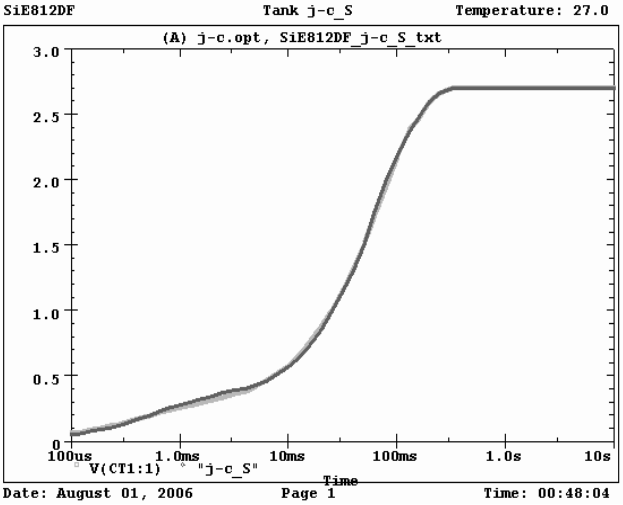
Page 1
Time: 17:02:52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0.5
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100us
1.0ms
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1.0s
10s
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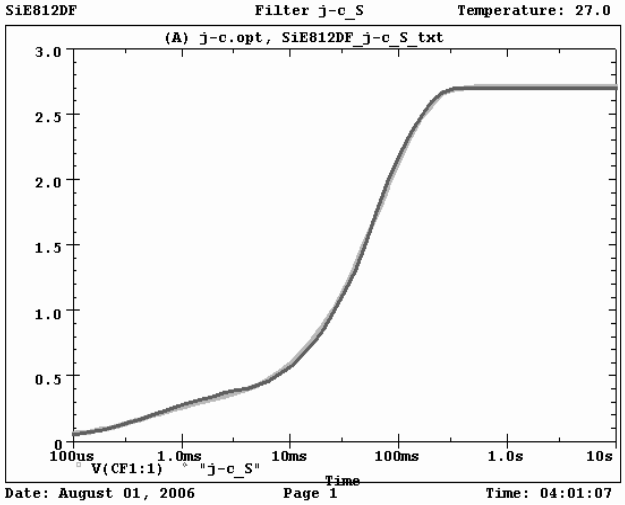
Time
Date: August 01, 2006
Page 1
Time: 00:48:04


SiE812DF
Filter j-c_S
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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: August 01, 2006
Page 1
Time: 04:01:07