R-C Thermal Model Parameters

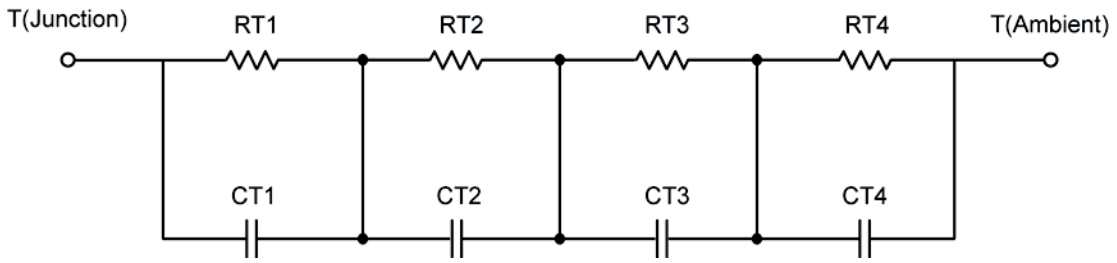
DESCRIPTION

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.

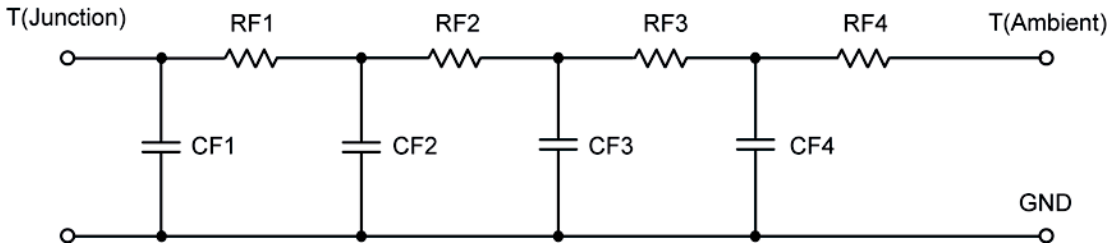
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.1447	N/A	35.9865
RT2	37.0103	N/A	6.3548
RT3	42.5267	N/A	8.5154
RT4	40.3183	N/A	24.1433
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	137.6127 u	N/A	1.4986 m
CT2	3.2679 m	N/A	258.6898 u
CT3	22.8724 m	N/A	248.3849 m
CT4	2.4660	N/A	8.5691 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

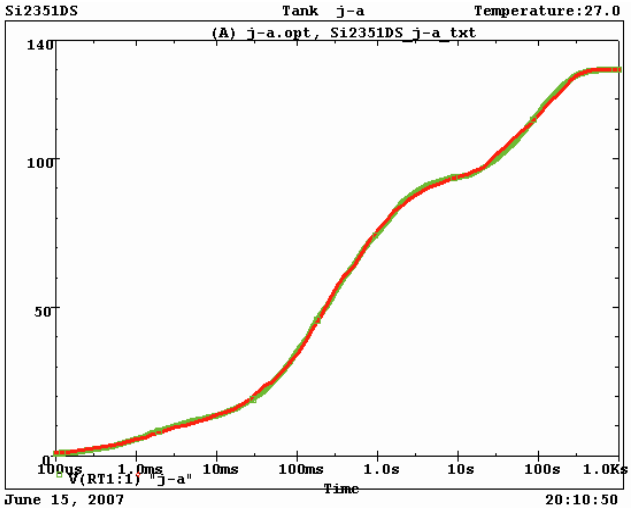


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.3489	N/A	10.7171
RF2	44.4742	N/A	45.1596
RF3	33.3918	N/A	11.6834
RF4	39.7851	N/A	7.4399
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	167.2351 u	N/A	255.4383 u
CF2	2.8430 m	N/A	1.1739 m
CF3	23.1781 m	N/A	12.9916 m
CF4	2.3991	N/A	213.8914 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


Si2351DS
Tank j-a
Temperature:27.0
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140
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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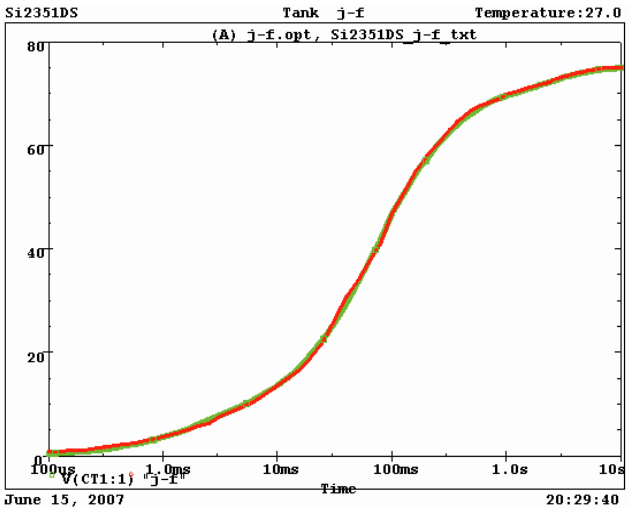
Time
June 15, 2007
20:10:50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20
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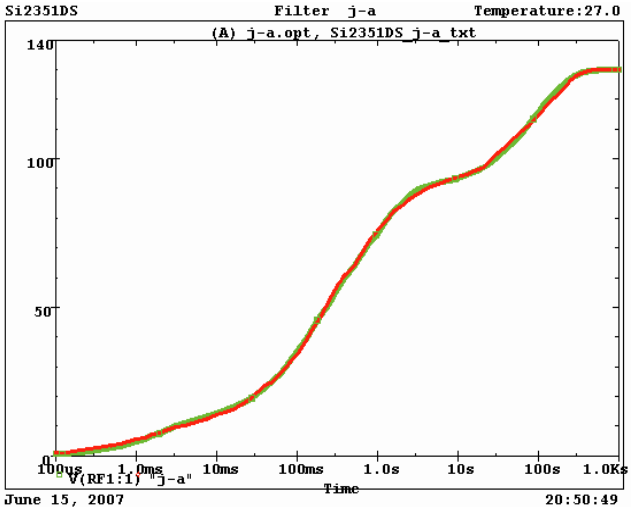
Si2351DS
Filter j-a
Temperature:27.0
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100
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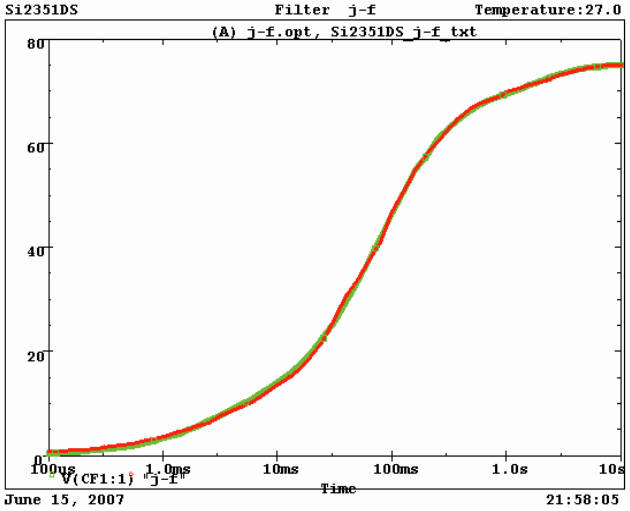
Si2351DS
Filter j-f
Temperature:27.0
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60
40
20
0
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Time
June 15, 2007
21:58:05