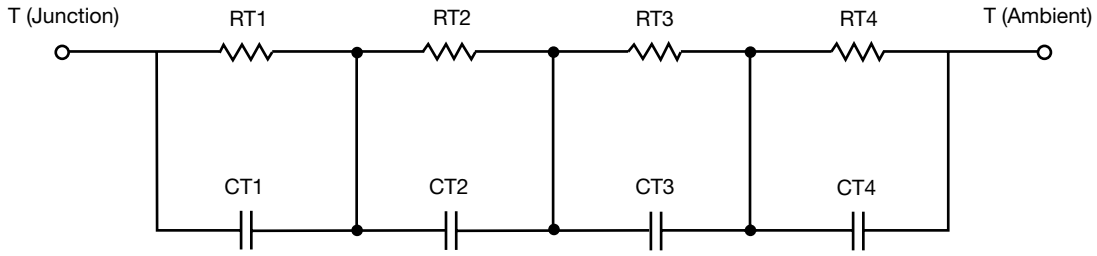
R-C Thermal Model Parameters

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

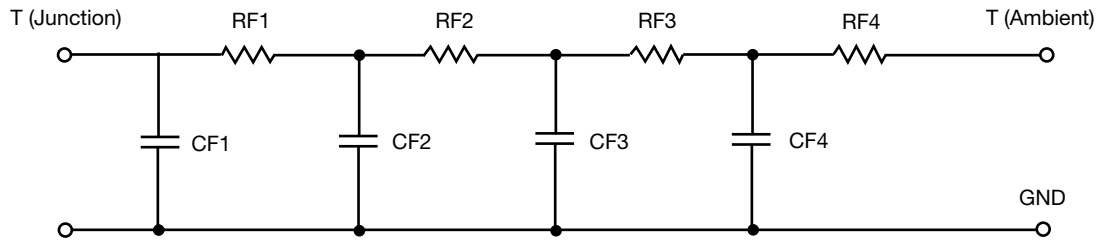


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	27.1045	572.2433 m	N/A
RT2	26.3604	677.3013 m	N/A
RT3	11.8321	76.3303 m	N/A
RT4	4.5730	1.4742	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.8715	1.1561 m	N/A
CT2	3.4454	26.6951 m	N/A
CT3	150.0699 m	16.2041 u	N/A
CT4	19.7217 m	7.2803 m	N/A

Note
N/A indicates not applicable

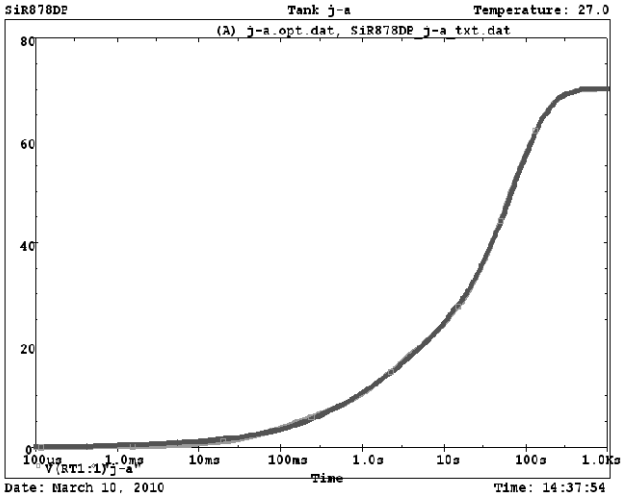
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

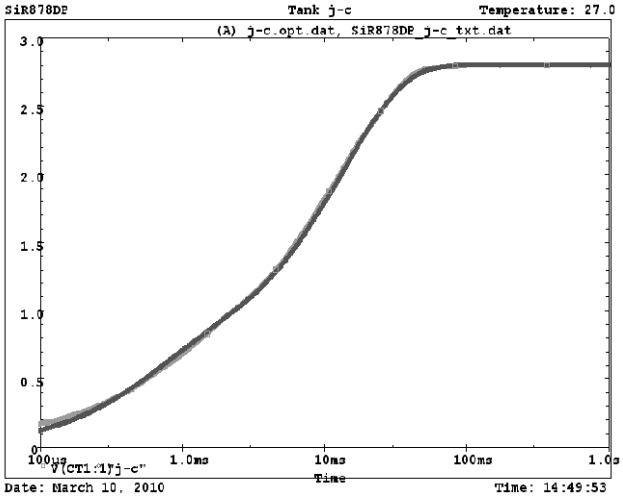
R-C THERMAL MODEL FOR FILTER CONFIGURATION

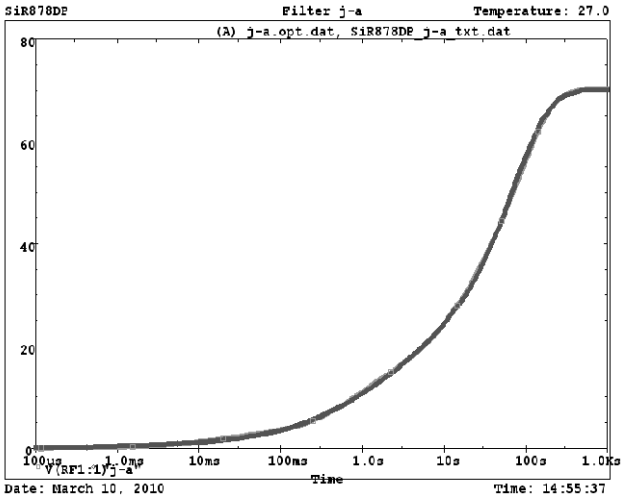


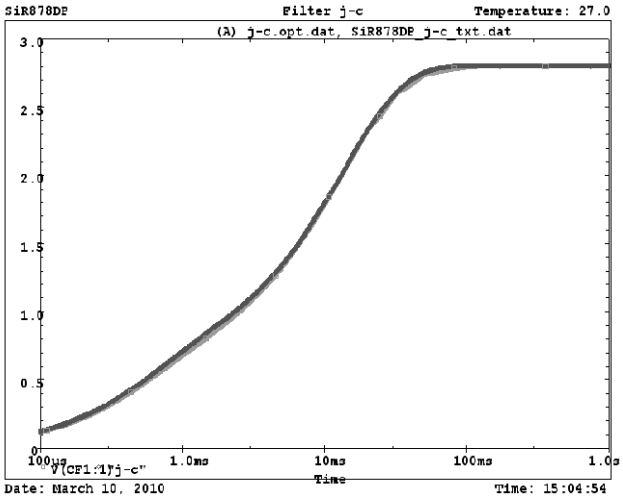
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.5835	798.1177 m	N/A
RF2	11.6136	1.2307	N/A
RF3	19.8430	667.7051 m	N/A
RF4	36.0528	103.4772 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	5.9867 m	764.0222 u	N/A
CF2	60.1785 m	5.1912 m	N/A
CF3	543.8886 m	1.8355 m	N/A
CF4	1.5012	235.2978 m	N/A

Note
N/A indicates not applicable


SiR878DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR878DP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)/j-a
Time
Date: March 10, 2010
Time: 14:37:54


SiR878DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR878DP_j-c_txt.dat
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: March 10, 2010
Time: 14:49:53


SiR878DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR878DP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)/j-a"
Time
Date: March 10, 2010
Time: 14:55:37


SiR878DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR878DP_j-c_txt.dat
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: March 10, 2010
Time: 15:04:54