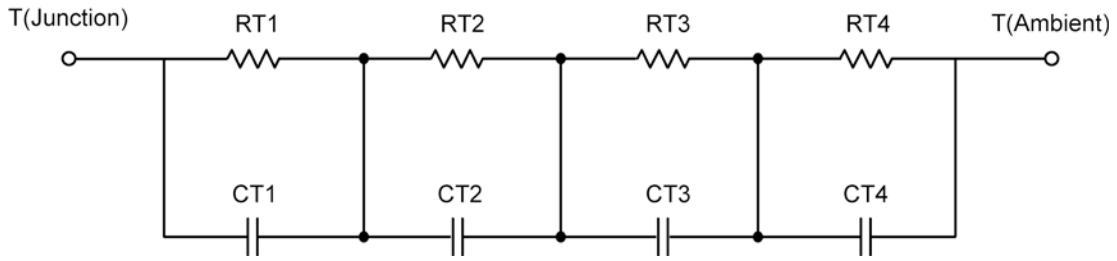
R-C Thermal Model Parameters

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."

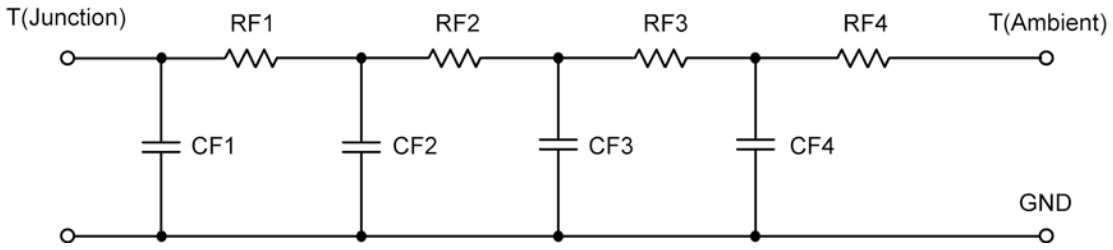
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Channel 1**	**Ambient Channel 2**	**Case Channel 1**	**Case Channel 2**	**Foot**
RT1	6.1994	6.8067	1.7922	1.5119	N/A
RT2	16.0233	13.5941	1.8337	1.6890	N/A
RT3	20.2819	17.1741	571.3000 m	521.7000 m	N/A
RT4	45.4954	45.4251	2.1028	1.9774	N/A
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Channel 1**	**Ambient Channel 2**	**Case Channel 1**	**Case Channel 2**	**Foot**
CT1	659.0079 u	1.1554 m	16.4313 m	20.5978 m	N/A
CT2	21.0634 m	24.1894 m	544.2037 u	575.1787 u	N/A
CT3	341.5476 m	326.1981 m	2.3995	2.4479	N/A
CT4	2.0034	1.4890	2.1094 m	2.4358 m	N/A

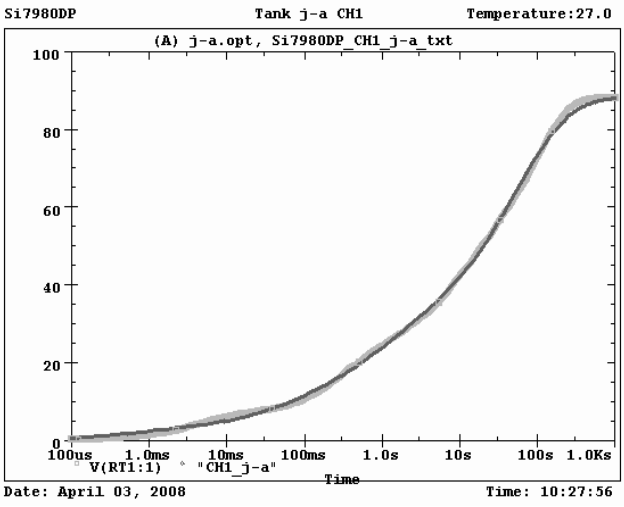
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

