R-C Thermal Model Parameters

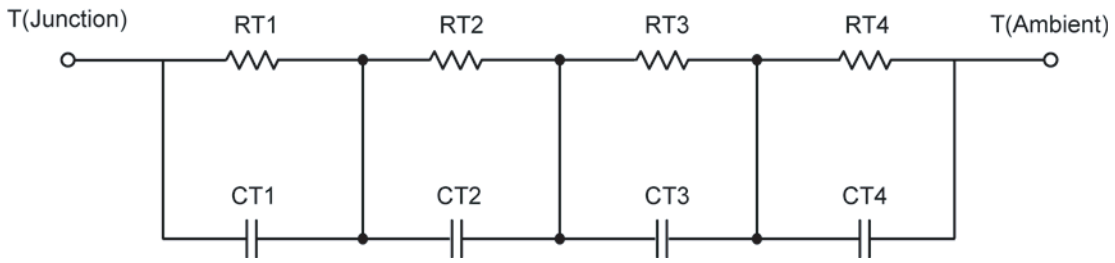
DESCRIPTION

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.

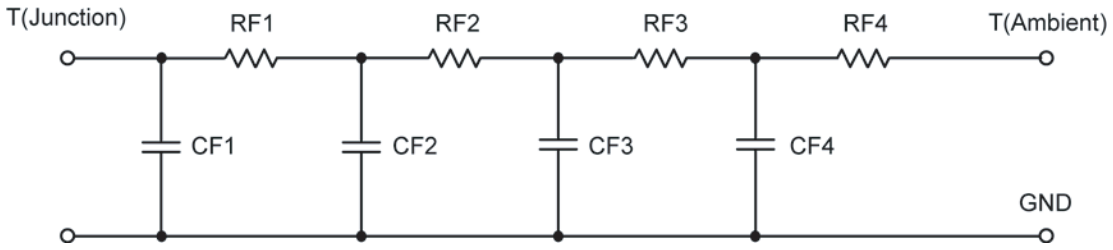
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	220.7868	N/A	79.6144
RT2	27.2959	N/A	15.9707
RT3	107.0035	N/A	116.5748
RT4	92.6812	N/A	124.3247
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	5.0802 m	N/A	853.1305 u
CT2	208.2422 u	N/A	121.8111 u
CT3	452.2647 m	N/A	10.5289 m
CT4	1.1652 m	N/A	3.6906 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

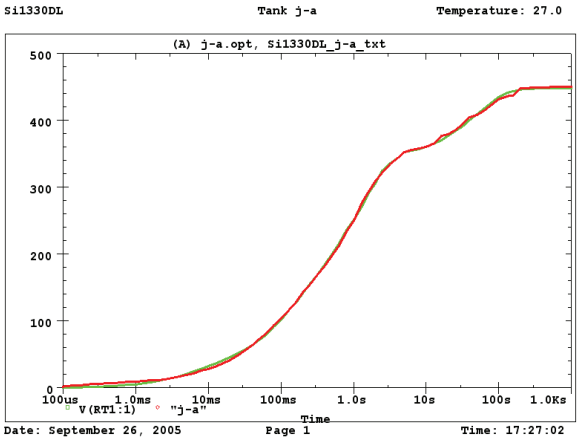


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	17.8401	N/A	21.3981
RF2	133.6206	N/A	135.9713
RF3	201.3067	N/A	84.0886
RF4	95.7909	N/A	95.2982
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	49.2264 u	N/A	95.6622 u
CF2	691.2758 u	N/A	596.9559 u
CF3	4.9227 m	N/A	2.8977 m
CF4	583.8633 m	N/A	3.9614 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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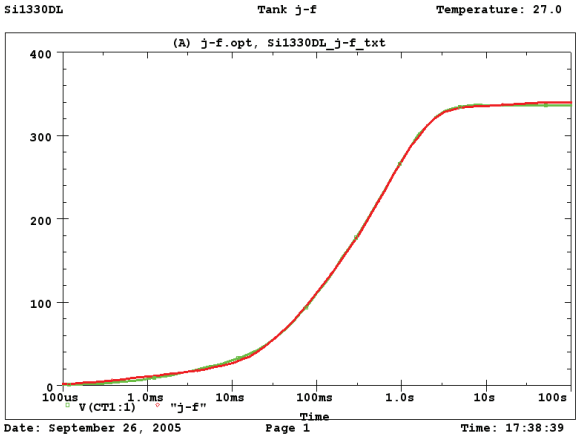
400
300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: September 26, 2005
Page 1
Time: 17:27:02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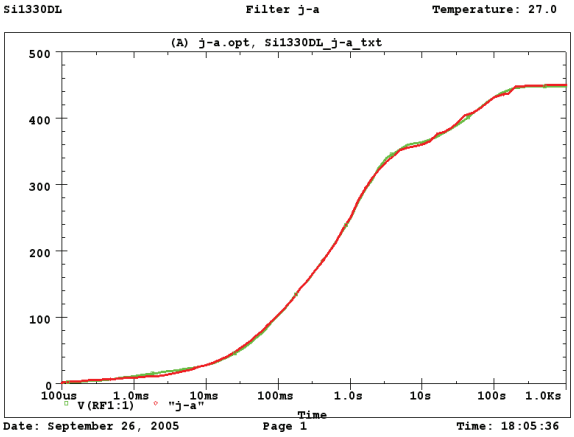
Time: 17:38:39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Filter j-a
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300
200
100
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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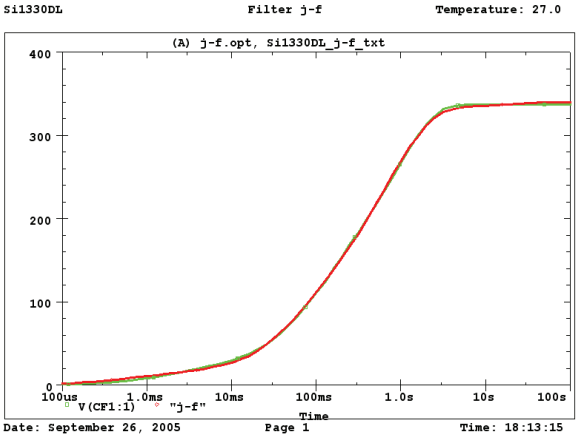
Time
Date: September 26, 2005
Page 1
Time: 18:05:36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Filter j-f
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200
100
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100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date: September 26, 2005
Page 1
Time: 18:13:15