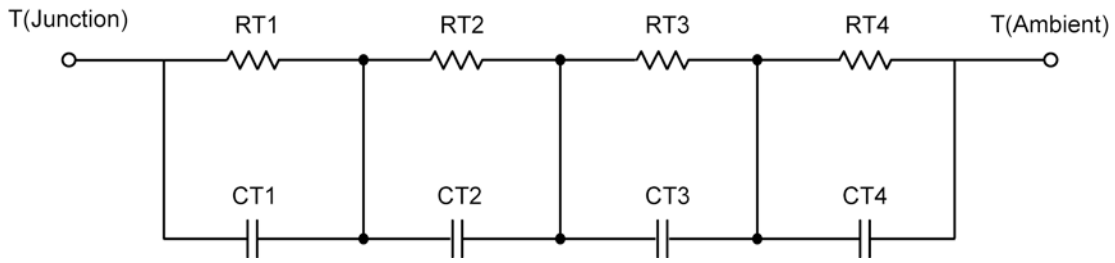
R-C Thermal Model Parameters

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."

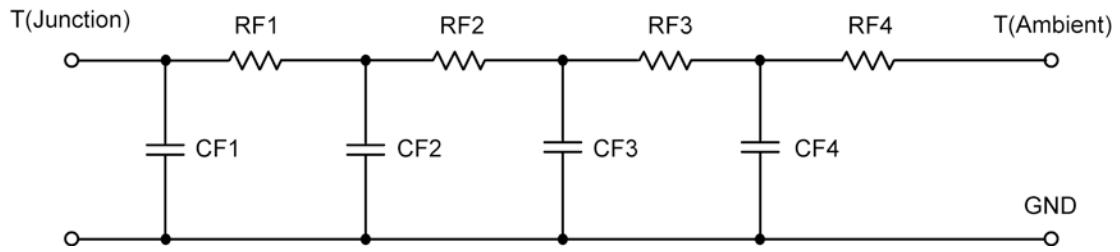
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.5911	398.5209 m	N/A
RT2	12.7251	249.5940 m	N/A
RT3	1.2919	697.2851 m	N/A
RT4	56.3919	1.0546	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	15.4736 m	3.0860 m	N/A
CT2	130.6264 m	1.1149 m	N/A
CT3	772.0420 u	14.4835 m	N/A
CT4	1.2194	16.4906 m	N/A

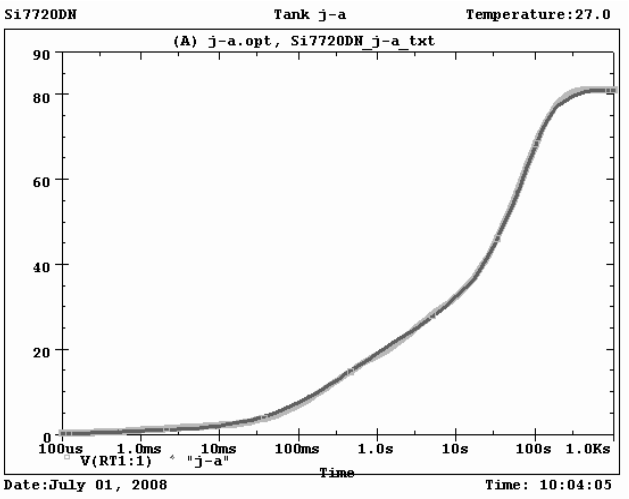
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

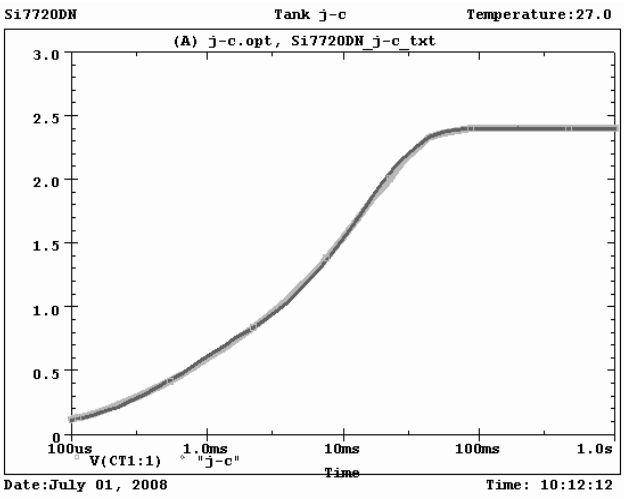
R-C THERMAL MODEL FOR FILTER CONFIGURATION

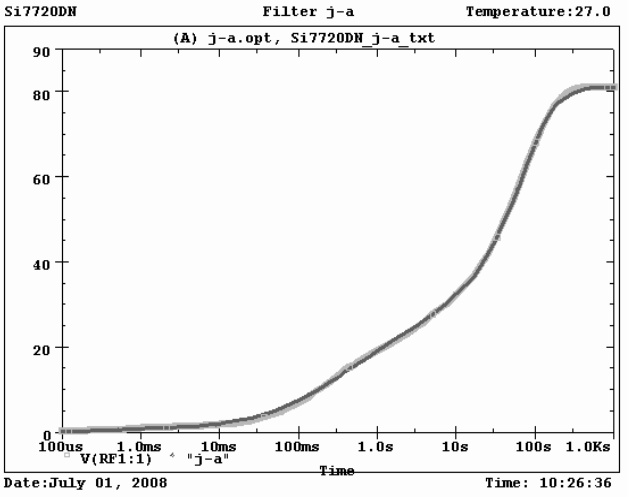


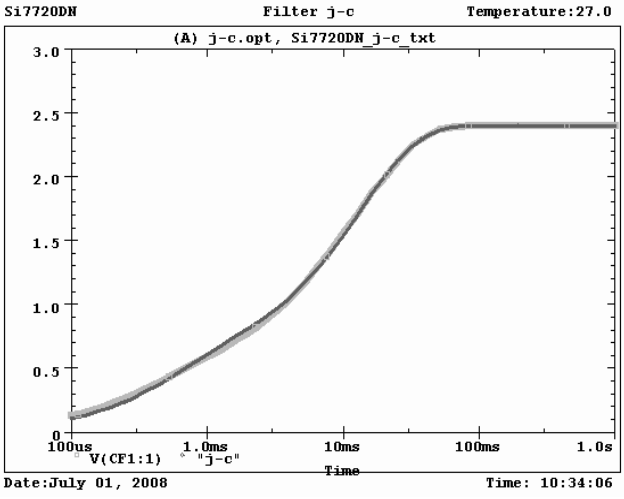
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.1540	568.1206 m	N/A
RF2	15.7975	532.1878 m	N/A
RF3	12.2887	531.8931 m	N/A
RF4	51.7598	767.7985 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	619.3526 u	691.0242 u	N/A
CF2	13.0375 m	4.6359 m	N/A
CF3	217.9451 m	112.7287 u	N/A
CF4	1.1007	7.5926 m	N/A

Note
NA indicates not applicable


Si7720DN
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7720DN_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:July 01, 2008
Time: 10:04:05


Si7720DN
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7720DN_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:July 01, 2008
Time: 10:12:12


Si7720DN
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7720DN_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:July 01, 2008
Time: 10:26:36


Si7720DN
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7720DN_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:July 01, 2008
Time: 10:34:06