R-C Thermal Model Parameters

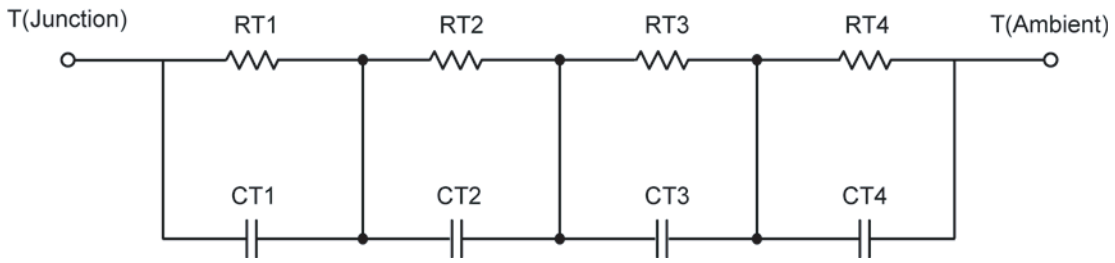
DESCRIPTION

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.

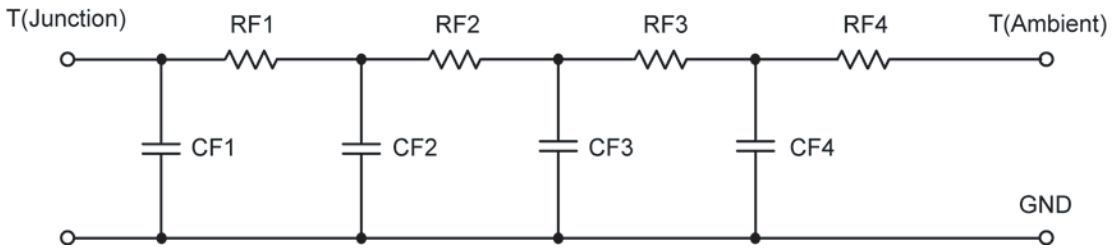
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.9748	N/A	10.2073
RT2	9.3362	N/A	2.5130
RT3	42.4493	N/A	8.3590
RT4	51.1267	N/A	8.9386
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.9916 m	N/A	5.8856 m
CT2	7.9736 m	N/A	448.1246 μ
CT3	12.6508 m	N/A	42.8629 m
CT4	1.2020	N/A	9.5199 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

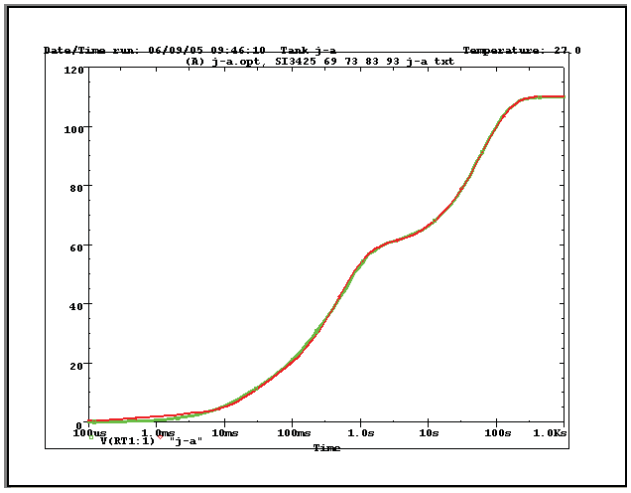


R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	17.7112	N/A	3.2167
RF2	15.3855	N/A	10.4678
RF3	26.4729	N/A	10.9615
RF4	50.2298	N/A	5.3440
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.7309 m	N/A	497.9077 µ
CF2	8.3273 m	N/A	2.6562 m
CF3	2.9762 m	N/A	993.4035 µ
CF4	1.1950	N/A	56.7081 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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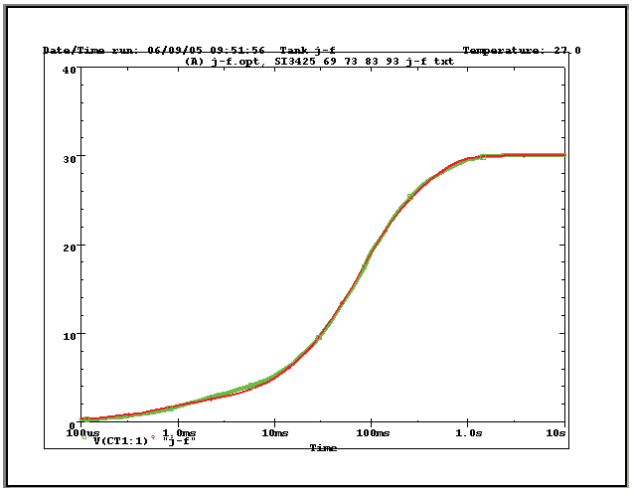
(A) j-a.opt, SI3425 69 73 83 93 j-a txt
120
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time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40
30
20
10
0
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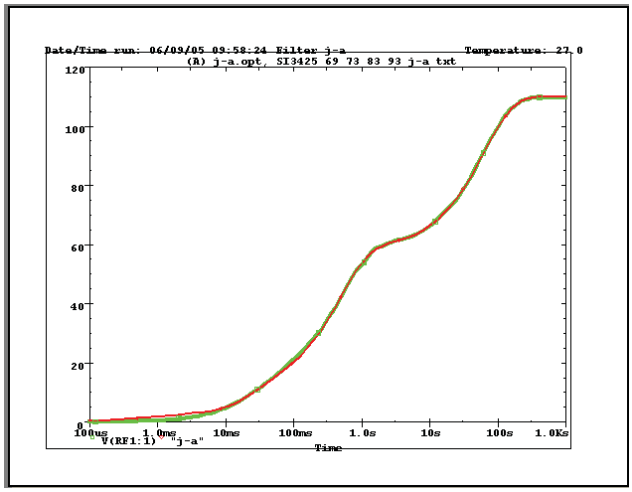
V(CT1:1) "j-f"
Time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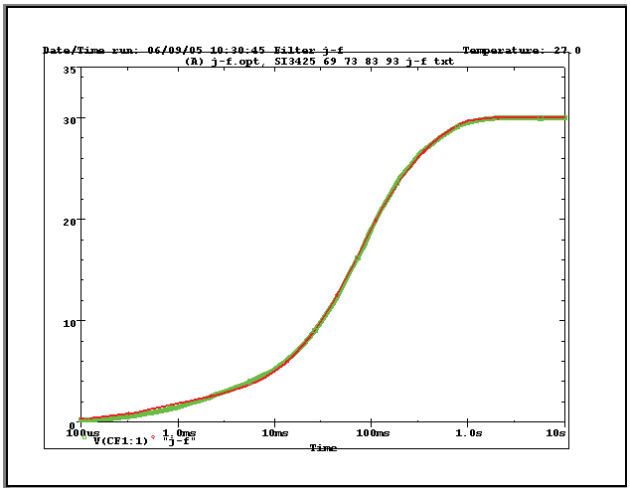
120
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a"
Time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35
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "j-f"
Time