R-C Thermal Model Parameters

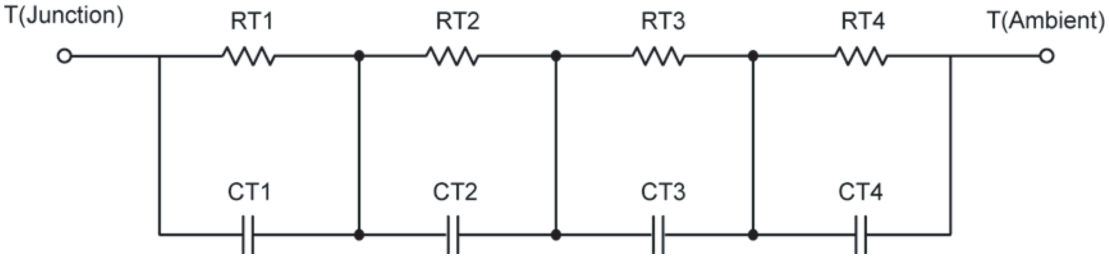
DESCRIPTION

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.

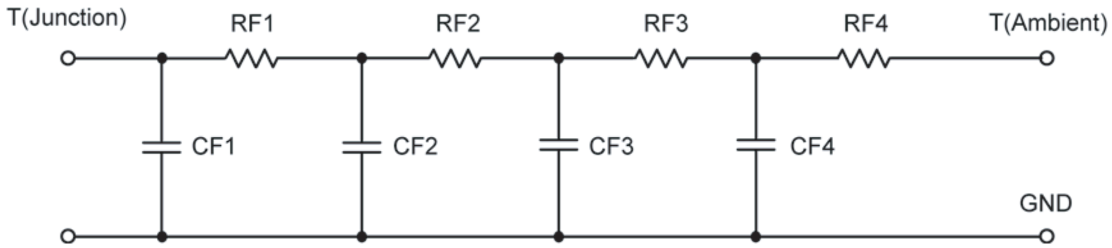
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
	Thermal Resistance (°C/W)		
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.5372	N/A	13.5384
RT2	27.8770	N/A	3.1354
RT3	20.1395	N/A	8.3301
RT4	56.4463	N/A	14.9961
	Thermal Capacitance (Joules/°C)		
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.3286 m	N/A	7.5561 m
CT2	54.2793 m	N/A	2.0729 m
CT3	12.1622 m	N/A	209.1380 m
CT4	1.3383	N/A	43.9567 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



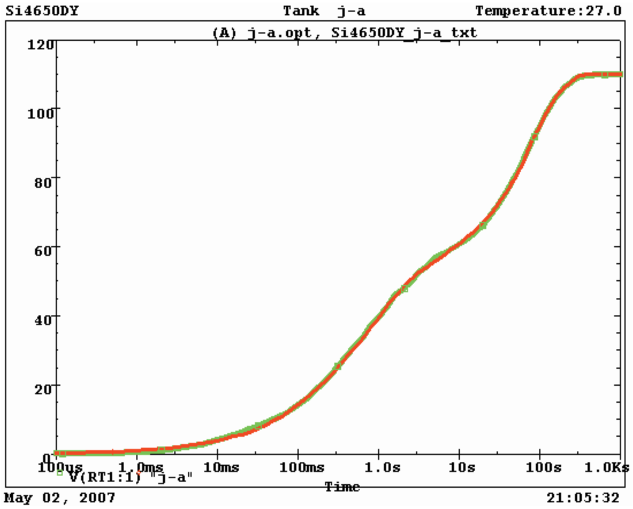
R-C VALUES FOR FILTER CONFIGURATION

Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.4879	N/A	2.9606
RF2	28.9659	N/A	17.3231
RF3	20.1927	N/A	16.0548
RF4	51.3535	N/A	3.6615
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.2280 m	N/A	685.4423 u
CF2	9.6163 m	N/A	5.0699 m
CF3	100.7188 m	N/A	30.9504 m
CF4	1.4247	N/A	727.2935 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
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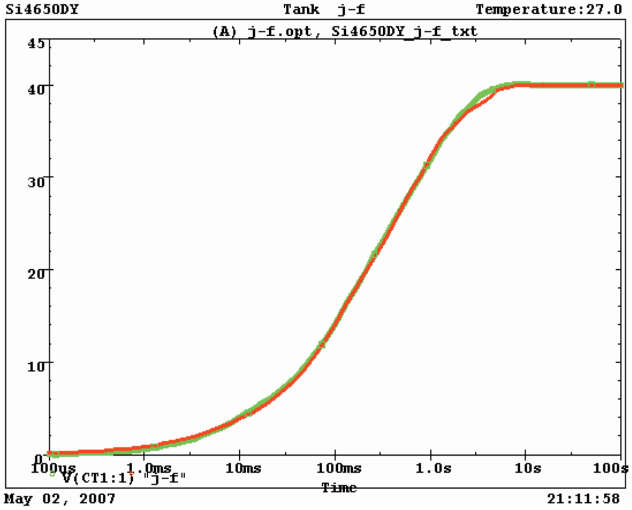
Time
May 02, 2007
21:05:32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Tank j-f
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40
30
20
10
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10ms
100ms
1.0s
10s
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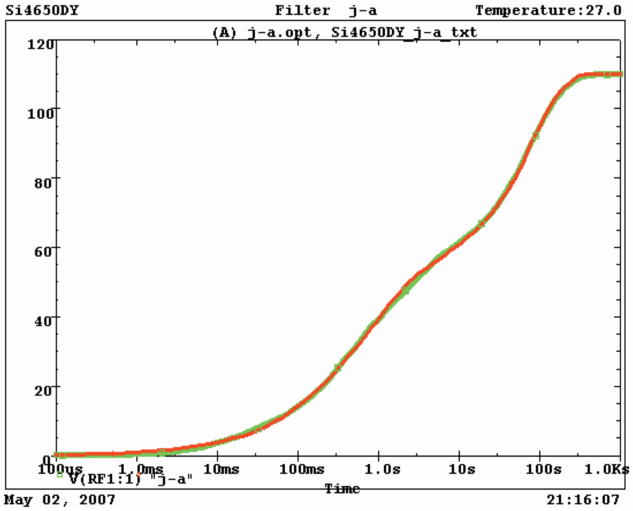
Si4650DY
Filter j-a
Temperature:27.0
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100
80
60
40
20
0
100us
1.0ms
10ms
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1.0s
10s
100s
1.0Ks
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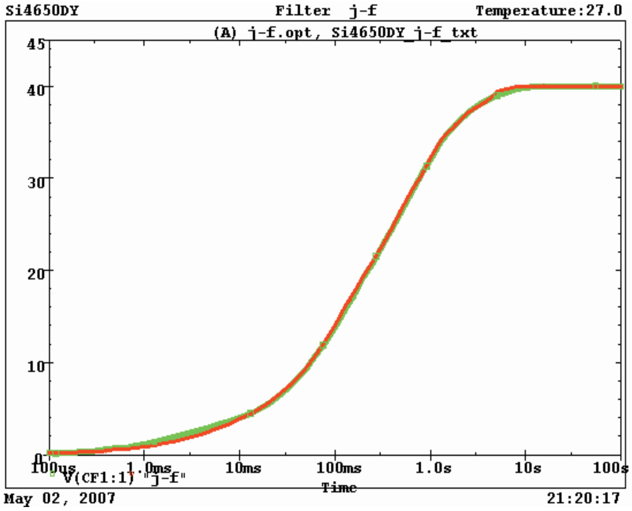
Si4650DY
Filter j-f
Temperature:27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
May 02, 2007
21:20:17