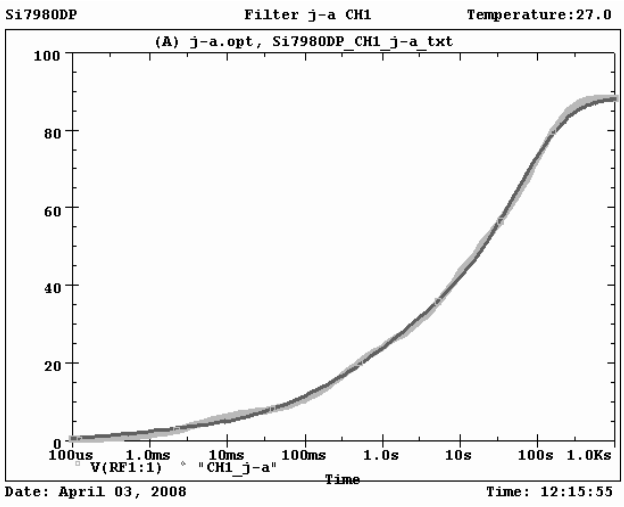
R-C THERMAL MODEL FOR FILTER CONFIGURATION

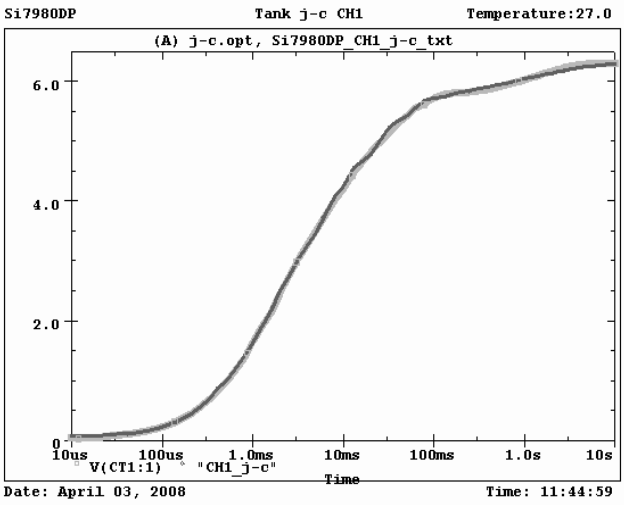


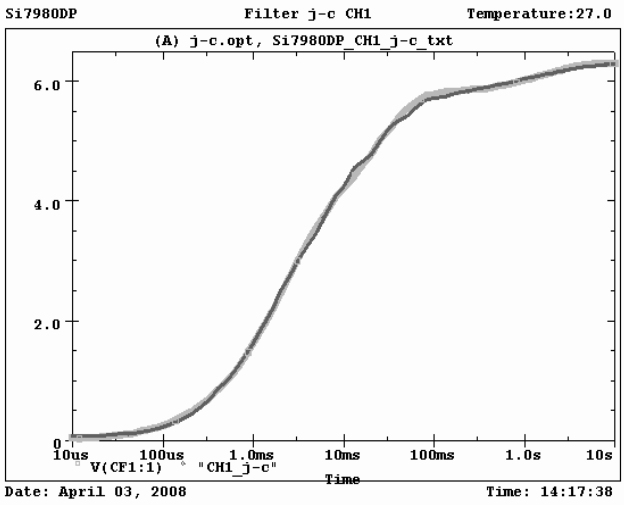
R-C VALUES FOR FILTER CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	**Ambient Channel 1**	**Ambient Channel 2**	**Case Channel 1**	**Case Channel 2**	**Foot**
RF1	6.5003	6.0912	1.7388	1.1722	N/A
RF2	17.0799	15.9706	2.0798	2.0180	N/A
RF3	26.7464	24.2796	1.9808	1.9977	N/A
RF4	37.6734	36.6586	500.6000 m	512.1000 m	N/A
Thermal Capacitance (Joules/°C)					
Junction to	**Ambient Channel 1**	**Ambient Channel 2**	**Case Channel 1**	**Case Channel 2**	**Foot**
CF1	637.0891 u	752.2680 u	373.0803 u	419.6078 u	N/A
CF2	18.3485 m	16.9097 m	489.1923 u	246.5867 u	N/A
CF3	262.1416 m	261.2141 m	10.1939 m	8.5505 m	N/A
CF4	2.1880	1.5724	3.2458	2.5898	N/A

