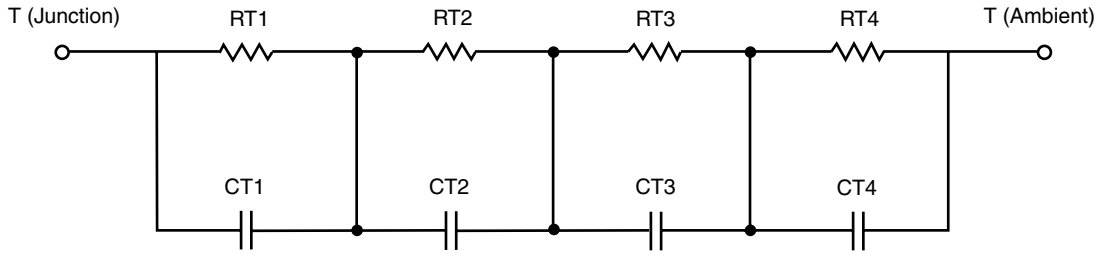
R-C Thermal Model Parameters

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

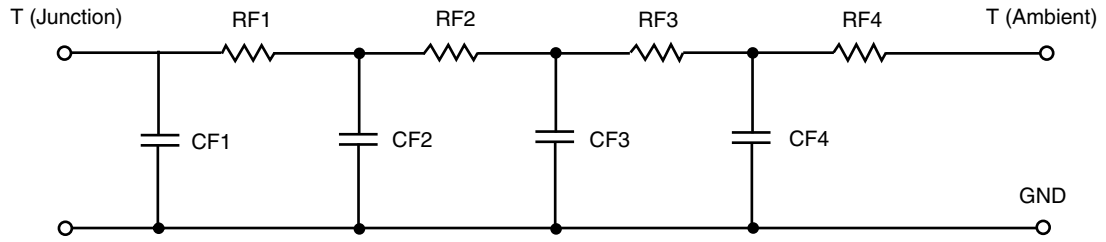


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	3.3801	3.8570	N/A
RT2	2.9889	349.0847 m	N/A
RT3	14.2250	2.1758	N/A
RT4	49.2429	1.6052	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.0702 m	9.4386 m	N/A
CT2	20.2529 m	9.5696 m	N/A
CT3	88.1979 m	62.0952 m	N/A
CT4	1.2789	608.8276 u	N/A

Note
N/A indicates not applicable

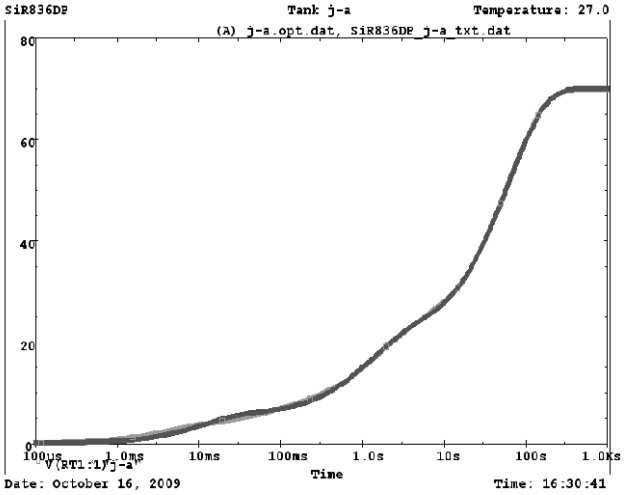
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

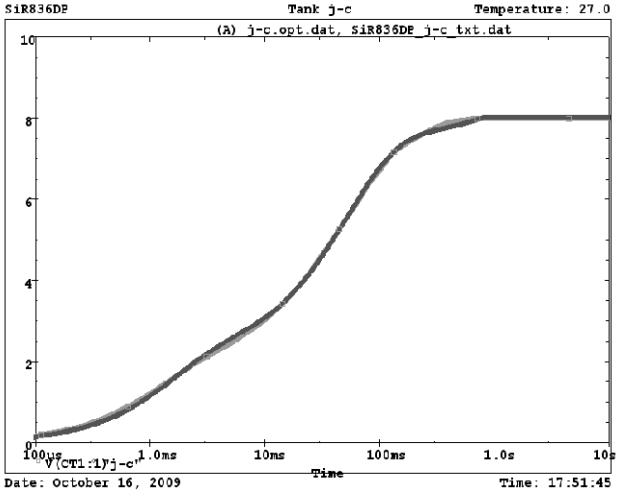
R-C THERMAL MODEL FOR FILTER CONFIGURATION

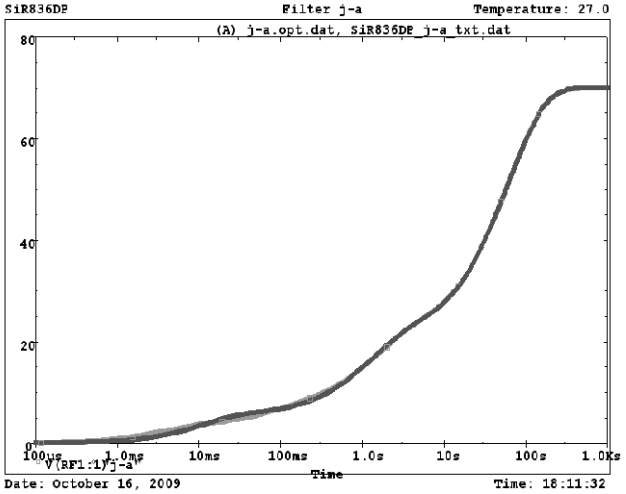


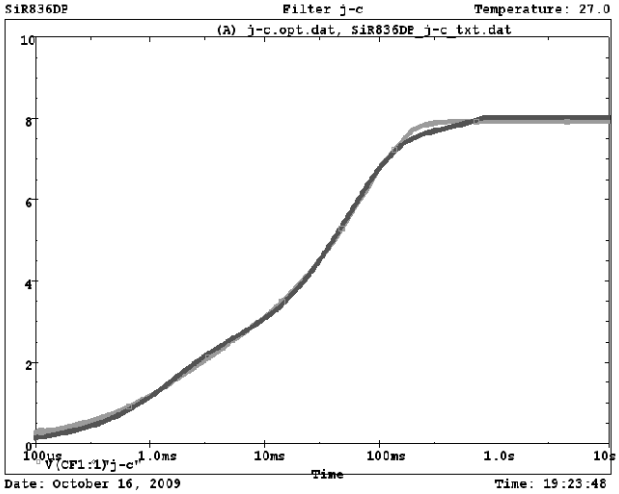
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.7543	348.2518 m	N/A
RF2	4.7556	1.7276	N/A
RF3	14.3672	1.5392	N/A
RF4	47.0215	4.3116	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	933.7466 u	216.0837 u	N/A
CF2	18.0280 m	536.1768 u	N/A
CF3	75.2420 m	3.8924 m	N/A
CF4	1.2516	9.3753 m	N/A

Note
N/A indicates not applicable


SiR836DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR836DP_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: October 16, 2009
Time: 16:30:41


SiR836DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR836DP_j-c_txt.dat
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: October 16, 2009
Time: 17:51:45


SiR836DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR836DP_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: October 16, 2009
Time: 18:11:32


SiR836DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR836DP_j-c_txt.dat
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: October 16, 2009
Time: 19:23:48