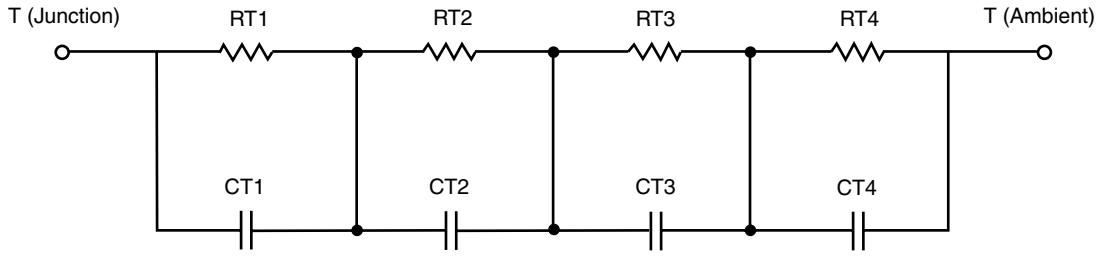
R-C Thermal Model Parameters

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

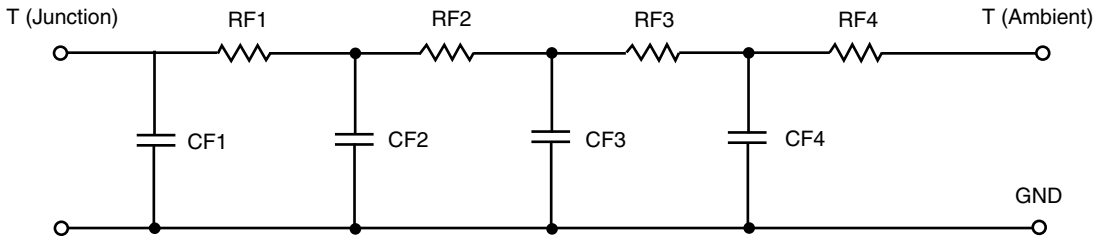


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	9.6744	205.8960 m	N/A
RT2	39.3627	344.9488 m	N/A
RT3	13.0119	286.8793 m	N/A
RT4	2.9510	468.5711 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	113.4016 m	2.8043 m	N/A
CT2	2.0969	29.2247 m	N/A
CT3	1.7672	17.1209 m	N/A
CT4	23.8769 m	20.2769 m	N/A

Note
N/A indicates not applicable

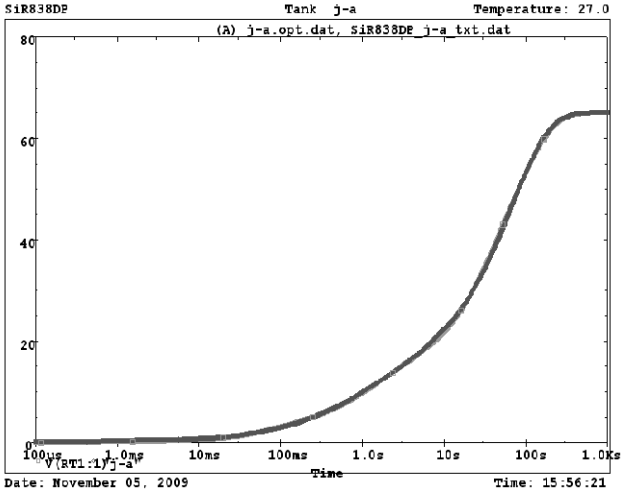
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

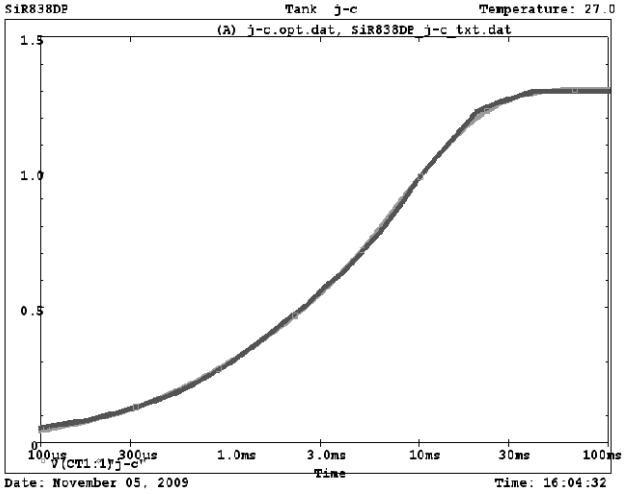
R-C THERMAL MODEL FOR FILTER CONFIGURATION

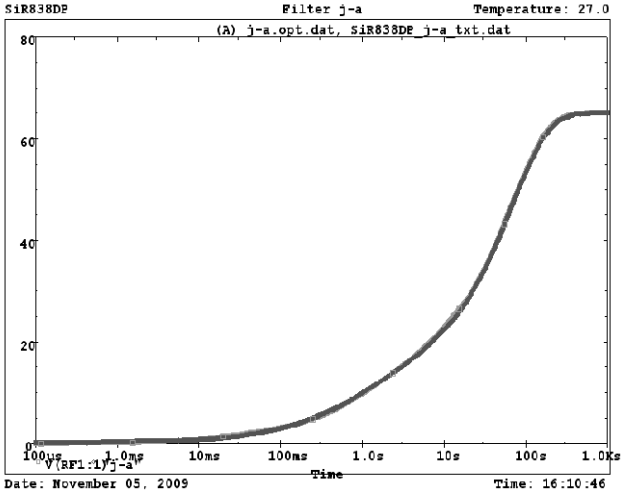


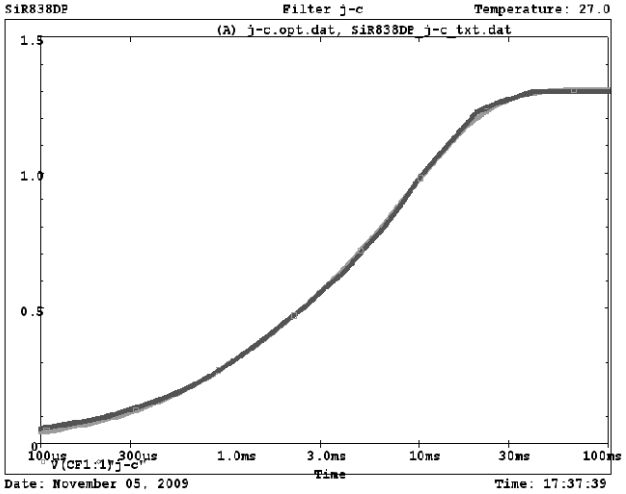
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.3468	452.4088 m	N/A
RF2	9.6654	260.2583 m	N/A
RF3	11.7567	227.1541 m	N/A
RF4	41.2311	365.1466 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	9.5175 m	2.2522 m	N/A
CF2	63.4848 m	5.4337 m	N/A
CF3	346.9739 m	4.0675 m	N/A
CF4	1.2254	1.0535 m	N/A

Note
N/A indicates not applicable


SiR838DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR838DP_j-a_txt.dat
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: November 05, 2009
Time: 15:56:21


SiR838DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR838DP_j-c_txt.dat
1.5
1.0
0.5
0
100µs
300µs
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)j-c
Time
Date: November 05, 2009
Time: 16:04:32


SiR838DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR838DP_j-a_txt.dat
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: November 05, 2009
Time: 16:10:46


SiR838DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR838DP_j-c_txt.dat
1.5
1.0
0.5
0
100µs
300µs
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)j-c
Time
Date: November 05, 2009
Time: 17:37:39