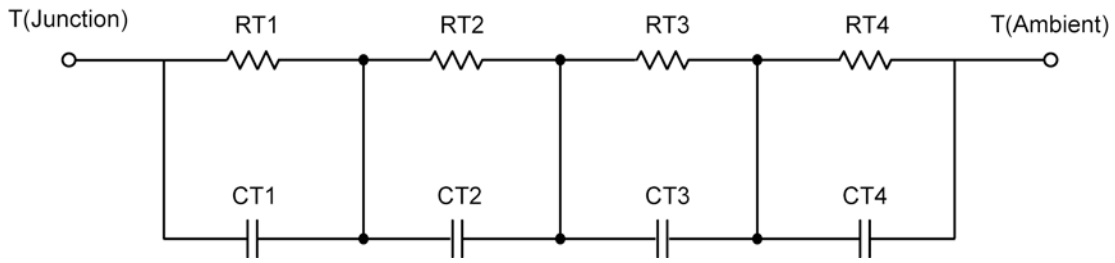
R-C Thermal Model Parameters

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."

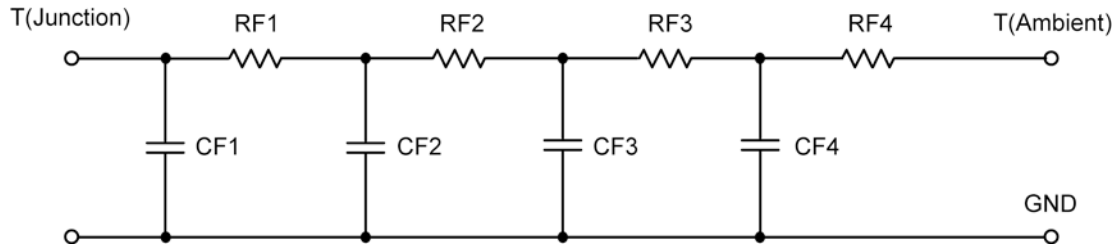
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	27.1864	322.3634 m	N/A
RT2	10.1627	151.4366 m	N/A
RT3	16.3707	4.6136	N/A
RT4	51.2802	4.4126	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.8363 m	73.1634 u	N/A
CT2	158.1715 u	10.6415 m	N/A
CT3	138.5954 m	70.1494 u	N/A
CT4	1.5909	358.6033 u	N/A

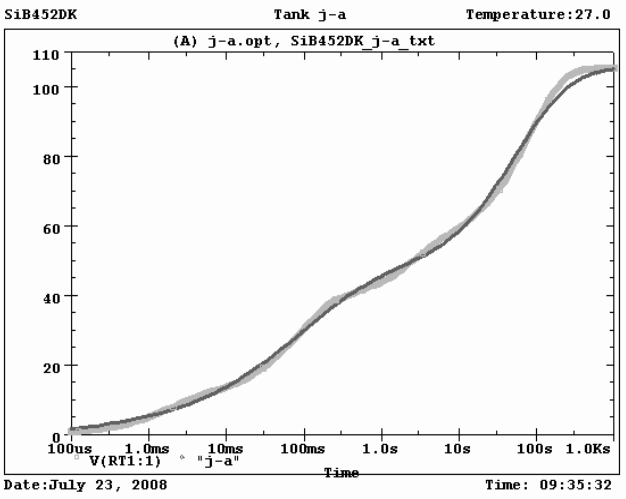
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

