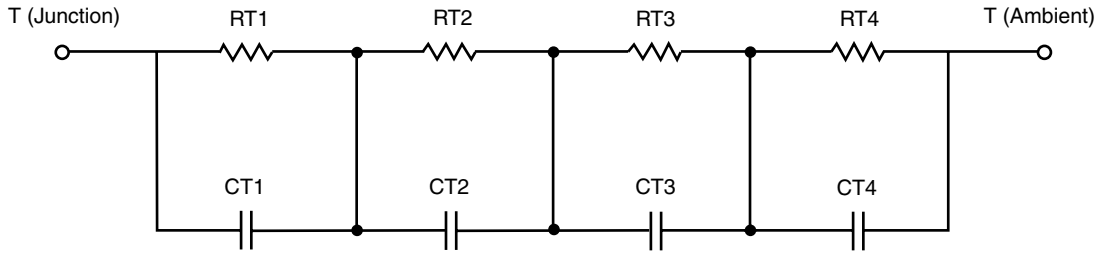
R-C Thermal Model Parameters

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

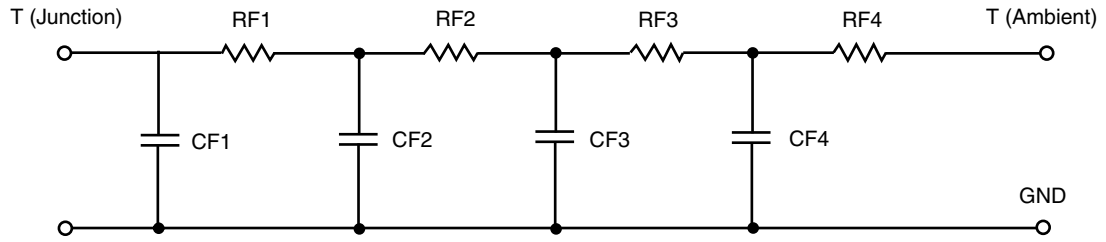


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	9.5285	101.7519 m	N/A
RT2	42.4567	599.2605 m	N/A
RT3	9.9556	925.0177 m	N/A
RT4	3.0592	973.9699 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	70.1358 m	2.0786 m	N/A
CT2	1.9385	2.4169 m	N/A
CT3	642.4620 m	17.0475 m	N/A
CT4	7.3580 m	15.8988 m	N/A

Note
N/A indicates not applicable

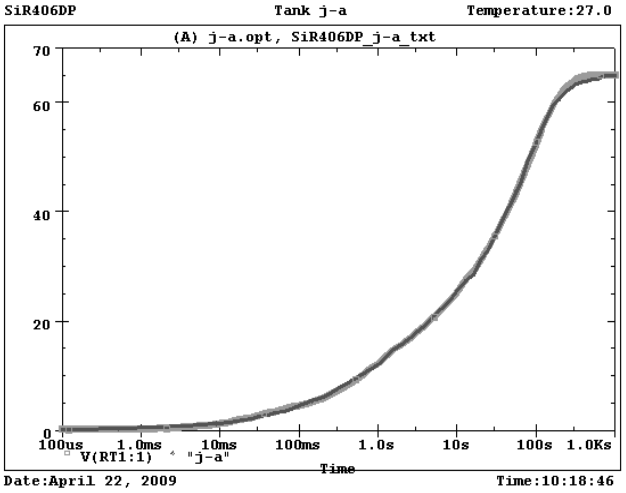
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

