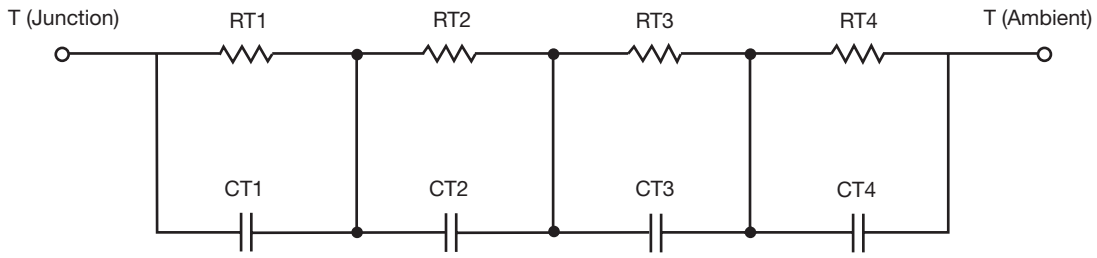
R-C Thermal Model Parameters

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

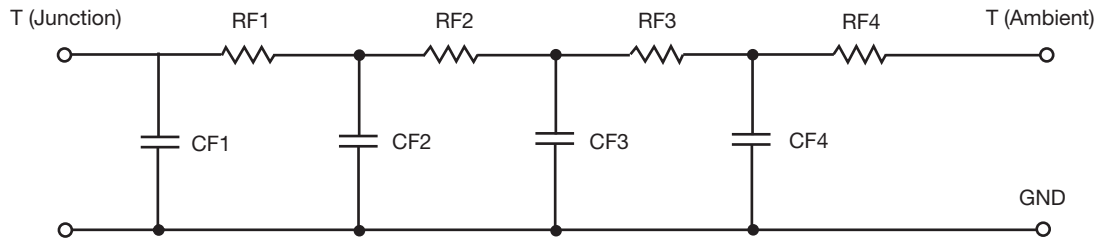


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	12.3356	709.7433m	N/A
RT2	13.1857	734.6512m	N/A
RT3	1.3053	321.9776m	N/A
RT4	57.7878	930.1138m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	18.5681m	31.4074m	N/A
CT2	281.2414m	5.7526m	N/A
CT3	133.5392u	2.2806	N/A
CT4	1.1045	1.3015m	N/A

Note
N/A indicates not applicable

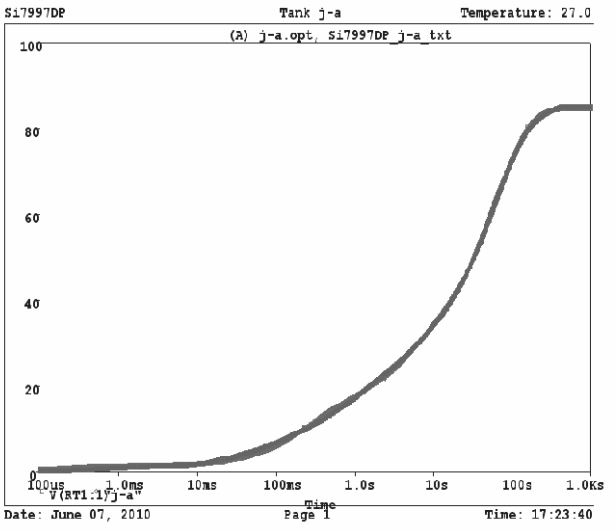
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

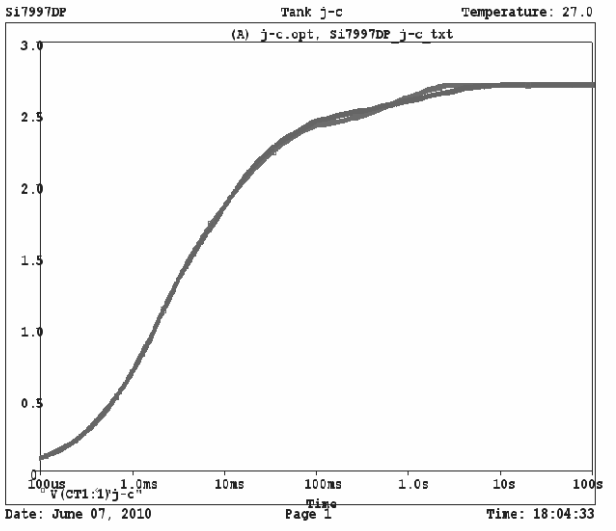
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.2440	1.5045	N/A
RF2	13.6738	123.6809m	N/A
RF3	18.1705	819.1907m	N/A
RF4	47.5881	252.6284m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.0817m	1.0552m	N/A
CF2	32.7328m	14.4672m	N/A
CF3	296.1996m	2.9659m	N/A
CF4	993.3826m	3.5436	N/A

Note
N/A indicates not applicable


Si7997DP
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7997DP_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)"j-a"
Time
Date: June 07, 2010
Page 1
Time: 17:23:40


Si7997DP
Tank j-c
Temperature: 27.0
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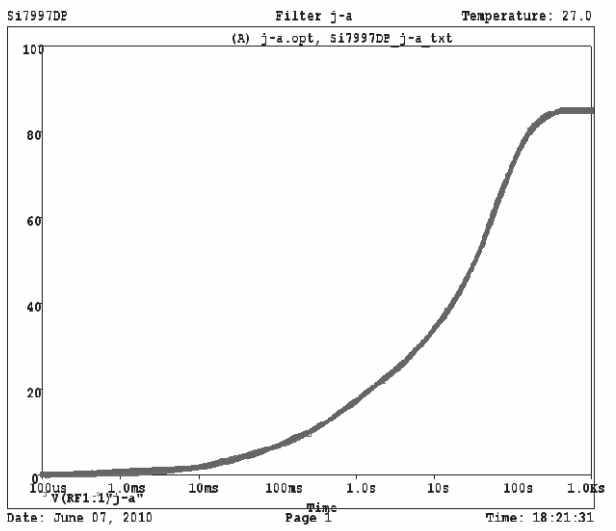
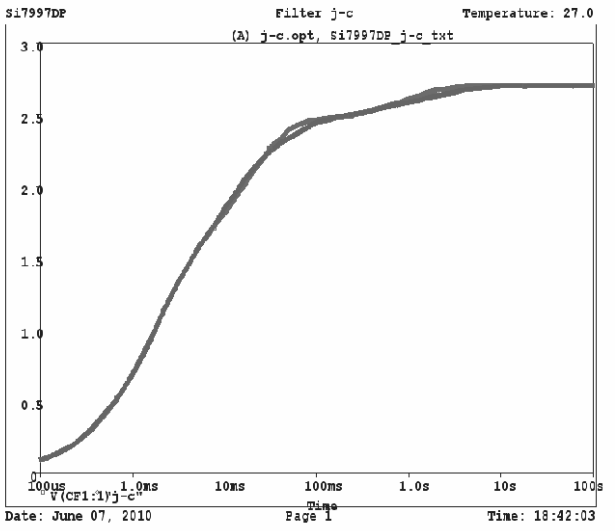
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)"j-c"
Time
Date: June 07, 2010
Page 1
Time: 18:04:33


Si7997DP
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7997DP_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)"j-a"
Time
Date: June 07, 2010
Page 1
Time: 18:21:31


Si7997DP
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7997DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)"j-c"
Time
Date: June 07, 2010
Page 1
Time: 18:42:03