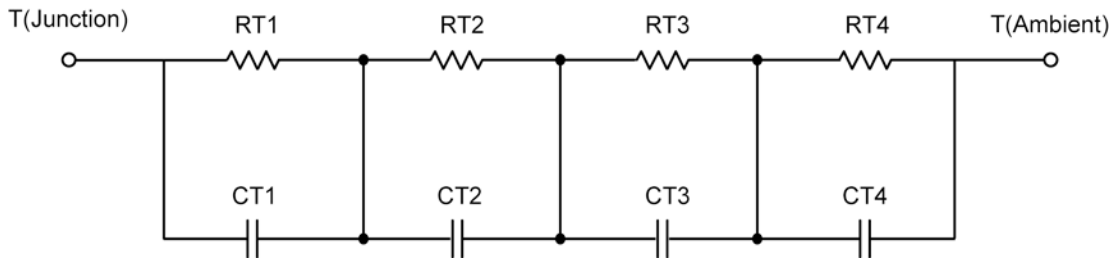
R-C Thermal Model Parameters

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."

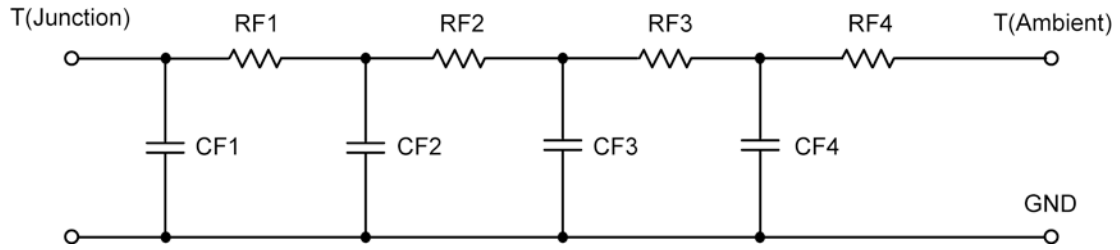
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	2.6471	222.2449 m	N/A
RT2	7.5449	255.8425 m	N/A
RT3	6.0964	382.4273 m	N/A
RT4	48.7116	639.4853 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	23.2897 m	19.2480 m	N/A
CT2	352.8241 m	1.7381 m	N/A
CT3	109.9004 m	58.9039 m	N/A
CT4	1.3295	28.4504 m	N/A

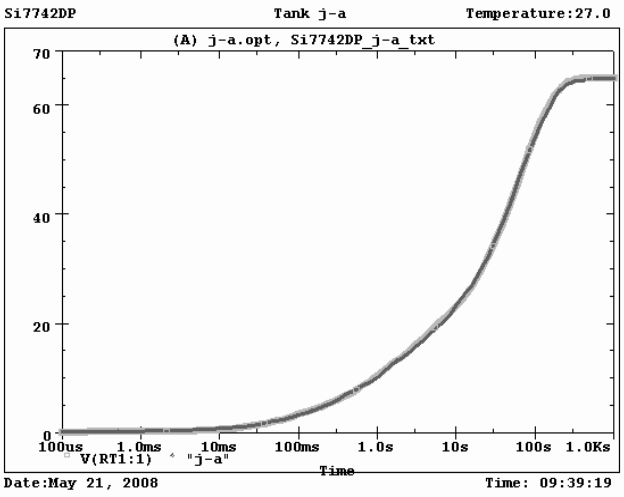
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

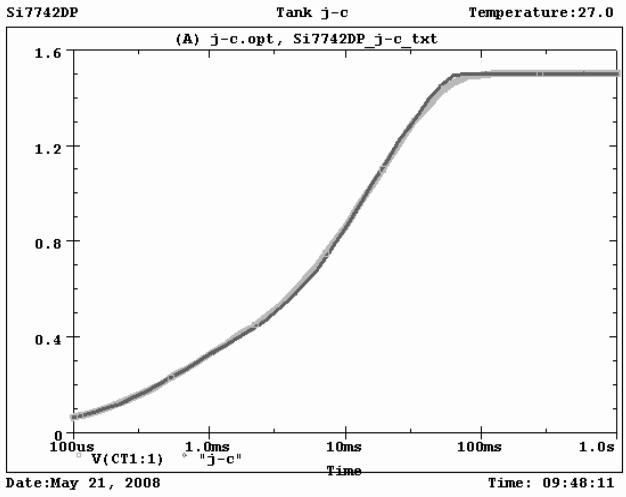
R-C THERMAL MODEL FOR FILTER CONFIGURATION

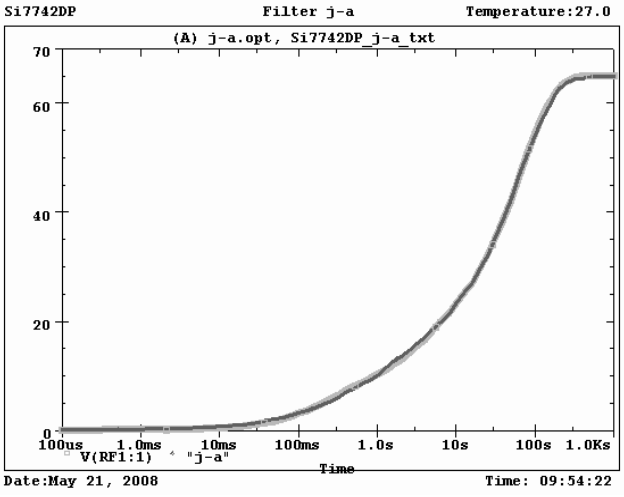


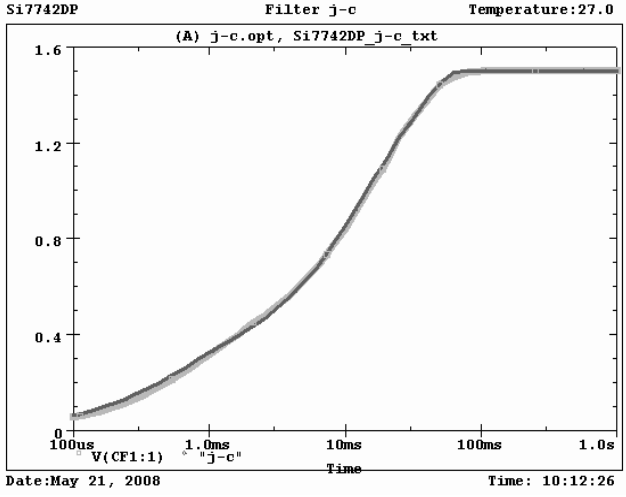
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.0173	377.0705 m	N/A
RF2	9.1182	68.0788 m	N/A
RF3	7.8963	688.0029 m	N/A
RF4	39.9682	366.8478 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	25.3987 m	1.7861 m	N/A
CF2	207.7280 m	2.8015 m	N/A
CF3	339.2510 m	11.2160 m	N/A
CF4	1.0206	2.2760 m	N/A

Note
NA indicates not applicable


Si7742DP
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7742DP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:May 21, 2008
Time: 09:39:19


Si7742DP
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7742DP_j-c_txt
1.6
1.2
0.8
0.4
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:May 21, 2008
Time: 09:48:11


Si7742DP
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7742DP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:May 21, 2008
Time: 09:54:22


Si7742DP
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7742DP_j-c_txt
1.6
1.2
0.8
0.4
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:May 21, 2008
Time: 10:12:26