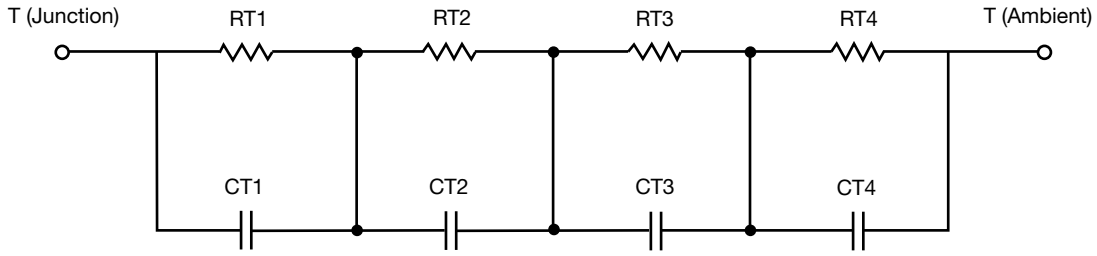
R-C Thermal Model Parameters

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

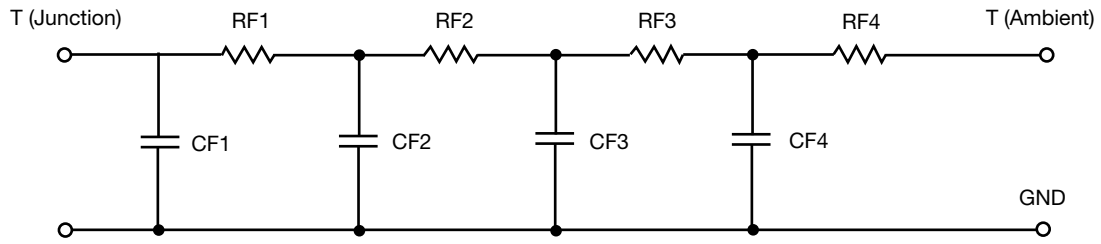


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	17.8333	N/A	21.3326
RT2	48.5491	N/A	47.7324
RT3	31.6397	N/A	10.2756
RT4	51.9779	N/A	10.2093
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	235.2486u	N/A	676.3187u
CT2	1.6118m	N/A	1.4088m
CT3	17.8300m	N/A	63.7632u
CT4	1.3106	N/A	2.1932m

Note
N/A indicates not applicable

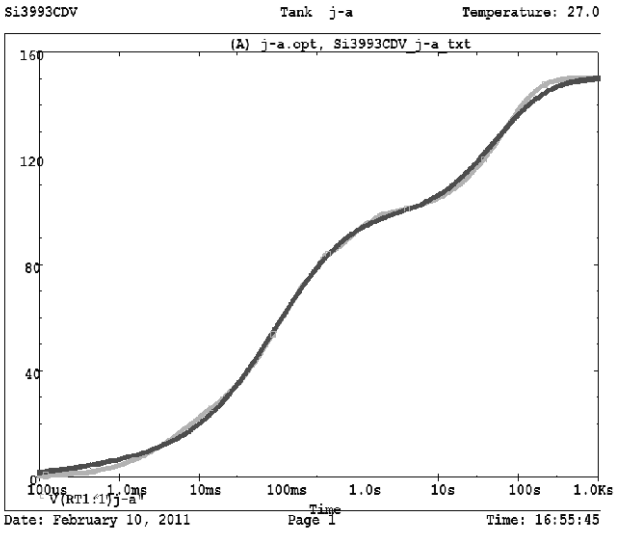
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

