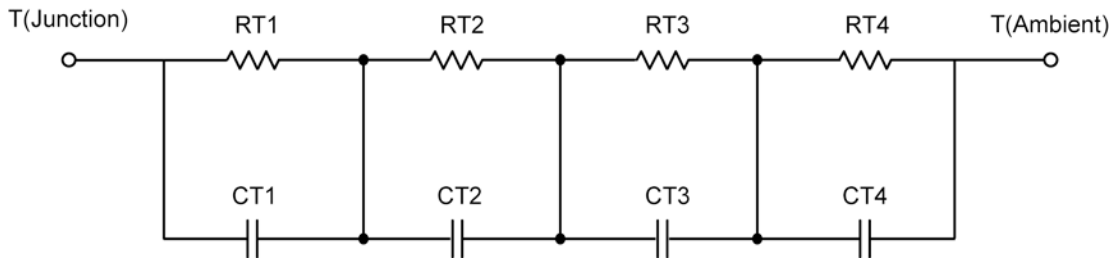
R-C Thermal Model Parameters

DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. R-C values for the electrical circuit in the Foster/Tank and Cauer/Filter configurations are included. When implemented in P-Spice, these values have matching characteristic curves to the single-pulse transient thermal impedance curves for the MOSFET.

These RC values can be used in the P-SPICE simulation to evaluate the thermal behavior of the MOSFET junction temperature under a defined power profile. These techniques are described in Application Note AN609, "Thermal Simulation of Power MOSFETs on the P-Spice Platform."

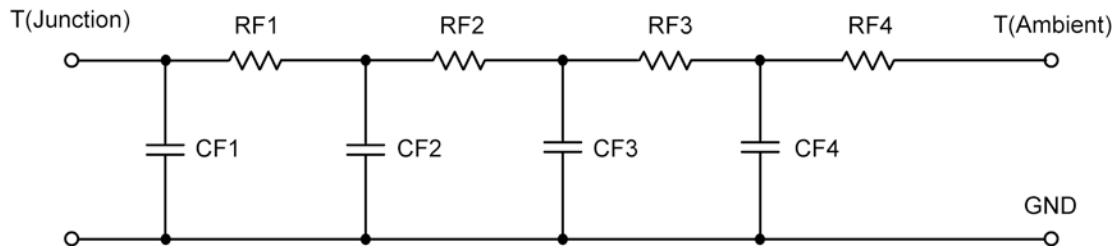
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	9.9004	N/A	13.8348
RT2	26.5192	N/A	4.6353
RT3	12.0911	N/A	1.5811
RT4	46.4893	N/A	9.9488
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.0746 m	N/A	115.6895 m
CT2	49.1545 m	N/A	412.7292 u
CT3	45.3225 m	N/A	91.9029 m
CT4	1.2045	N/A	7.7318 m

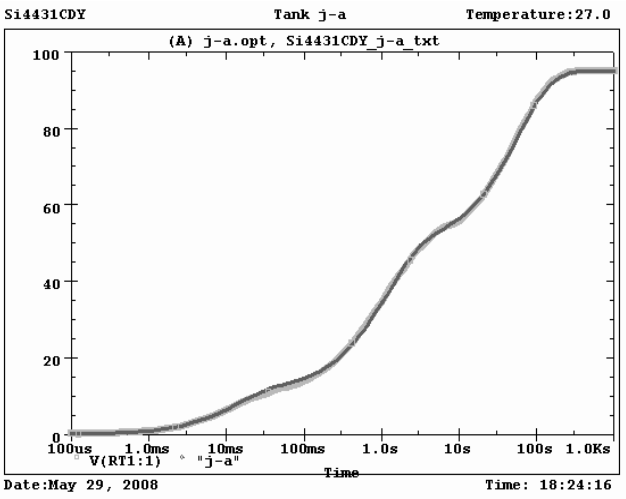
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

