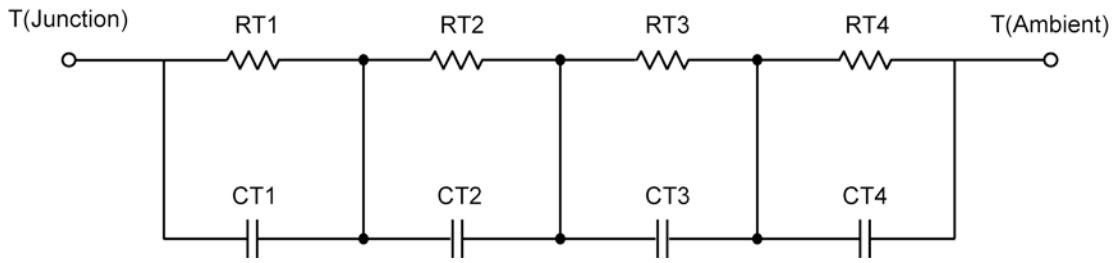
R-C Thermal Model Parameters

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."

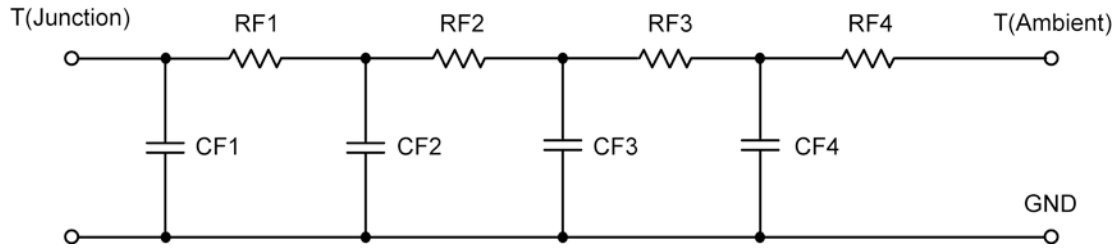
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	7.6859	833.5000 m	N/A
RT2	9.6688	3.8261	N/A
RT3	14.3817	2.5194	N/A
RT4	49.2636	5.8210	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	194.6634 u	45.1365 m	N/A
CT2	7.5785 m	2.0752 m	N/A
CT3	60.8889 m	159.8617 u	N/A
CT4	1.1536	2.2659 m	N/A

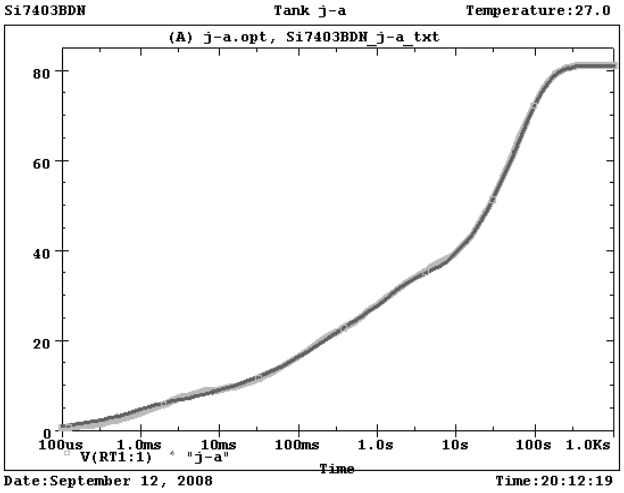
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

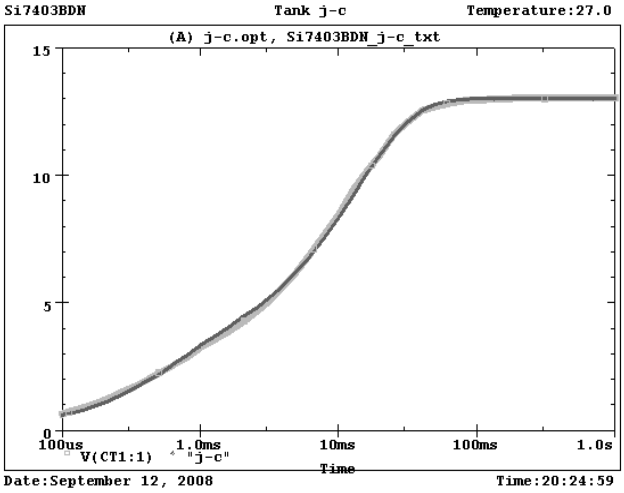
R-C THERMAL MODEL FOR FILTER CONFIGURATION

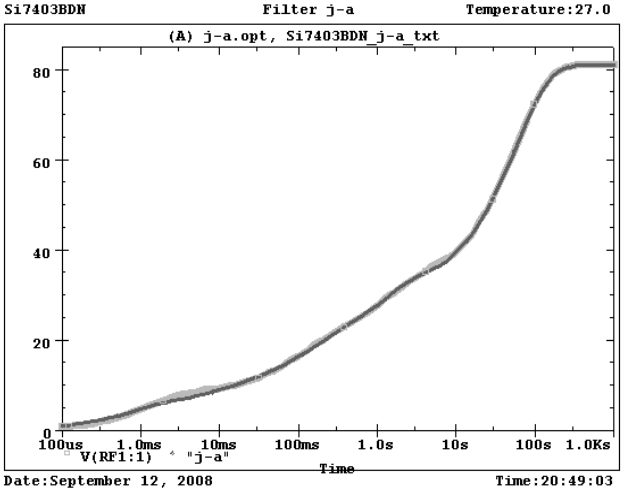


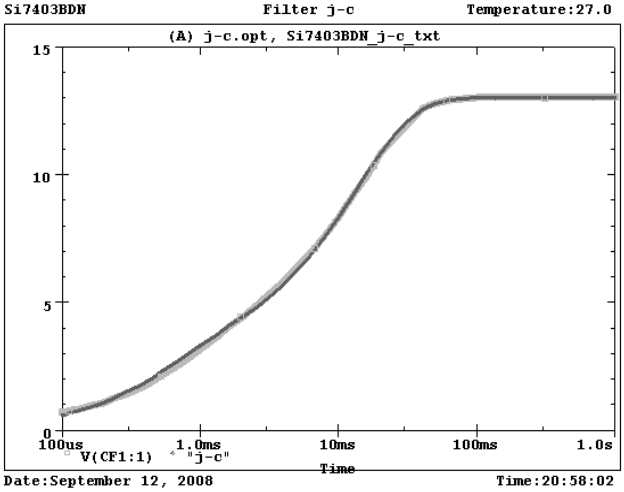
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.2840	681.3000 m	N/A
RF2	12.3795	3.8839	N/A
RF3	12.7991	2.8853	N/A
RF4	47.5374	5.5495	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	144.0906 u	83.4036 u	N/A
CF2	7.0728 m	151.5145 u	N/A
CF3	70.6428 m	1.1310 m	N/A
CF4	1.1127	508.1715 u	N/A

Note
NA indicates not applicable


Si7403BDN
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7403BDN_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:September 12, 2008
Time:20:12:19


Si7403BDN
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7403BDN_j-c_txt
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:September 12, 2008
Time:20:24:59


Si7403BDN
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7403BDN_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:September 12, 2008
Time:20:49:03


Si7403BDN
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7403BDN_j-c_txt
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:September 12, 2008
Time:20:58:02