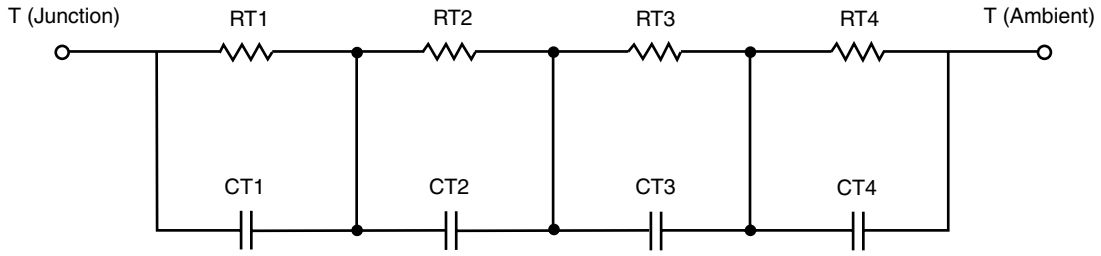
R-C Thermal Model Parameters

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

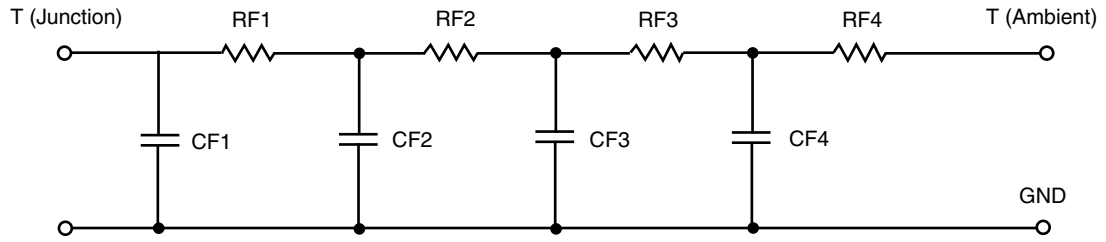


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.1054	N/A	10.3299
RT2	38.0982	N/A	19.4403
RT3	29.8754	N/A	11.8014
RT4	46.9210	N/A	18.3596
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	386.9239 u	N/A	294.9573 u
CT2	2.6608 m	N/A	1.8122 m
CT3	38.2375 m	N/A	28.4218 m
CT4	1.4114	N/A	3.2092 m

Note
N/A indicates not applicable

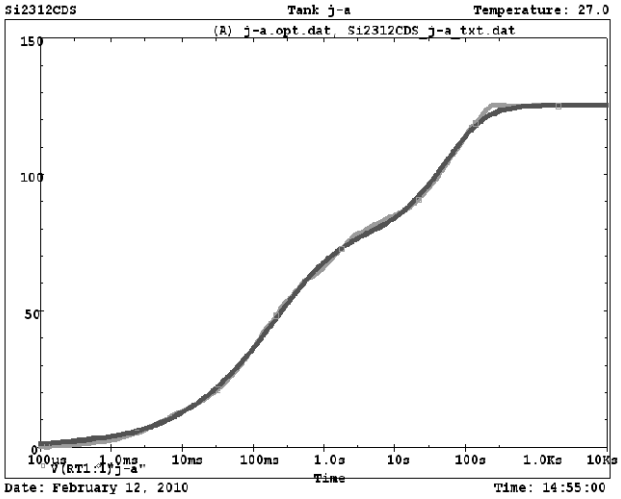
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

