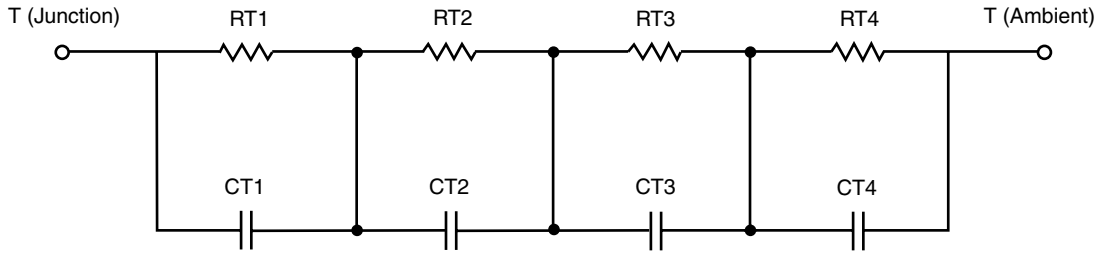
R-C Thermal Model Parameters

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

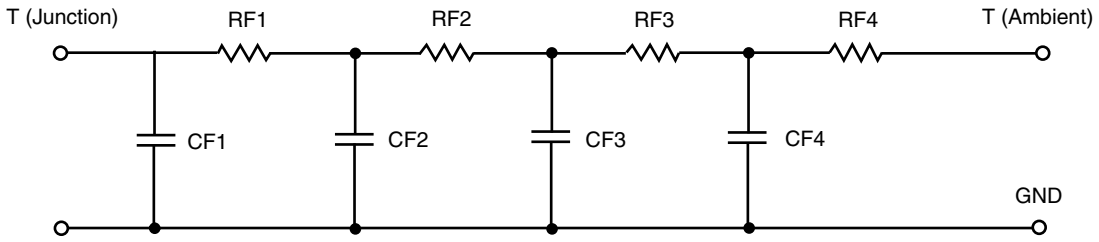


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	12.3498	12.7452	N/A
RT2	35.6279	20.8236	N/A
RT3	41.6187	20.8313	N/A
RT4	39.5560	20.3366	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	187.7181 u	65.6989 u	N/A
CT2	4.0705 m	653.3579 u	N/A
CT3	20.6273 m	4.1253 m	N/A
CT4	1.7063	1.8300 m	N/A

Note
N/A indicates not applicable

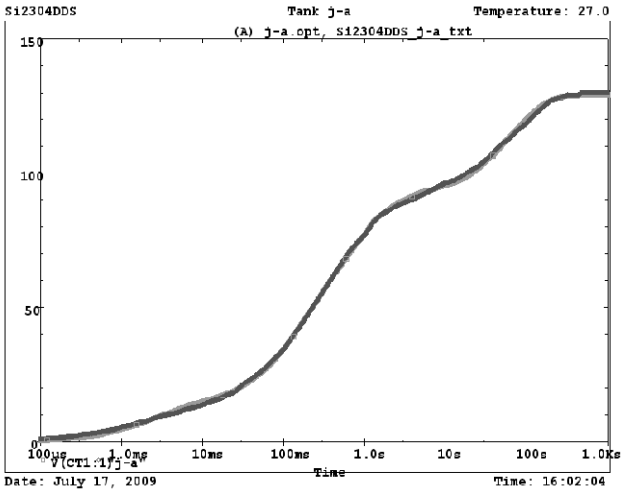
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

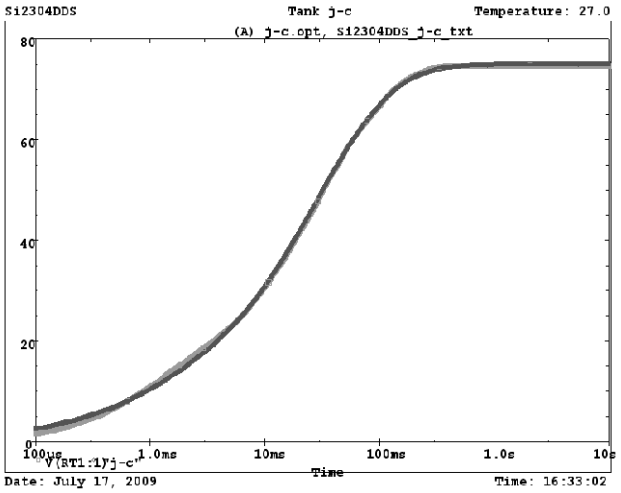
R-C THERMAL MODEL FOR FILTER CONFIGURATION

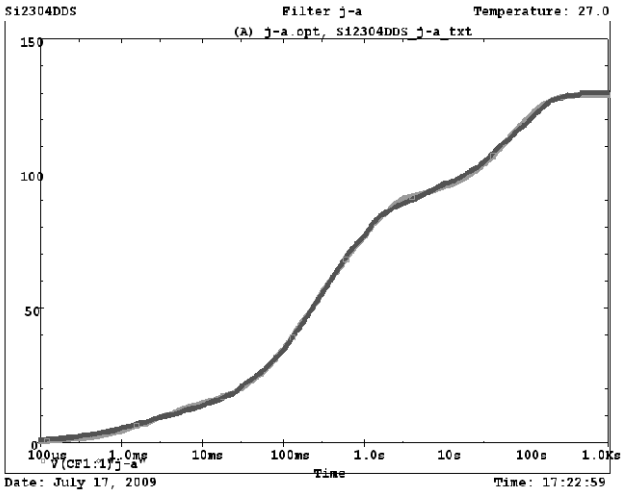


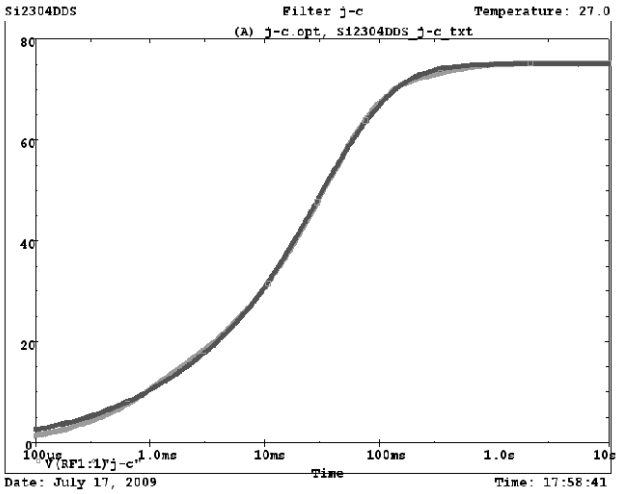
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.2793	16.4588	N/A
RF2	47.0412	30.2740	N/A
RF3	30.4936	23.6650	N/A
RF4	38.4116	4.7044	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	184.4415 u	60.6897 u	N/A
CF2	3.0973 m	363.2633 u	N/A
CF3	23.4614 m	943.2779 u	N/A
CF4	1.7535	51.2933 m	N/A

Note
N/A indicates not applicable


Si2304DDS
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si2304DDS_j-a_txt
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CT1:1)j-a
Time
Date: July 17, 2009
Time: 16:02:04


Si2304DDS
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si2304DDS_j-c_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RT1:1)j-c
Time
Date: July 17, 2009
Time: 16:33:02


Si2304DDS
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si2304DDS_j-a_txt
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CF1:1)j-a
Time
Date: July 17, 2009
Time: 17:22:59


Si2304DDS
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si2304DDS_j-c_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RF1:1)j-c
Time
Date: July 17, 2009
Time: 17:58:41