R-C Thermal Model Parameters

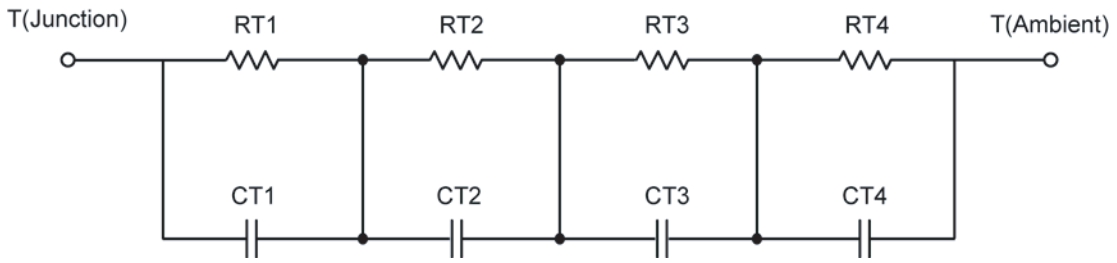
DESCRIPTION

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.

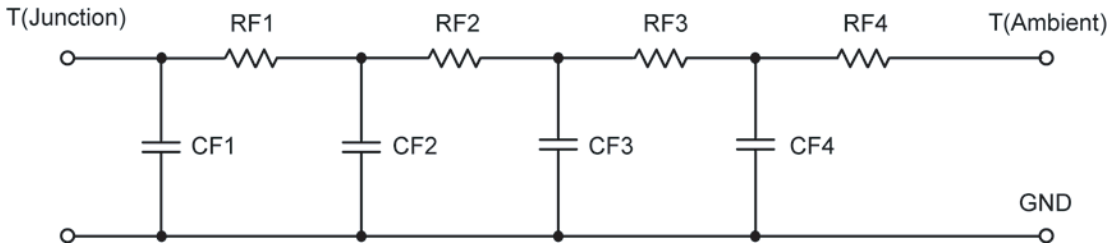
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.9793	N/A	31.9930
RT2	27.6092	N/A	7.1035
RT3	32.8136	N/A	26.7539
RT4	45.5979	N/A	19.1496
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	161.2130 u	N/A	2.7685 m
CT2	55.2082 m	N/A	236.5687 u
CT3	3.8601 m	N/A	18.0970 m
CT4	2.1658	N/A	1.9559 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