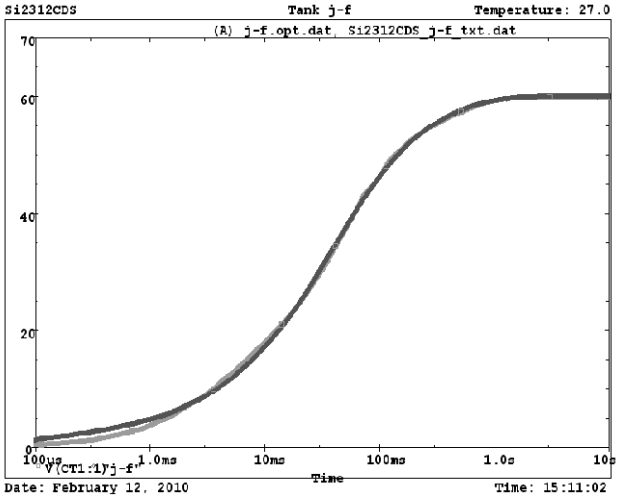
R-C THERMAL MODEL FOR FILTER CONFIGURATION

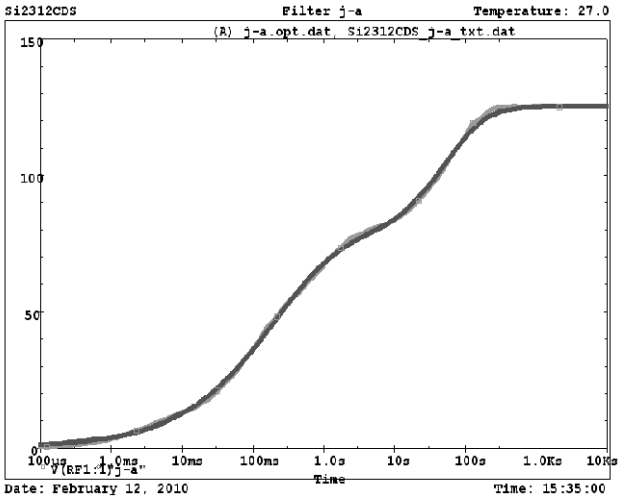


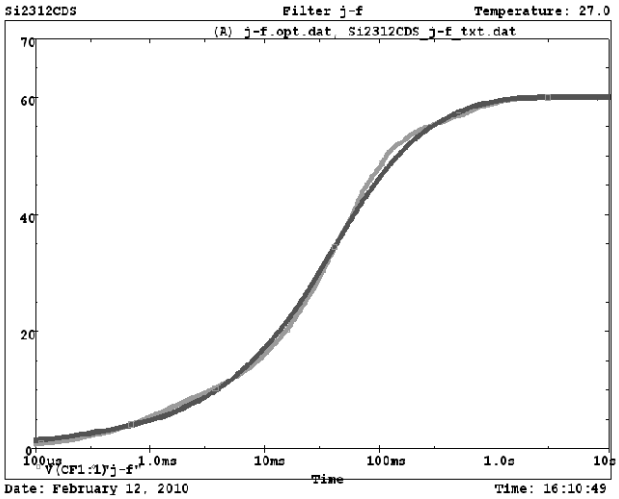
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	10.8015	N/A	8.8508
RF2	39.2641	N/A	43.7519
RF3	27.8933	N/A	1.0077
RF4	47.0411	N/A	6.3896
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	231.9415 u	N/A	125.1418 u
CF2	2.0111 m	N/A	873.7636 u
CF3	27.3468 m	N/A	53.7251 m
CF4	1.2854	N/A	6.5099 m

Note
N/A indicates not applicable


Si2312CDS
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si2312CDS_j-a_txt.dat
150
100
50
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
10Ks
V(RT1:1)j-a
Time
Date: February 12, 2010
Time: 14:55:00


Si2312CDS
Tank j-f
Temperature: 27.0
(A) j-f.opt.dat, Si2312CDS_j-f_txt.dat
70
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-f
Time
Date: February 12, 2010
Time: 15:11:02


Si2312CDS
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si2312CDS_j-a_txt.dat
150
100
50
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
10Ks
V(RF1:1)j-a
Time
Date: February 12, 2010
Time: 15:35:00


Si2312CDS
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, Si2312CDS_j-f_txt.dat
70
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: February 12, 2010
Time: 16:10:49