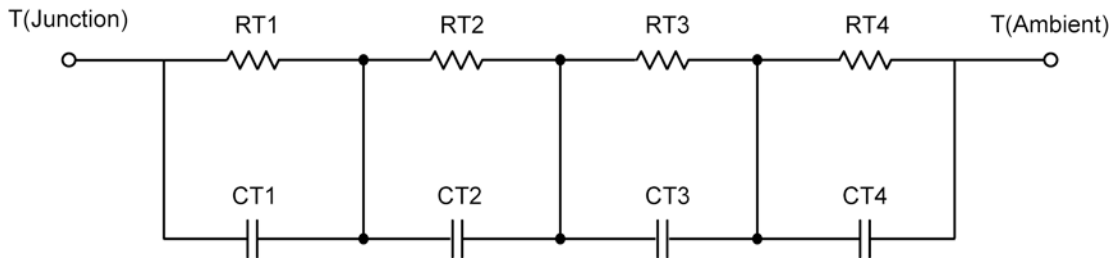
R-C Thermal Model Parameters

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."

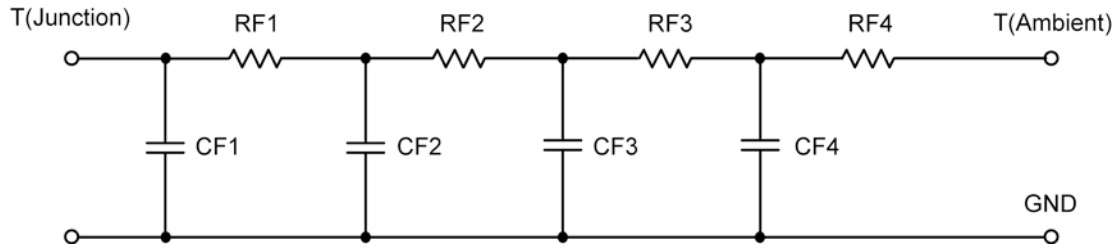
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.2751	817.8567 m	N/A
RT2	23.6133	851.7394 m	N/A
RT3	2.0454	804.8039 m	N/A
RT4	19.0662	1.5256	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	325.0437 m	878.7789 u	N/A
CT2	6.6447	2.7892 m	N/A
CT3	17.8623 m	157.0410 m	N/A
CT4	833.1502 m	10.7968 m	N/A

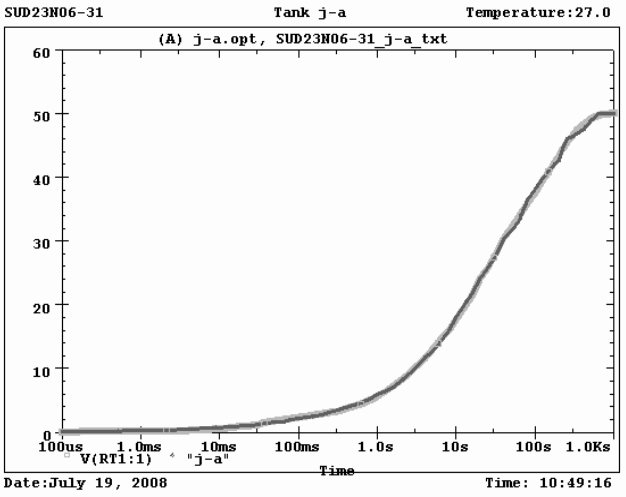
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