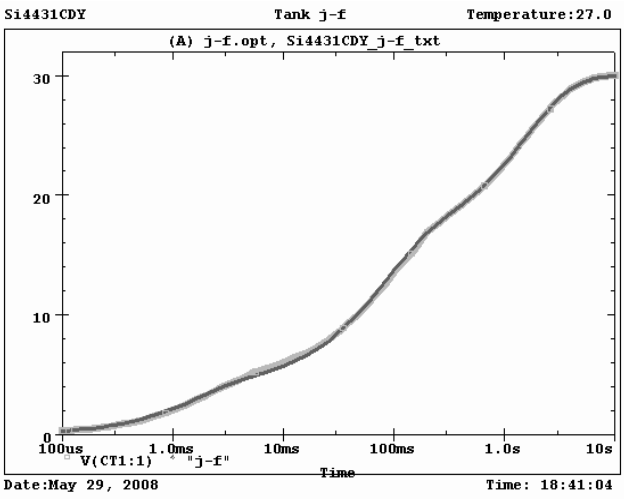
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.7809	N/A	5.3299
RF2	33.7021	N/A	9.2031
RF3	14.4066	N/A	3.0963
RF4	34.1104	N/A	12.3707
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.1510 m	N/A	384.7506 u
CF2	26.8303 m	N/A	6.5512 m
CF3	478.6767 m	N/A	1.3220 m
CF4	1.2723	N/A	118.2820 m

Note
NA indicates not applicable


Si4431CDY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4431CDY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:May 29, 2008
Time: 18:24:16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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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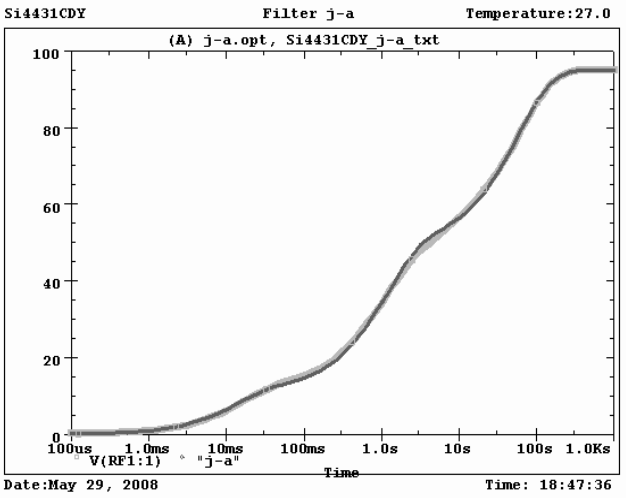
Time
Date:May 29, 2008
Time: 18:41:04


Si4431CDY
Filter j-a
Temperature:27.0
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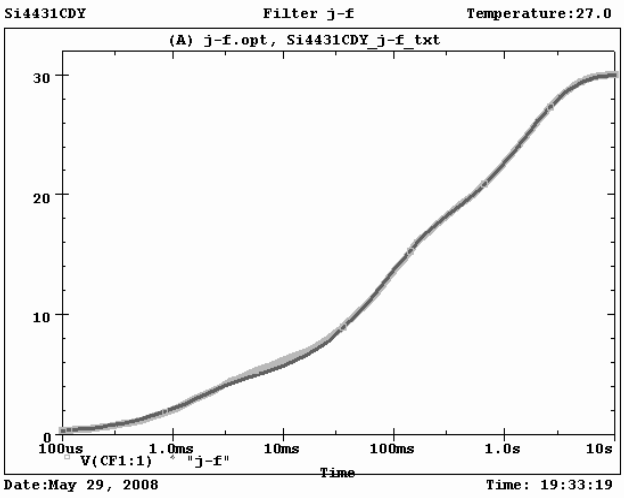
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:May 29, 2008
Time: 18:47:36


Si4431CDY
Filter j-f
Temperature:27.0
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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date:May 29, 2008
Time: 19:33:19