R-C Thermal Model Parameters

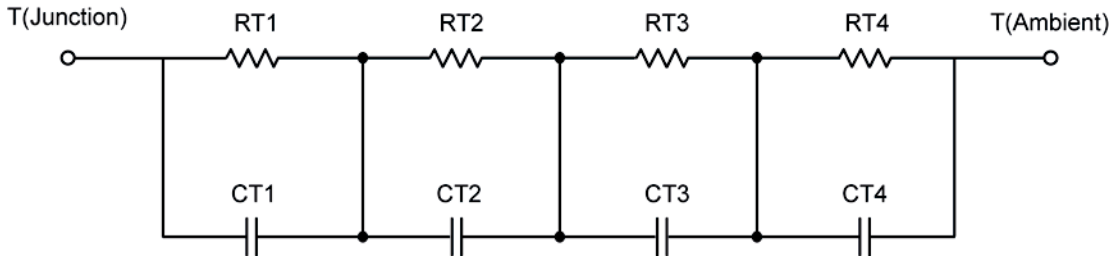
DESCRIPTION

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.

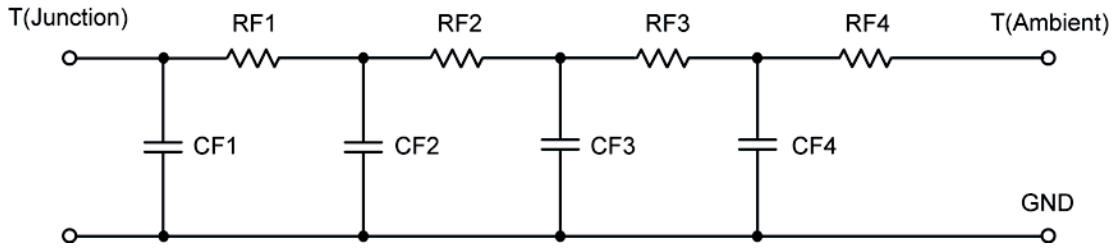
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	14.7729	N/A	7.0506
RT2	5.5562	N/A	1.4486
RT3	19.9735	N/A	2.8810
RT4	44.4841	N/A	13.5970
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	29.0266 m	N/A	5.9640 m
CT2	2.0800 m	N/A	387.3306 u
CT3	123.2311 m	N/A	716.4164 m
CT4	1.4515	N/A	51.9075 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

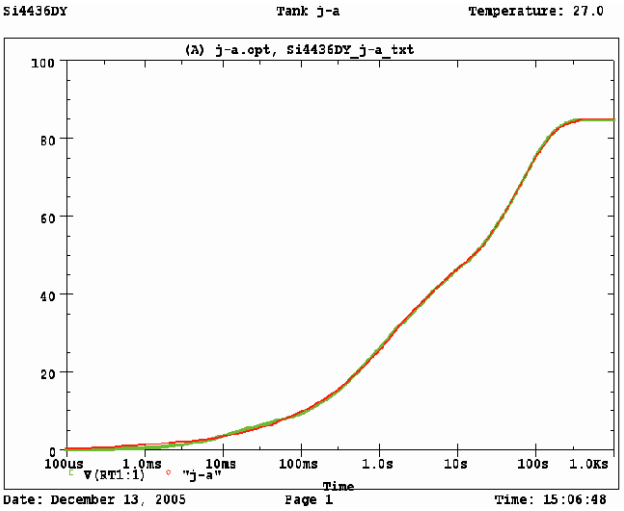


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.5113	N/A	2.8072
RF2	19.7159	N/A	9.4435
RF3	19.1722	N/A	7.3330
RF4	40.3395	N/A	5.3861
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.5876 m	N/A	770.0395 u
CF2	17.5910 m	N/A	7.5960 m
CF3	111.5355 m	N/A	56.3411 m
CF4	1.4772	N/A	38.4668 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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Tank j-a
Temperature: 27.0
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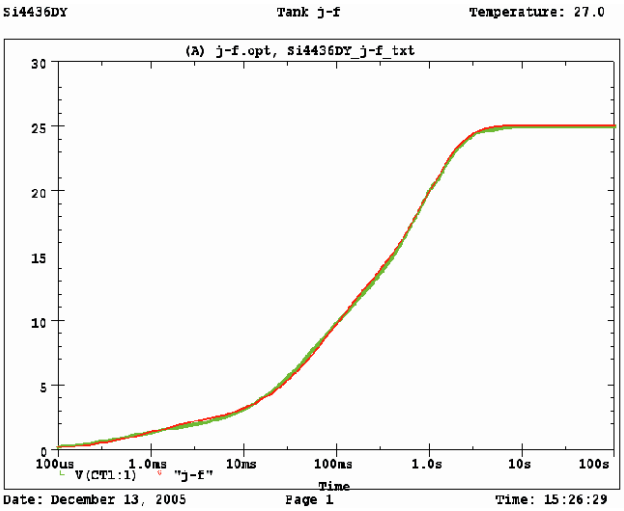
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: December 13, 2005
Page 1
Time: 15:06:48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100us
1.0ms
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10s
100s
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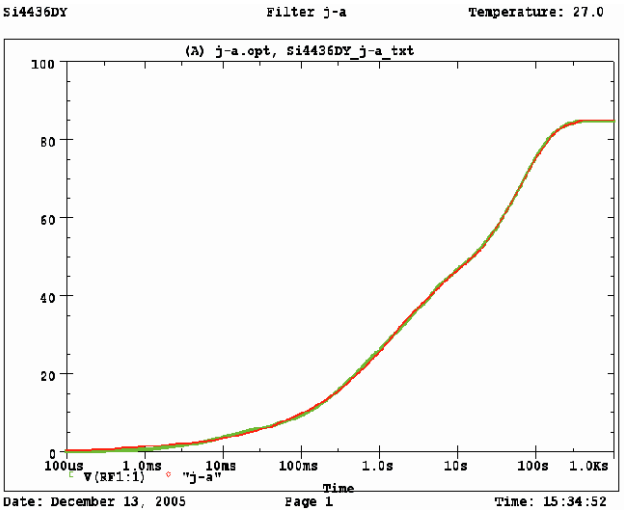
Time: 15:26:29


Si4436DY
Filter j-a
Temperature: 27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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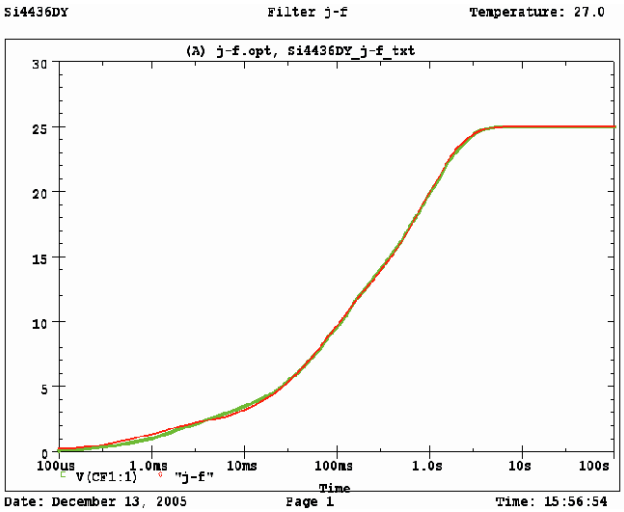
Time
Date: December 13, 2005
Page 1
Time: 15:34:52


Si4436DY
Filter j-f
Temperature: 27.0
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25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date: December 13, 2005
Page 1
Time: 15:56:54