R-C Thermal Model Parameters

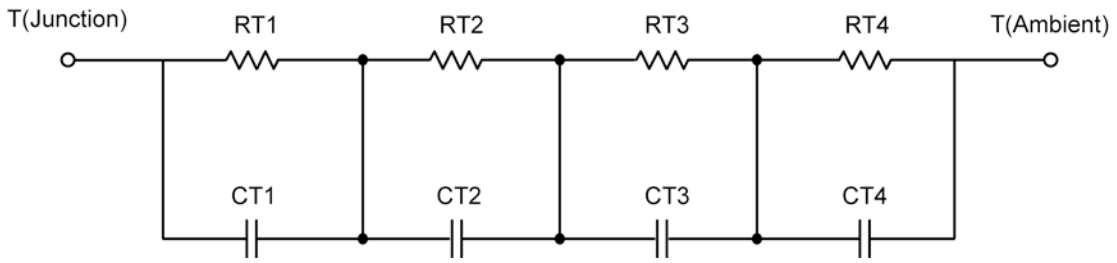
DESCRIPTION

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.

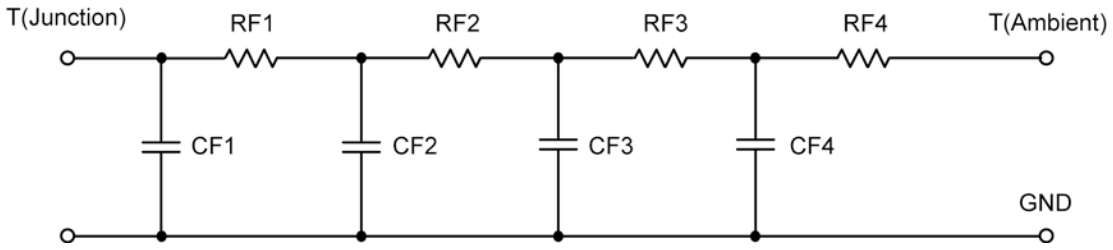
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.4718	N/A	11.8772
RT2	20.2604	N/A	5.2866
RT3	30.5059	N/A	9.7413
RT4	52.7619	N/A	11.0949
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	171.9710 u	N/A	9.3312 m
CT2	58.6522 m	N/A	77.1336 u
CT3	2.8148 m	N/A	979.8345 u
CT4	1.6221	N/A	2.6698 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

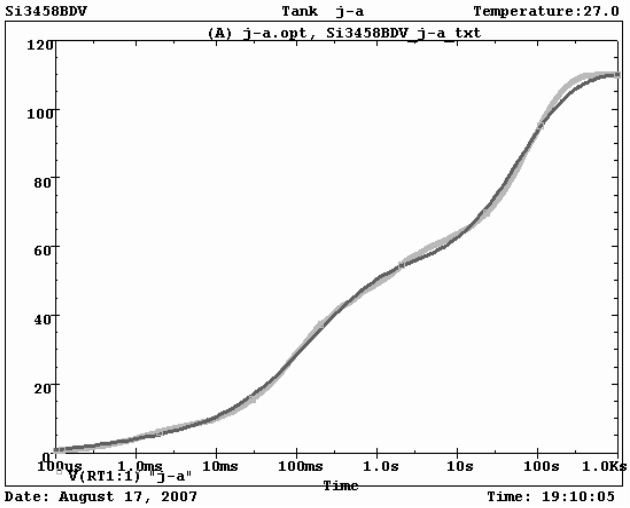


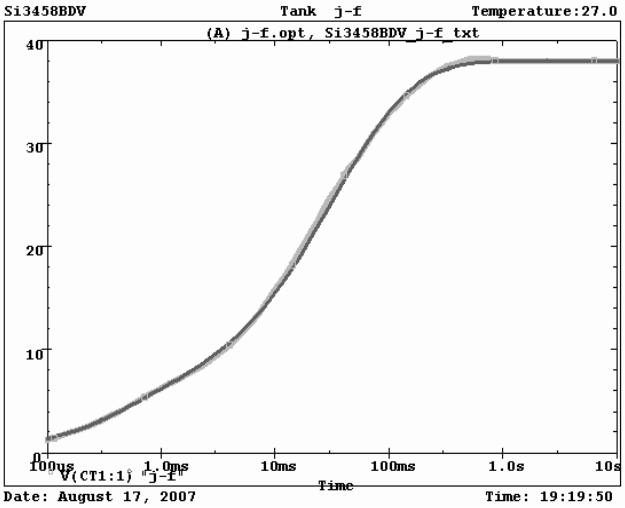
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.4286	N/A	7.8883
RF2	30.1231	N/A	8.9091
RF3	19.0764	N/A	11.9601
RF4	51.3719	N/A	9.2425
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	236.6841 u	N/A	88.4265 u
CF2	2.9295 m	N/A	860.3847 u
CF3	54.3607 m	N/A	15.7396 u
CF4	1.5915	N/A	9.6868 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


Si3458BDV
Tank j-a
Temperature:27.0
(A) j-a.opt, Si3458BDV_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: August 17, 2007
Time: 19:10:05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Tank j-f
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30
20
10
0
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10ms
100ms
1.0s
10s
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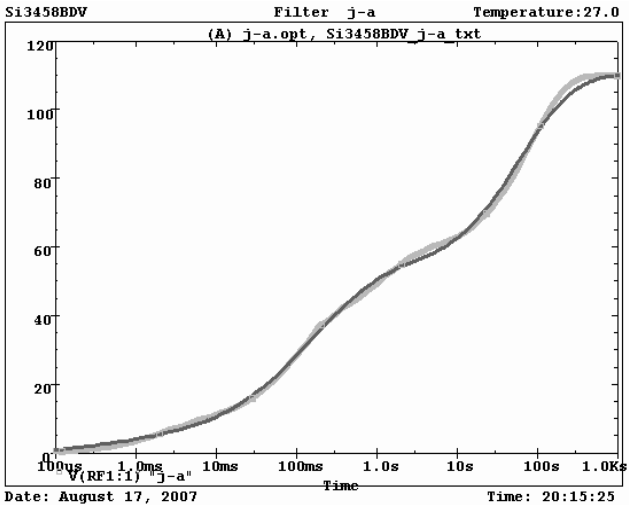
Si3458BDV
Filter j-a
Temperature:27.0
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120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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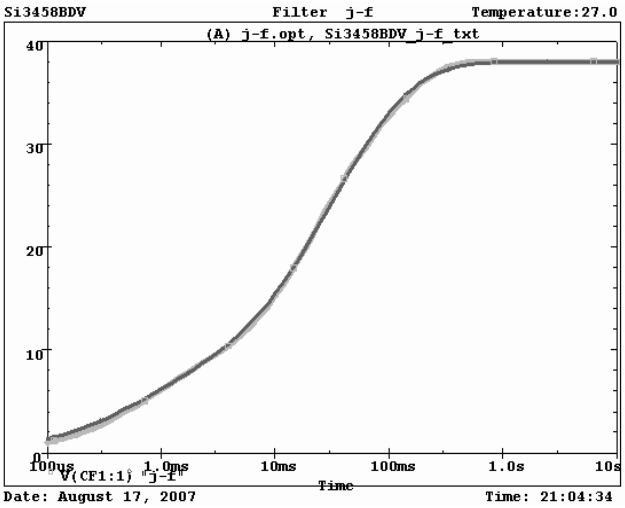
Time
Date: August 17, 2007
Time: 20:15:25


Si3458BDV
Filter j-f
Temperature:27.0
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) "j-f"
Time
Date: August 17, 2007
Time: 21:04:34