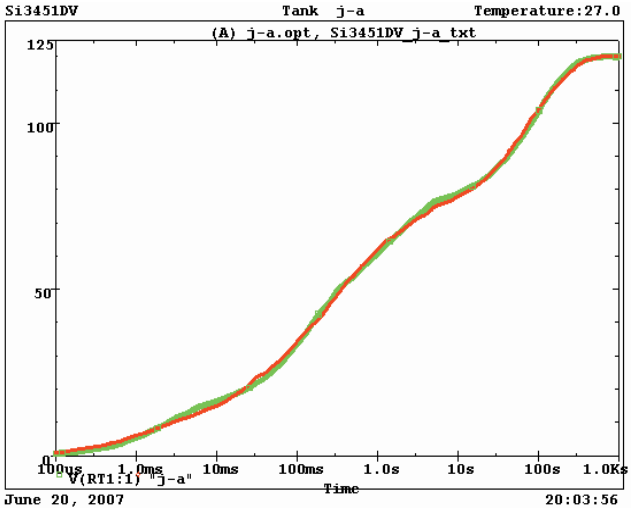


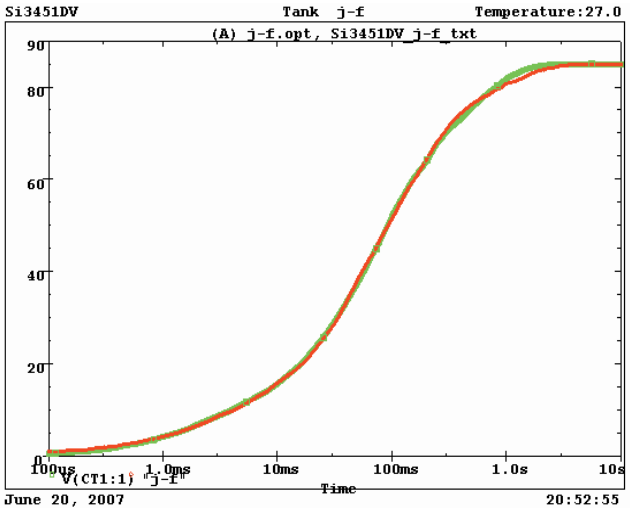
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.1829	N/A	11.9058
RF2	33.2644	N/A	48.5088
RF3	26.3643	N/A	21.4335
RF4	46.1884	N/A	3.1519
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	151.5771 u	N/A	219.0136 u
CF2	2.9696 m	N/A	999.4882 u
CF3	37.7652 m	N/A	12.5223 m
CF4	1.9506	N/A	651.3090 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


Si3451DV
Tank j-a
Temperature:27.0
(A) j-a.opt, Si3451DV_j-a_txt
125
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
June 20, 2007
20:03:56


Si3451DV
Tank j-f
Temperature:27.0
(A) j-f.opt, Si3451DV_j-f_txt
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80
60
40
20
0
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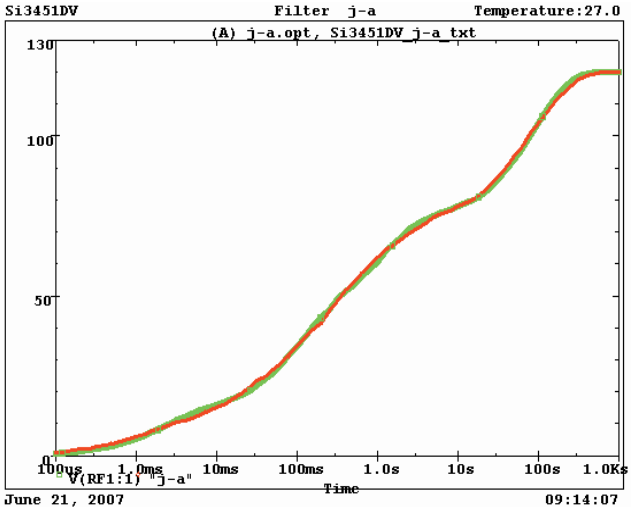
20:52:55


Si3451DV
Filter j-a
Temperature:27.0
(A) j-a.opt, Si3451DV_j-a_txt
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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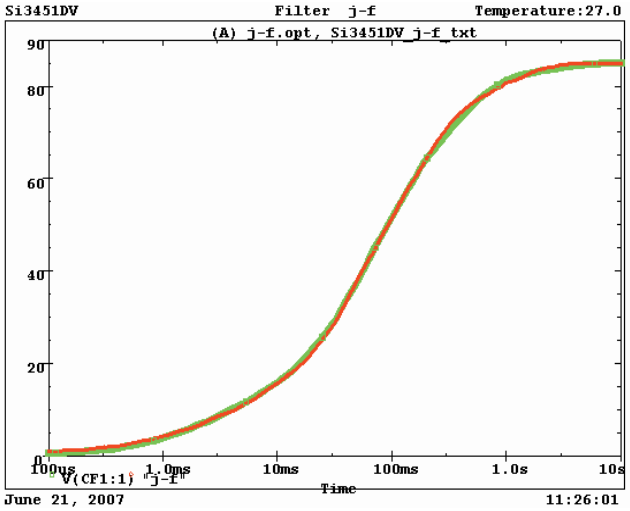
Time
June 21, 2007
09:14:07


Si3451DV
Filter j-f
Temperature:27.0
(A) j-f.opt, Si3451DV_j-f_txt
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80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time
June 21, 2007
11:26:01