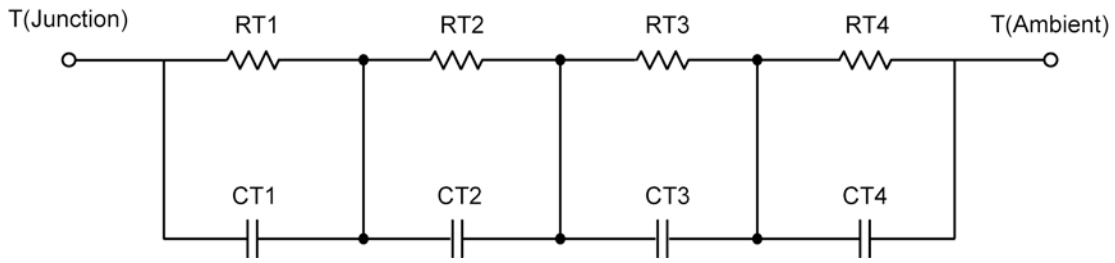
R-C Thermal Model Parameters

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."

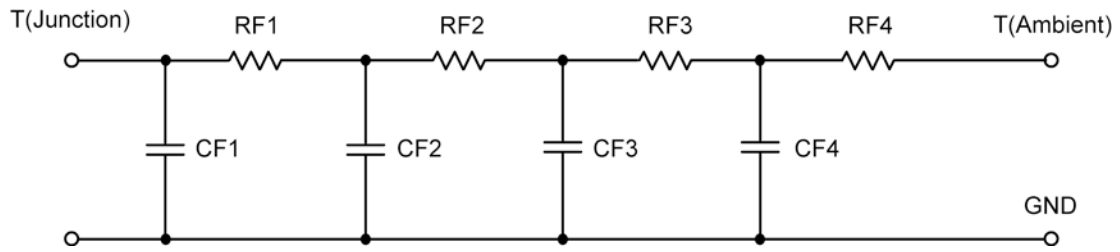
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.5861	2.6454	N/A
RT2	11.2824	839.5000 m	N/A
RT3	18.0601	322.3000 m	N/A
RT4	45.0714	2.6928	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	412.1751 u	561.0632 u	N/A
CT2	223.5536 m	129.3457 u	N/A
CT3	6.8153 m	40.7834 m	N/A
CT4	1.7863	1.3812 m	N/A

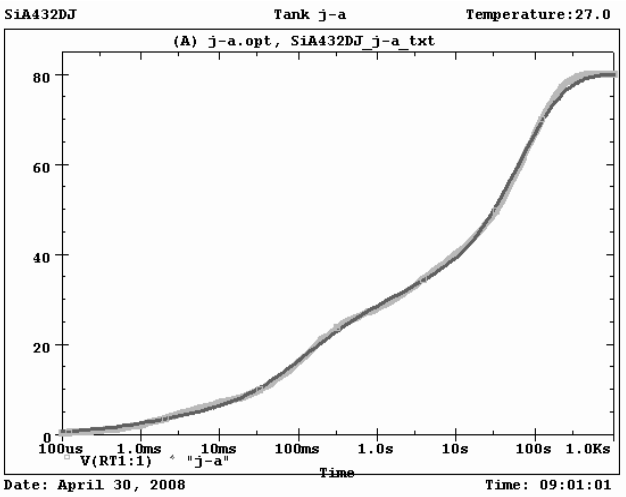
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