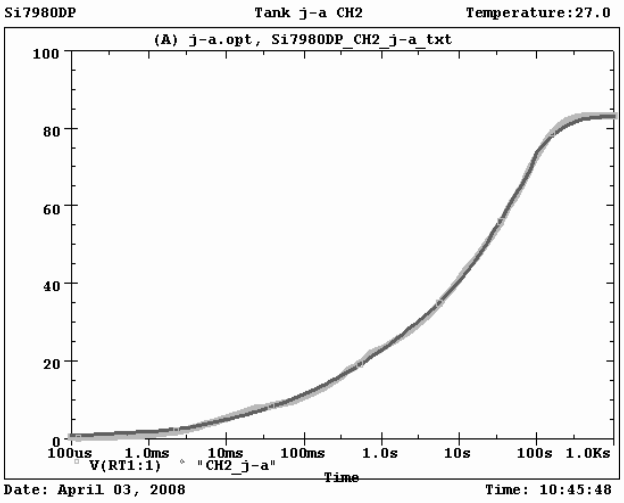
Note: NA indicates not applicable

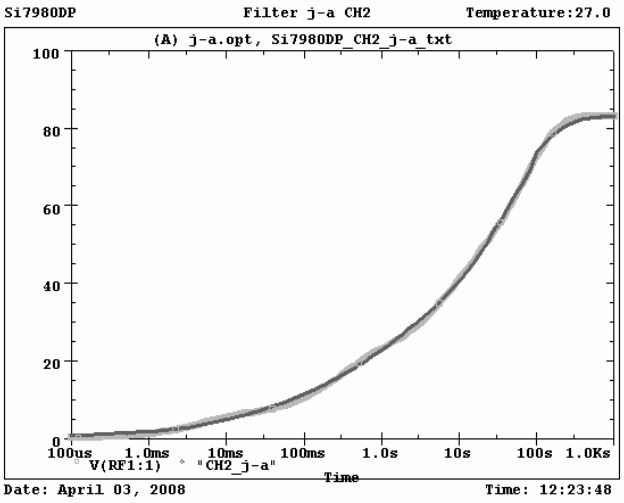

Si7980DP
Tank j-a CH1
Temperature:27.0
(A) j-a.opt, Si7980DP_CH1_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "CH1_j-a"
Time
Date: April 03, 2008
Time: 10:27:56

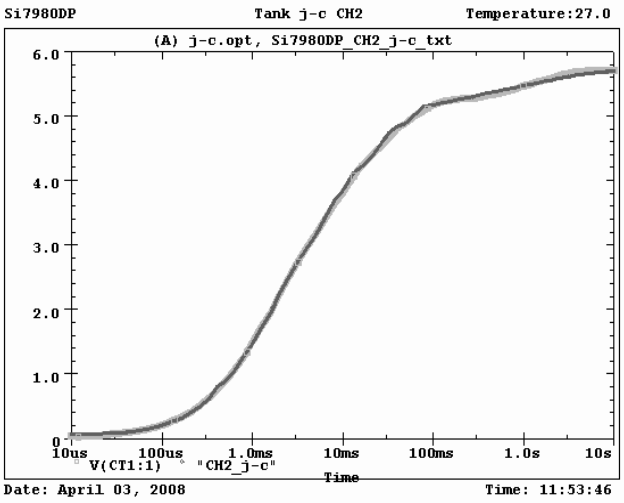

Si7980DP
Filter j-a CH1
Temperature:27.0
(A) j-a.opt, Si7980DP_CH1_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "CH1_j-a"
Time
Date: April 03, 2008
Time: 12:15:55

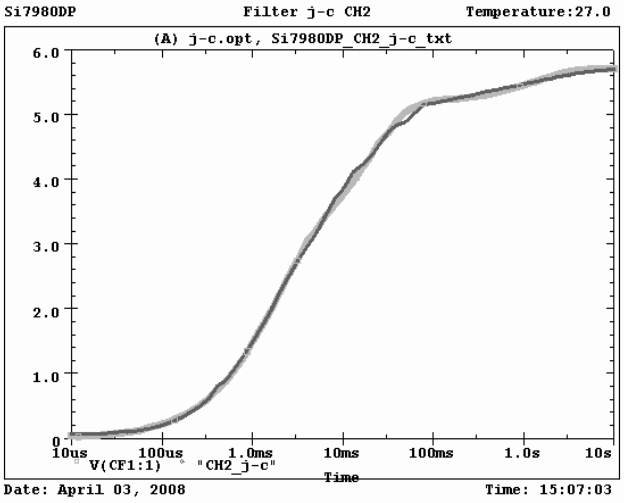

Si7980DP
Tank j-c CH1
Temperature:27.0
(A) j-c.opt, Si7980DP_CH1_j-c_txt
6.0
4.0
2.0
0
10us 100us 1.0ms 10ms 100ms 1.0s 10s
V(CT1:1) "CH1_j-c"
Time
Date: April 03, 2008
Time: 11:44:59


Si7980DP
Filter j-c CH1
Temperature:27.0
(A) j-c.opt, Si7980DP_CH1_j-c_txt
6.0
4.0
2.0
0
10us 100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "CH1_j-c"
Time
Date: April 03, 2008
Time: 14:17:38


Si7980DP
Tank j-a CH2
Temperature:27.0
(A) j-a.opt, Si7980DP_CH2_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"CH2_j-a"
Time
Date: April 03, 2008
Time: 10:45:48


Si7980DP
Filter j-a CH2
Temperature:27.0
(A) j-a.opt, Si7980DP_CH2_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"CH2_j-a"
Time
Date: April 03, 2008
Time: 12:23:48


Si7980DP
Tank j-c CH2
Temperature:27.0
(A) j-c.opt, Si7980DP_CH2_j-c_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
10us
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"CH2_j-c"
Time
Date: April 03, 2008
Time: 11:53:46


Si7980DP
Filter j-c CH2
Temperature:27.0
(A) j-c.opt, Si7980DP_CH2_j-c_txt
6.0
5.0
4.0
3.0
2.0
1.0
0
10us
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"CH2_j-c"
Time
Date: April 03, 2008
Time: 15:07:03