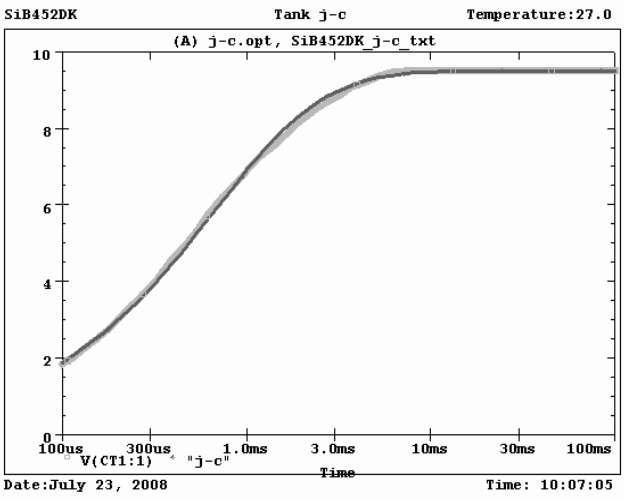
R-C THERMAL MODEL FOR FILTER CONFIGURATION

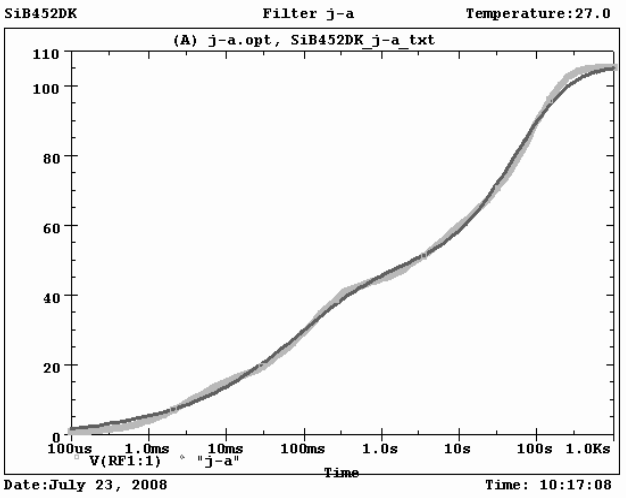


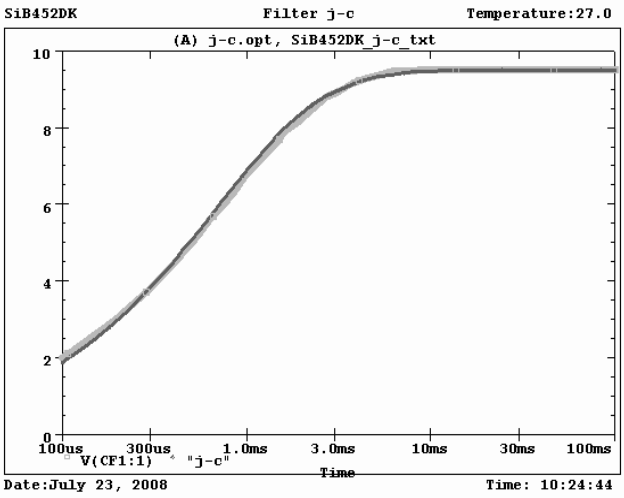
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.5834	2.7405	N/A
RF2	27.1067	4.8557	N/A
RF3	18.9512	159.5000 m	N/A
RF4	44.3587	1.7443	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	213.8209 u	32.0110 u	N/A
CF2	4.0714 m	77.9058 u	N/A
CF3	240.7075 m	542.5505 u	N/A
CF4	1.6975	15.9981 u	N/A

Note
NA indicates not applicable


SiB452DK
Tank j-a
Temperature:27.0
(A) j-a.opt, SiB452DK_j-a_txt
110
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date:July 23, 2008
Time: 09:35:32


SiB452DK
Tank j-c
Temperature:27.0
(A) j-c.opt, SiB452DK_j-c_txt
10
8
6
4
2
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CT1:1) "j-c"
Time
Date:July 23, 2008
Time: 10:07:05


SiB452DK
Filter j-a
Temperature:27.0
(A) j-a.opt, SiB452DK_j-a_txt
110
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a"
Time
Date:July 23, 2008
Time: 10:17:08


SiB452DK
Filter j-c
Temperature:27.0
(A) j-c.opt, SiB452DK_j-c_txt
10
8
6
4
2
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "j-c"
Time
Date:July 23, 2008
Time: 10:24:44