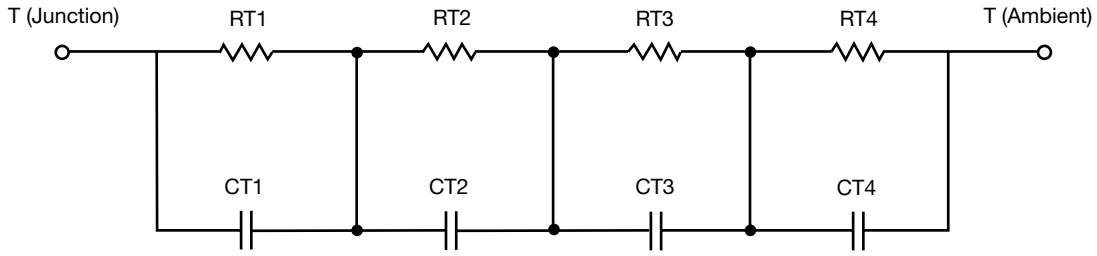
R-C Thermal Model Parameters

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

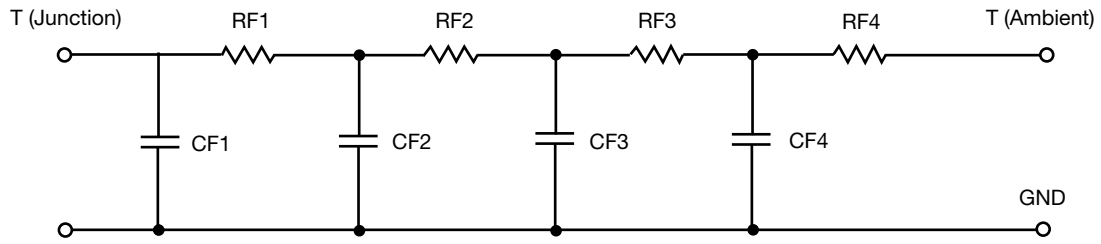


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	15.5024	42.7850 m	N/A
RT2	33.1364	722.0200 m	N/A
RT3	9.1026	308.9718 m	N/A
RT4	7.0439	423.9143 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	3.1953	116.8831 u	N/A
CT2	2.1628	24.4182 m	N/A
CT3	301.1764 m	2.4876 m	N/A
CT4	32.2602 m	42.3020 m	N/A

Note
N/A indicates not applicable

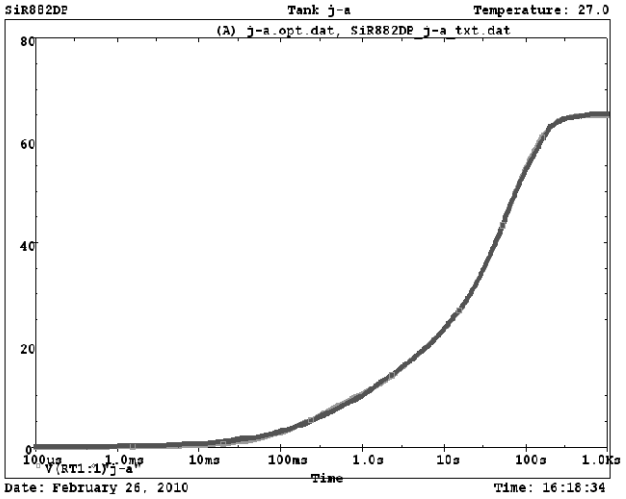
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

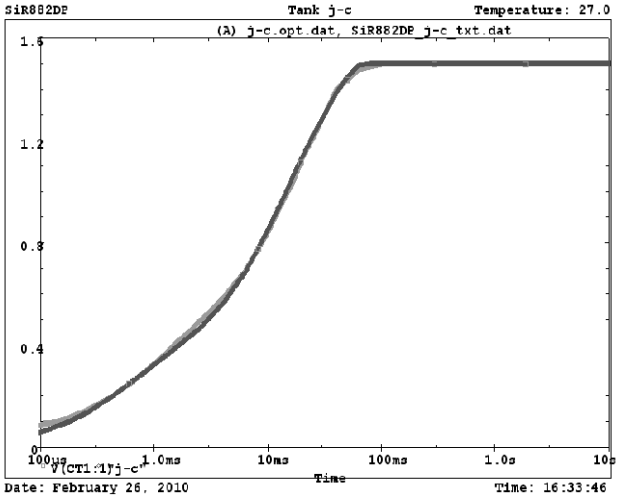
R-C THERMAL MODEL FOR FILTER CONFIGURATION

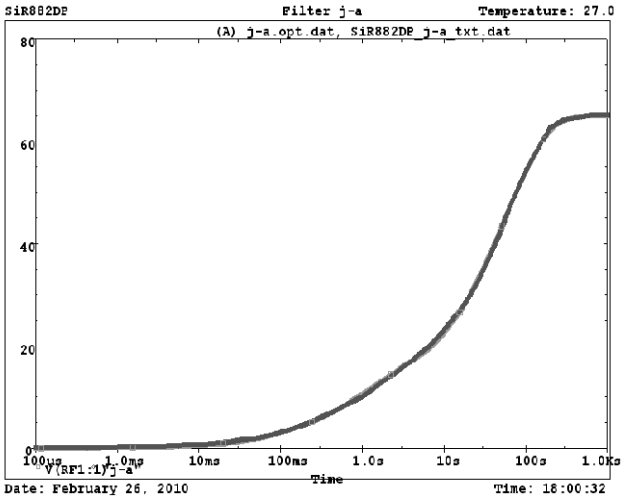


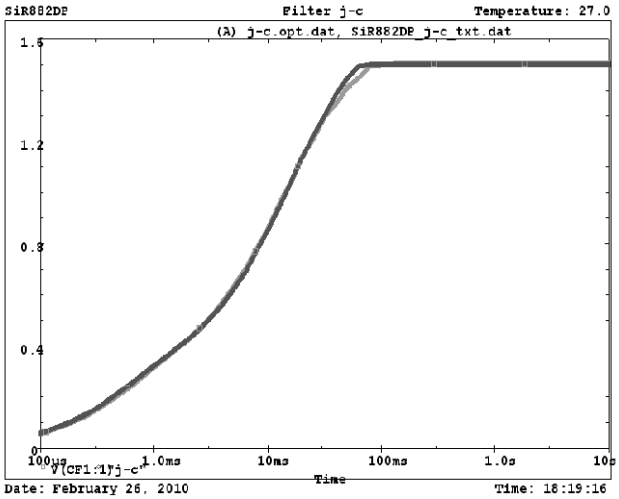
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.4173	356.3787 m	N/A
RF2	10.2233	837.5323 m	N/A
RF3	31.0306	276.9655 m	N/A
RF4	19.1874	32.4028 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	20.9006 m	1.5836 m	N/A
CF2	62.8708 m	10.0563 m	N/A
CF3	819.4426 m	55.4328 m	N/A
CF4	2.4337	44.6279 m	N/A

Note
N/A indicates not applicable


SiR882DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR882DP_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: February 26, 2010
Time: 16:18:34


SiR882DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR882DP_j-c_txt.dat
1.6
1.2
0.8
0.4
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: February 26, 2010
Time: 16:33:46


SiR882DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SiR882DP_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: February 26, 2010
Time: 18:00:32


SiR882DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiR882DP_j-c_txt.dat
1.6
1.2
0.8
0.4
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: February 26, 2010
Time: 18:19:16