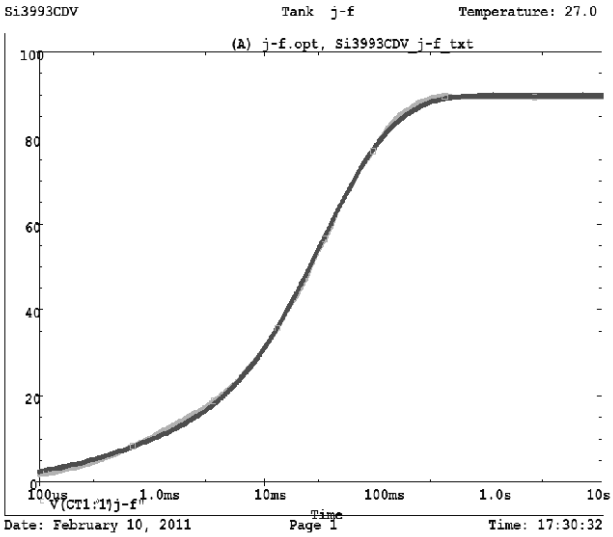
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	15.6523	N/A	14.7682
RF2	52.4409	N/A	48.6107
RF3	32.0326	N/A	15.3580
RF4	49.8742	N/A	11.2631
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	140.6334u	N/A	69.3984u
CF2	947.2142u	N/A	321.6013u
CF3	14.7360m	N/A	1.5871m
CF4	1.4191	N/A	3.8879m

Note
N/A indicates not applicable


Si3993CDV
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si3993CDV_j-a_txt
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: February 10, 2011
Page 1
Time: 16:55:45


Si3993CDV
Tank j-f
Temperature: 27.0
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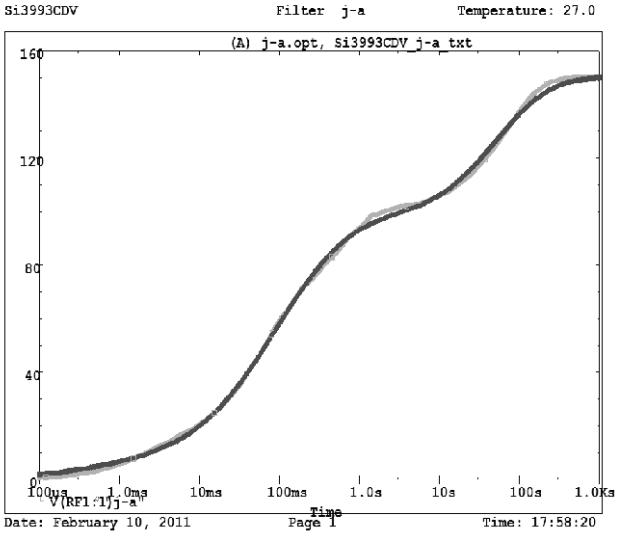
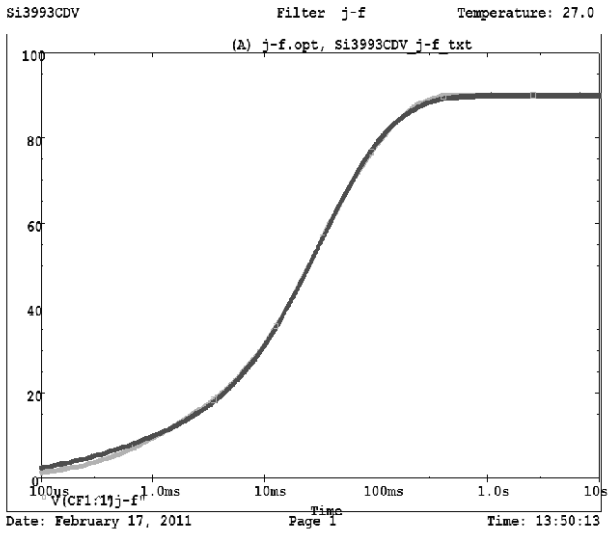
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-f
Time
Date: February 10, 2011
Page 1
Time: 17:30:32


Si3993CDV
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si3993CDV_j-a_txt
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: February 10, 2011
Page 1
Time: 17:58:20


Si3993CDV
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si3993CDV_j-f_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: February 17, 2011
Page 1
Time: 13:50:13