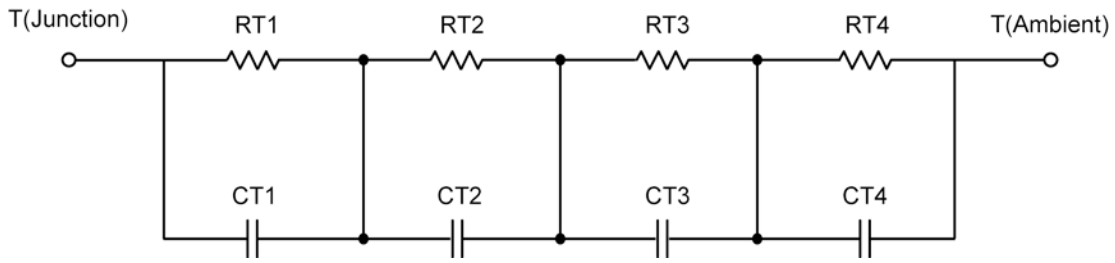
R-C Thermal Model Parameters

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."

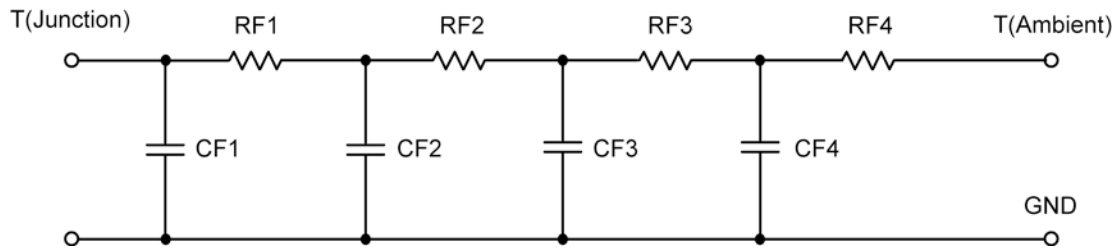
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	21.7093	N/A	12.5651
RT2	38.9649	N/A	3.6412
RT3	74.1761	N/A	28.1417
RT4	40.1497	N/A	33.6520
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	912.9326 u	N/A	2.3531 m
CT2	6.3002 m	N/A	115.1624 u
CT3	18.5836 m	N/A	8.5129 m
CT4	1.3989	N/A	24.8971 m

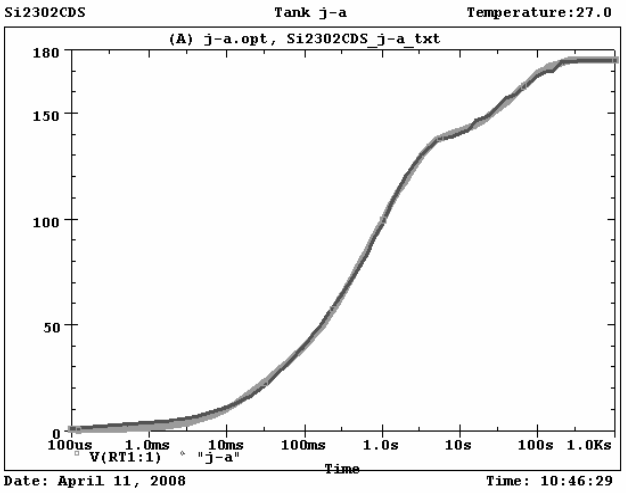
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