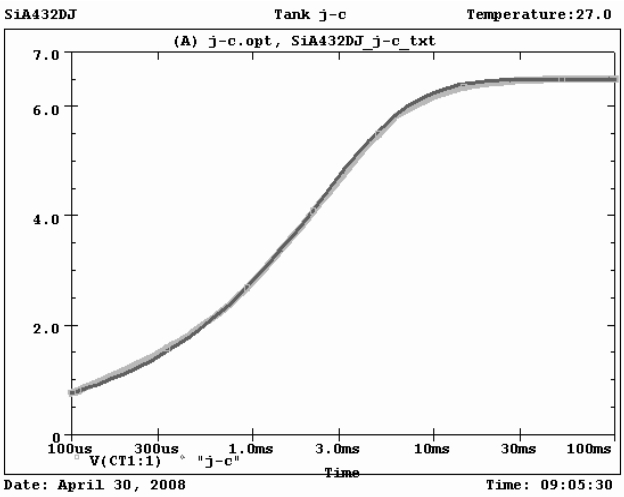
R-C THERMAL MODEL FOR FILTER CONFIGURATION

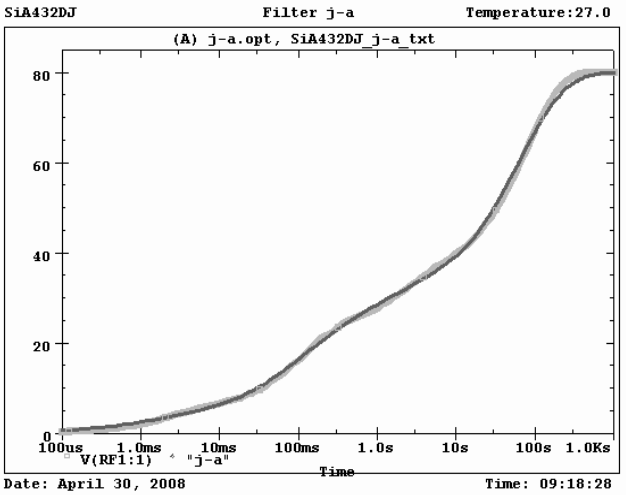


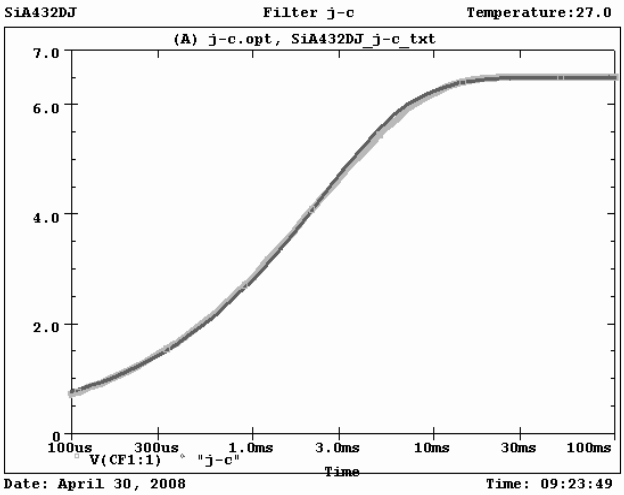
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.8076	1.3048	N/A
RF2	18.1111	3.1119	N/A
RF3	12.8981	1.6249	N/A
RF4	43.1832	458.4000 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	401.0633 u	103.4466 u	N/A
CF2	5.6776 m	244.9423 u	N/A
CF3	160.9978 m	1.1505 m	N/A
CF4	1.6530	3.3521 m	N/A

Note
NA indicates not applicable


SiA432DJ
Tank j-a
Temperature:27.0
(A) j-a.opt, SiA432DJ_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: April 30, 2008
Time: 09:01:01


SiA432DJ
Tank j-c
Temperature:27.0
(A) j-c.opt, SiA432DJ_j-c_txt
7.0
6.0
4.0
2.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)
"j-c"
Time
Date: April 30, 2008
Time: 09:05:30


SiA432DJ
Filter j-a
Temperature:27.0
(A) j-a.opt, SiA432DJ_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: April 30, 2008
Time: 09:18:28


SiA432DJ
Filter j-c
Temperature:27.0
(A) j-c.opt, SiA432DJ_j-c_txt
7.0
6.0
4.0
2.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)
"j-c"
Time
Date: April 30, 2008
Time: 09:23:49