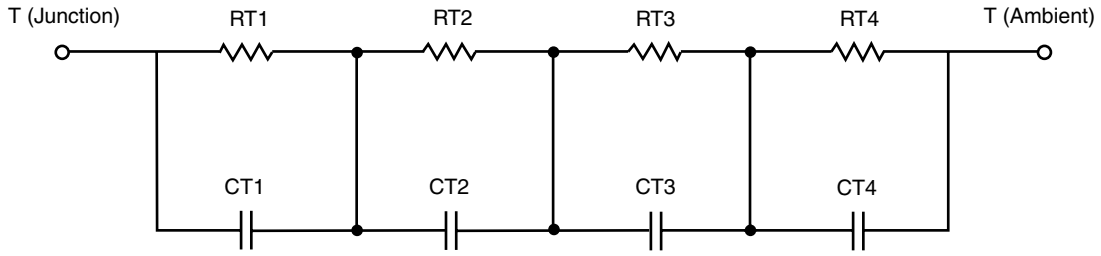
R-C Thermal Model Parameters

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

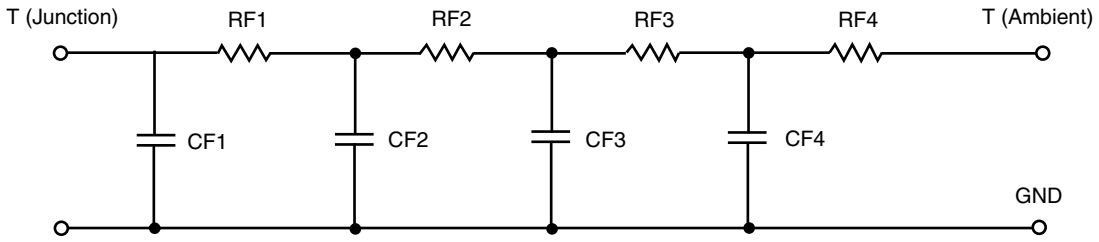


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	1.5740	147.3015 m	N/A
RT2	9.7251	1.4040	N/A
RT3	8.8853	818.3985 m	N/A
RT4	49.8156	1.1303	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.7508 m	1.4395 m	N/A
CT2	417.0557 m	11.0894 m	N/A
CT3	46.7045 m	1.8649 m	N/A
CT4	1.3820	14.2121 m	N/A

Note
N/A indicates not applicable

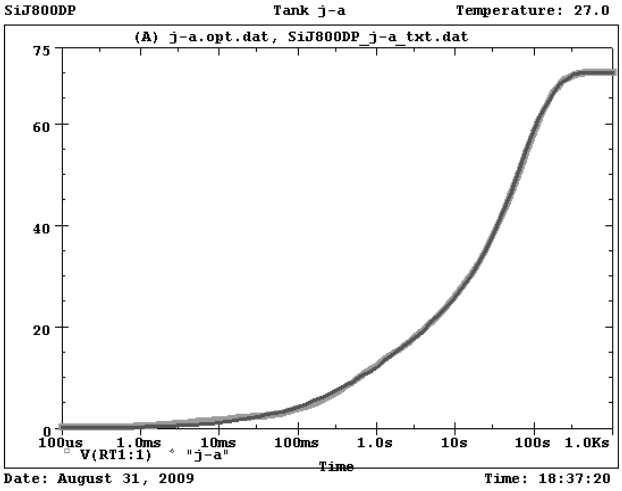
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

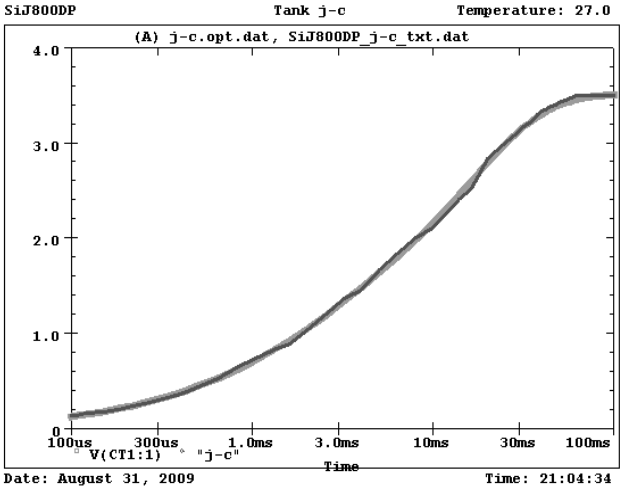
R-C THERMAL MODEL FOR FILTER CONFIGURATION

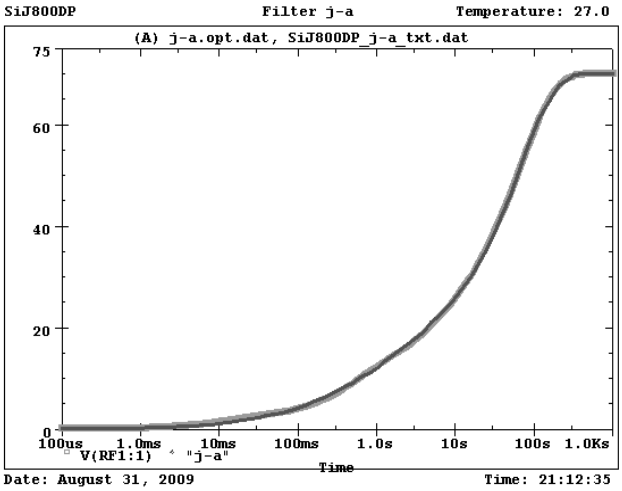


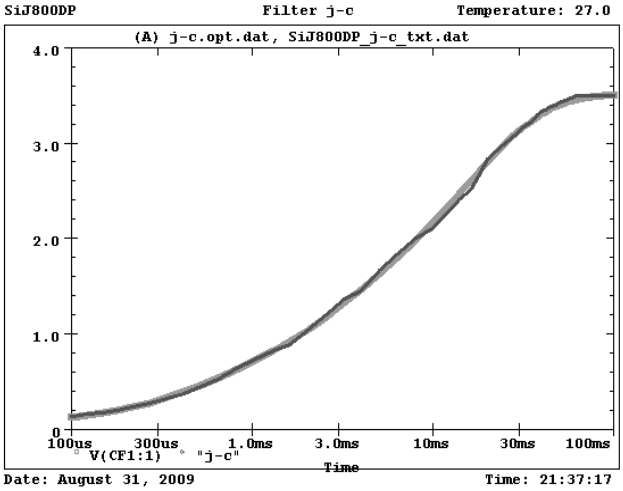
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.5899	768.9571 m	N/A
RF2	11.2728	1.0573	N/A
RF3	17.4460	1.3585	N/A
RF4	38.6913	315.2429 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.5204 m	800.7280 u	N/A
CF2	44.1258 m	1.9069 m	N/A
CF3	432.2485 m	5.9163 m	N/A
CF4	1.1963	3.2608 m	N/A

Note
N/A indicates not applicable


SiJ800DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiJ800DP_j-a_txt.dat
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: August 31, 2009
Time: 18:37:20


SiJ800DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiJ800DP_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)
"j-c"
Time
Date: August 31, 2009
Time: 21:04:34


SiJ800DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SiJ800DP_j-a_txt.dat
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: August 31, 2009
Time: 21:12:35


SiJ800DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiJ800DP_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)
"j-c"
Time
Date: August 31, 2009
Time: 21:37:17