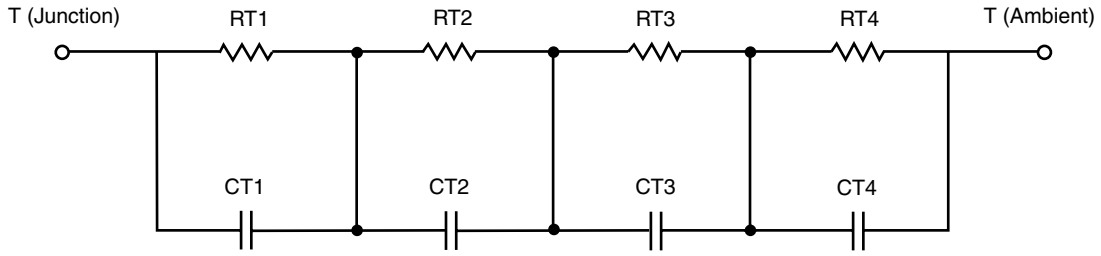
R-C Thermal Model Parameters

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

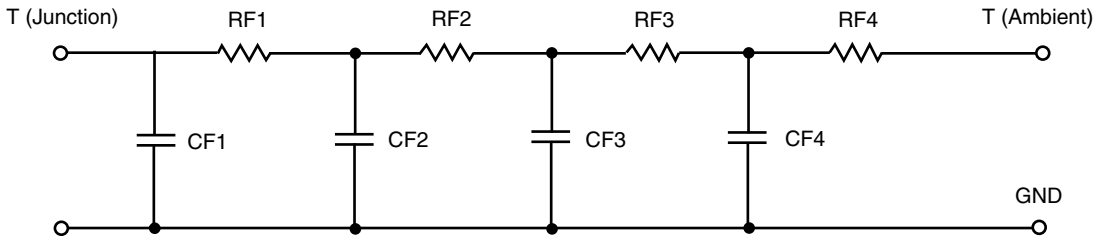


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	2.6689	99.4971 m	N/A
RT2	14.3703	358.5131 m	N/A
RT3	7.2773	88.1936 m	N/A
RT4	29.6835	645.0518 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	25.6934 m	11.9162 m	N/A
CT2	1.3133	25.5317 m	N/A
CT3	125.9755 m	1.4407 m	N/A
CT4	3.8020	93.6102 m	N/A

Note
N/A indicates not applicable

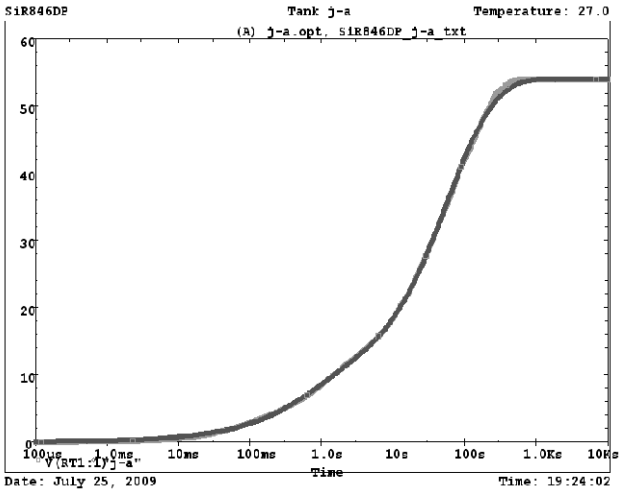
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