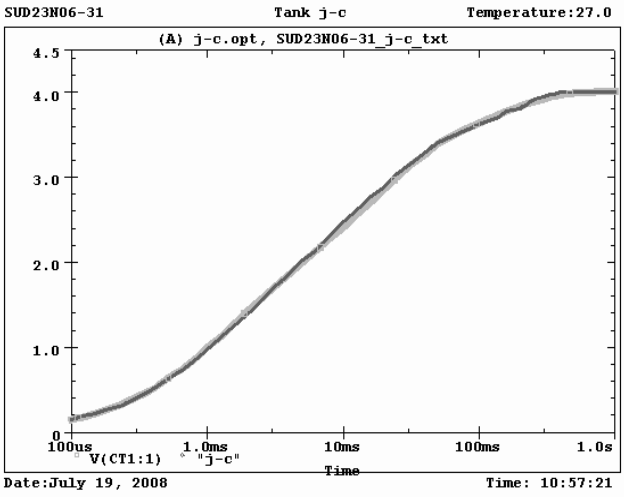
R-C THERMAL MODEL FOR FILTER CONFIGURATION

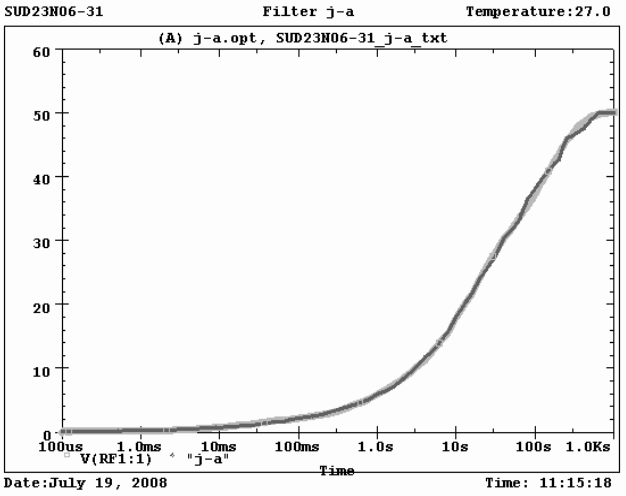


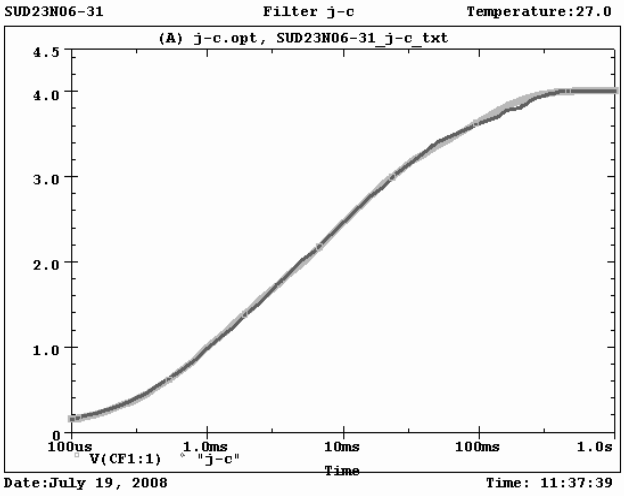
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.7863	1.5972	N/A
RF2	6.3517	791.9102 m	N/A
RF3	20.9085	724.0332 m	N/A
RF4	20.9535	886.8566 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	11.1816 m	664.8699 u	N/A
CF2	143.7391 m	5.4183 m	N/A
CF3	463.6964 m	278.6557 u	N/A
CF4	6.2624	87.6535 m	N/A

Note
NA indicates not applicable


SUD23N06-31
Tank j-a
Temperature:27.0
(A) j-a.opt, SUD23N06-31_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:July 19, 2008
Time: 10:49:16


SUD23N06-31
Tank j-c
Temperature:27.0
(A) j-c.opt, SUD23N06-31_j-c_txt
4.5
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:July 19, 2008
Time: 10:57:21


SUD23N06-31
Filter j-a
Temperature:27.0
(A) j-a.opt, SUD23N06-31_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:July 19, 2008
Time: 11:15:18


SUD23N06-31
Filter j-c
Temperature:27.0
(A) j-c.opt, SUD23N06-31_j-c_txt
4.5
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:July 19, 2008
Time: 11:37:39