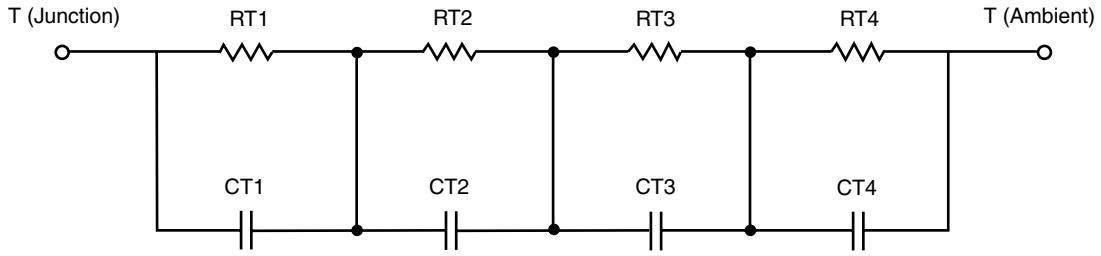
R-C Thermal Model Parameters

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

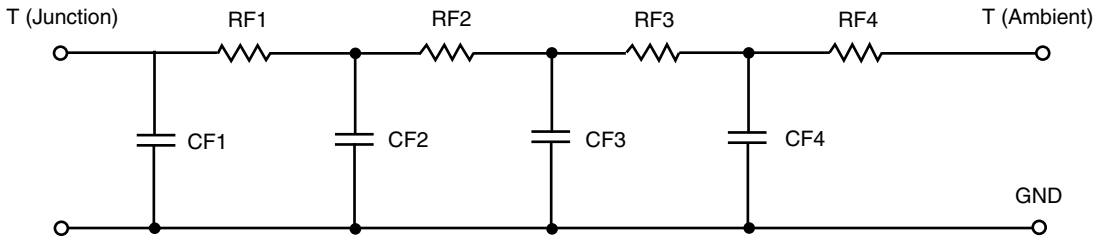


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	3.8182	903.7082 m	N/A
RT2	2.5429	545.8738 m	N/A
RT3	9.9822	269.8909 m	N/A
RT4	48.6567	80.5271 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	65.6230 m	18.0466 m	N/A
CT2	55.5225 m	9.2154 m	N/A
CT3	260.8236 m	56.4630 m	N/A
CT4	1.3313	181.1549 u	N/A

Note
N/A indicates not applicable

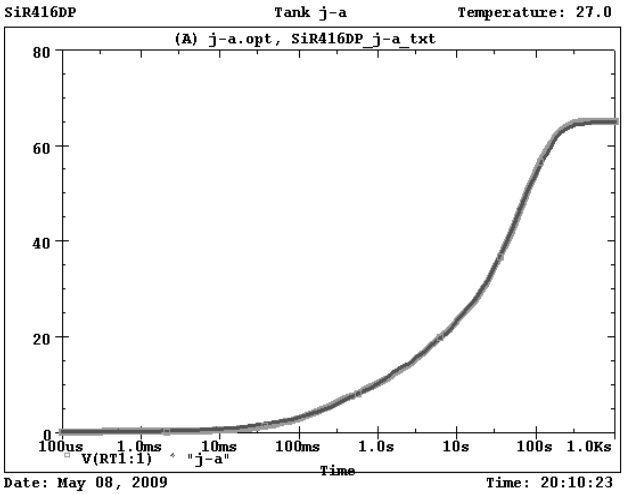
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

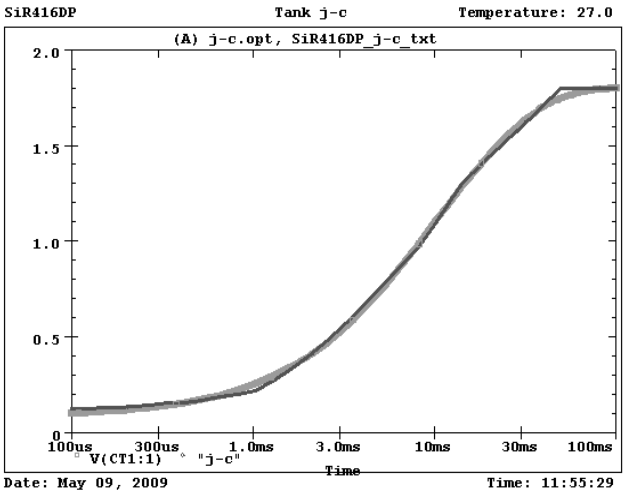
R-C THERMAL MODEL FOR FILTER CONFIGURATION

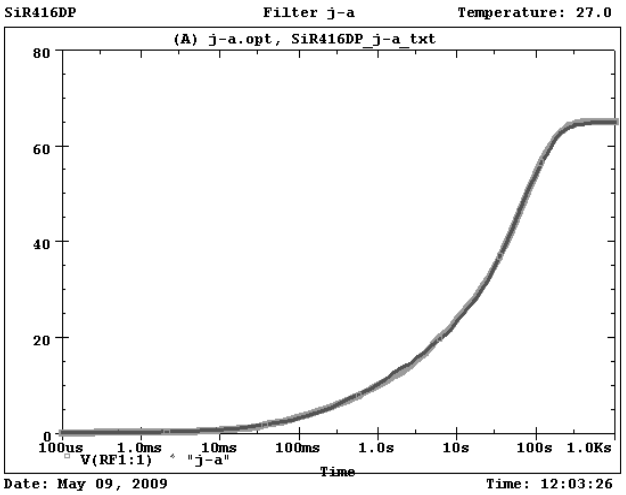


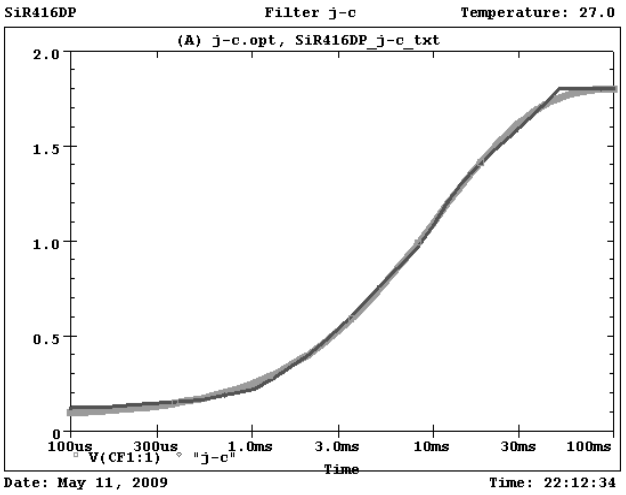
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.3135	87.9847 m	N/A
RF2	5.8822	1.1435	N/A
RF3	13.8955	81.3205 m	N/A
RF4	40.9088	487.1948 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	17.5966 m	346.0902 u	N/A
CF2	61.6409 m	5.0736 m	N/A
CF3	244.2502 m	3.6155 m	N/A
CF4	1.2998	17.7425 m	N/A

Note
N/A indicates not applicable


SiR416DP
Tank j-a
Temperature: 27.0
(A) j-a.opt, SiR416DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: May 08, 2009
Time: 20:10:23


SiR416DP
Tank j-c
Temperature: 27.0
(A) j-c.opt, SiR416DP_j-c_txt
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: May 09, 2009
Time: 11:55:29


SiR416DP
Filter j-a
Temperature: 27.0
(A) j-a.opt, SiR416DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: May 09, 2009
Time: 12:03:26


SiR416DP
Filter j-c
Temperature: 27.0
(A) j-c.opt, SiR416DP_j-c_txt
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: May 11, 2009
Time: 22:12:34