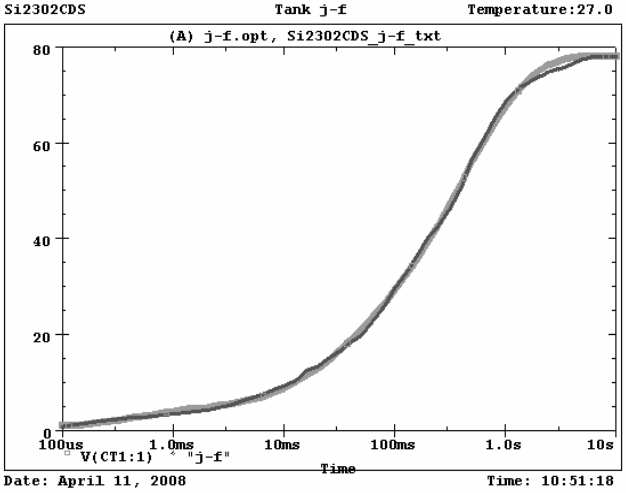
R-C THERMAL MODEL FOR FILTER CONFIGURATION

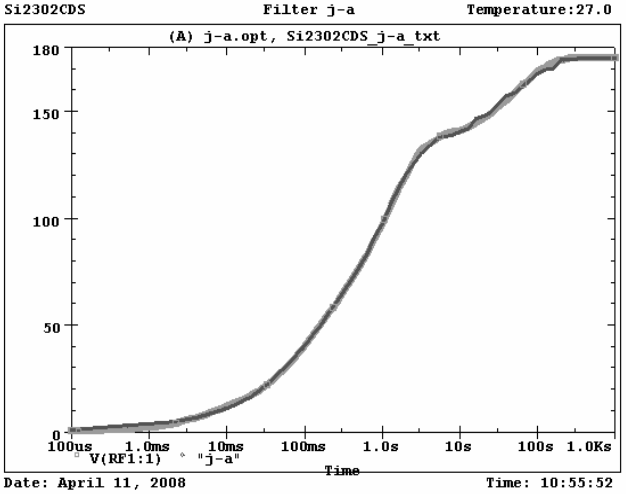


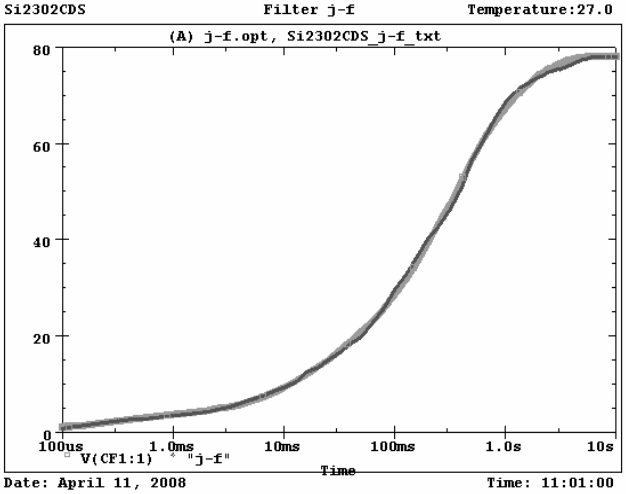
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.0369	N/A	3.4209
RF2	45.7533	N/A	16.7866
RF3	77.5694	N/A	43.1277
RF4	38.6404	N/A	14.6648
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	432.6249 u	N/A	88.0878 u
CF2	1.7423 m	N/A	1.2591 m
CF3	12.0840 m	N/A	4.8278 m
CF4	1.4185	N/A	62.2955 m

Note
NA indicates not applicable


Si2302CDS
Tank j-a
Temperature:27.0
(A) j-a.opt, Si2302CDS_j-a_txt
180
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: April 11, 2008
Time: 10:46:29


Si2302CDS
Tank j-f
Temperature:27.0
(A) j-f.opt, Si2302CDS_j-f_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"j-f"
Time
Date: April 11, 2008
Time: 10:51:18


Si2302CDS
Filter j-a
Temperature:27.0
(A) j-a.opt, Si2302CDS_j-a_txt
180
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: April 11, 2008
Time: 10:55:52


Si2302CDS
Filter j-f
Temperature:27.0
(A) j-f.opt, Si2302CDS_j-f_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date: April 11, 2008
Time: 11:01:00