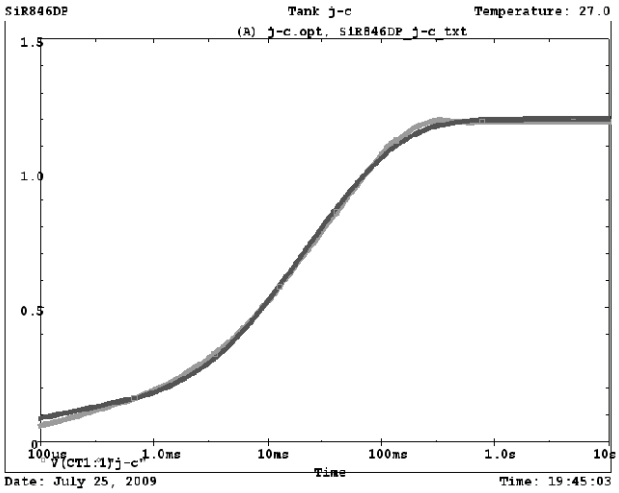
R-C THERMAL MODEL FOR FILTER CONFIGURATION

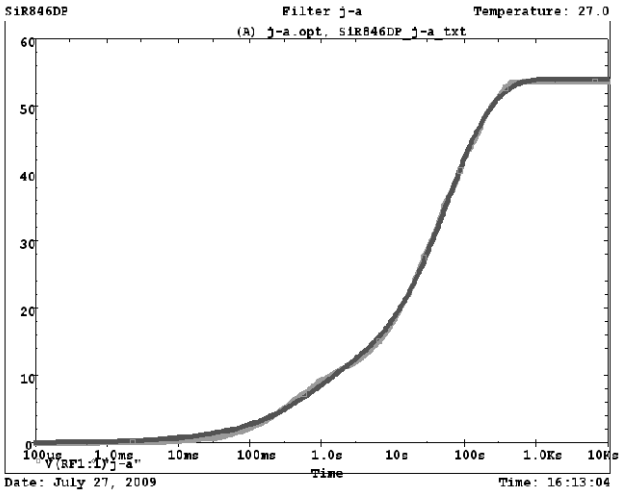


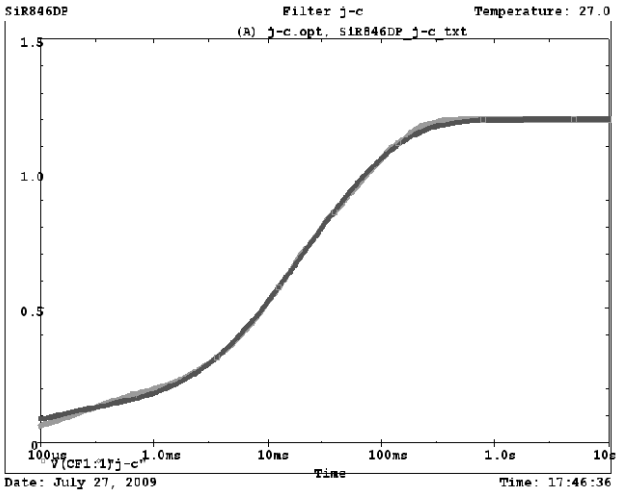
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	9.6832	168.8382 m	N/A
RF2	8.2201	624.9347 m	N/A
RF3	17.9740	359.5053 m	N/A
RF4	17.8252	46.8218 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	41.1771 m	1.2014 m	N/A
CF2	876.5156 m	17.2662 m	N/A
CF3	476.3528 u	158.2433 m	N/A
CF4	5.3678	3.5111 m	N/A

Note
N/A indicates not applicable


SiR846DP
Tank j-a
Temperature: 27.0
(A) j-a.opt, SiR846DP_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
10Ks
Time
V(RT1:1)j-a
Date: July 25, 2009
Time: 19:24:02


SiR846DP
Tank j-c
Temperature: 27.0
(A) j-c.opt, SiR846DP_j-c_txt
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
Time
V(CT1:1)j-c
Date: July 25, 2009
Time: 19:45:03


SiR846DP
Filter j-a
Temperature: 27.0
(A) j-a.opt, SiR846DP_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
10Ks
Time
V(RF1:1)j-a
Date: July 27, 2009
Time: 16:13:04


SiR846DP
Filter j-c
Temperature: 27.0
(A) j-c.opt, SiR846DP_j-c_txt
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
Time
V(CF1:1)j-c
Date: July 27, 2009
Time: 17:46:36