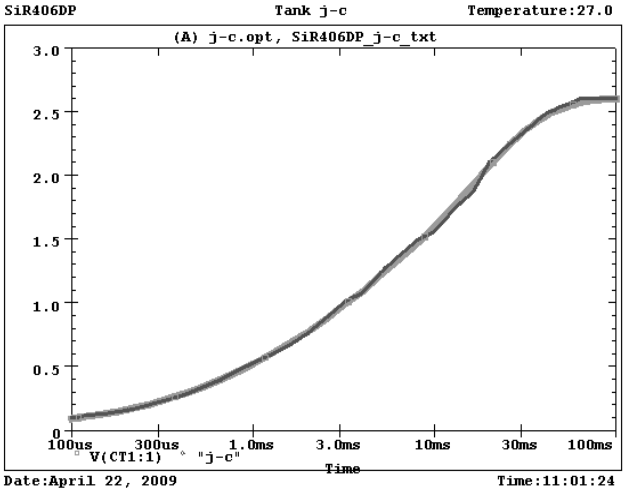
R-C THERMAL MODEL FOR FILTER CONFIGURATION

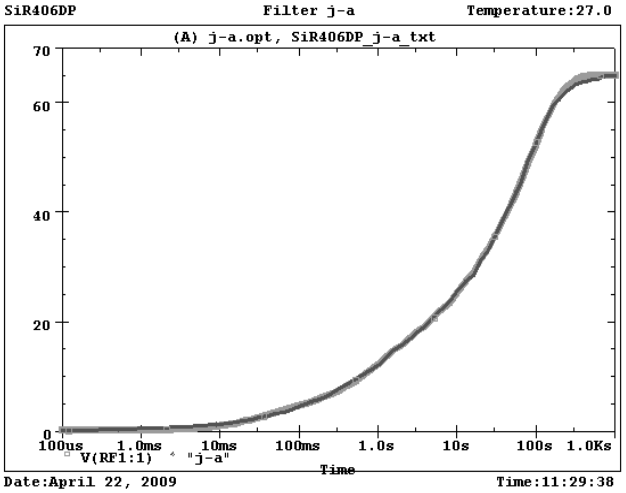


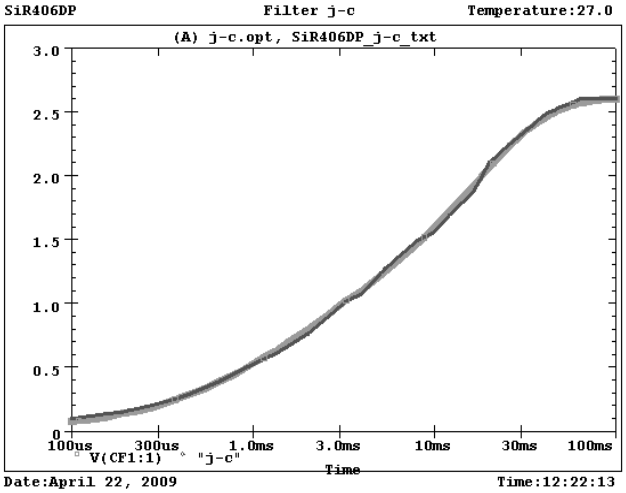
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.7921	701.3825 m	N/A
RF2	11.5675	348.5849 m	N/A
RF3	15.0596	449.0326 m	N/A
RF4	33.5808	1.1010	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	9.0189 m	1.2828 m	N/A
CF2	67.6902 m	932.2877 u	N/A
CF3	556.7223 m	6.8867 m	N/A
CF4	1.7211	1.8447 m	N/A

Note
N/A indicates not applicable


SiR406DP
Tank j-a
Temperature:27.0
(A) j-a.opt, SiR406DP_j-a_txt
70
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date:April 22, 2009
Time:10:18:46


SiR406DP
Tank j-c
Temperature:27.0
(A) j-c.opt, SiR406DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CT1:1) "j-c"
Time
Date:April 22, 2009
Time:11:01:24


SiR406DP
Filter j-a
Temperature:27.0
(A) j-a.opt, SiR406DP_j-a_txt
70
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a"
Time
Date:April 22, 2009
Time:11:29:38


SiR406DP
Filter j-c
Temperature:27.0
(A) j-c.opt, SiR406DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "j-c"
Time
Date:April 22, 2009
Time:12:22:13