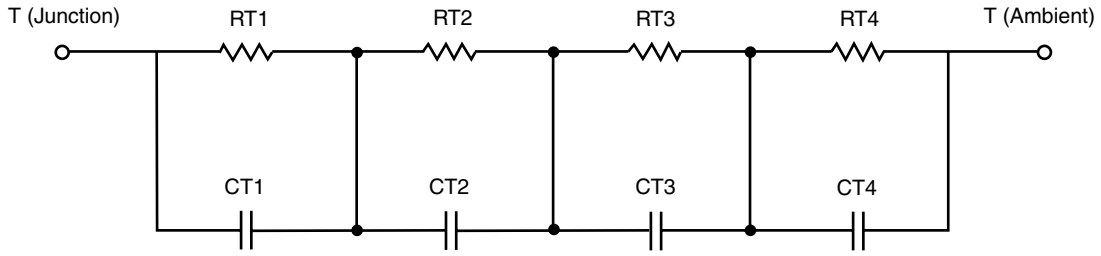
R-C Thermal Model Parameters

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

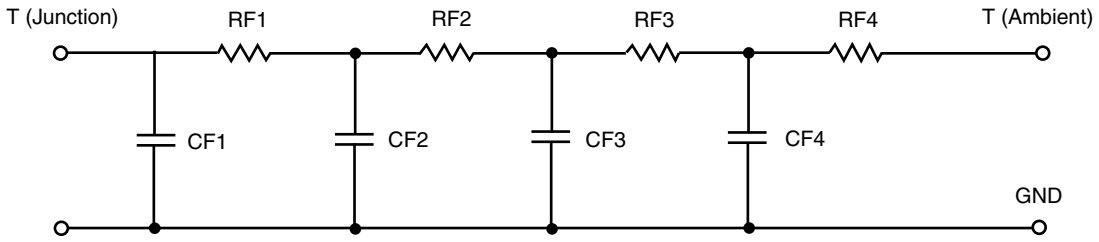


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	28.9817	4.4055	N/A
RT2	52.0866	2.7169	N/A
RT3	10.8995	3.4172	N/A
RT4	17.7502	5.4604	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.1241 m	6.3025 m	N/A
CT2	1.3819	441.5273 u	N/A
CT3	258.9245 u	63.1552 m	N/A
CT4	52.8242 m	4.9315 m	N/A

Note
N/A indicates not applicable

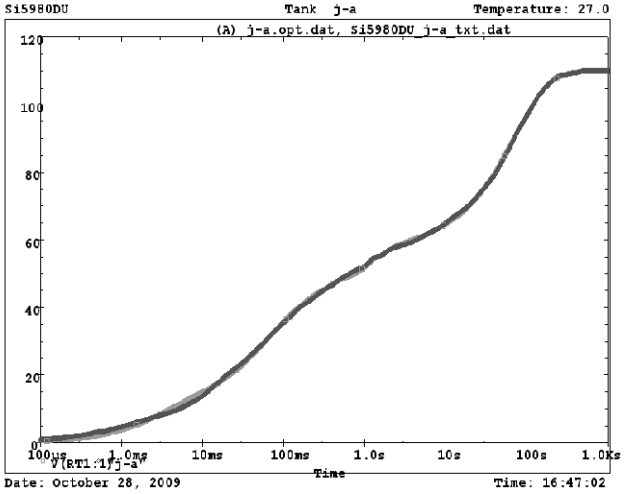
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

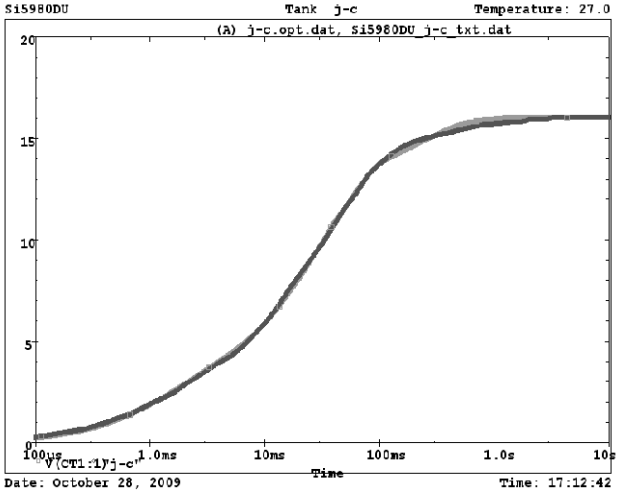
R-C THERMAL MODEL FOR FILTER CONFIGURATION

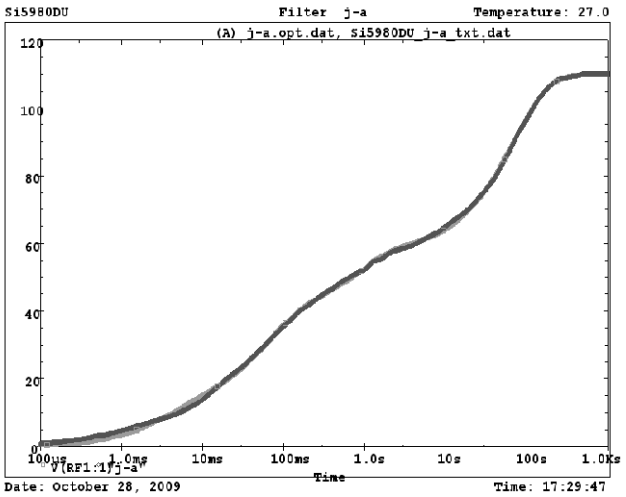


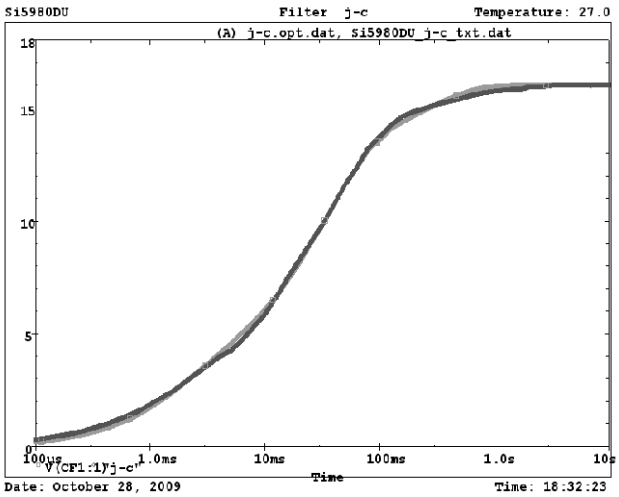
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	14.5430	4.2839	N/A
RF2	26.4966	5.8365	N/A
RF3	17.4869	3.6397	N/A
RF4	51.1585	2.2399	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	256.6734 u	450.1383 u	N/A
CF2	1.9346 m	2.5735 m	N/A
CF3	42.4295 m	1.6550 m	N/A
CF4	1.3487	103.5449 m	N/A

Note
N/A indicates not applicable


Si5980DU
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si5980DU_j-a_txt.dat
120
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: October 28, 2009
Time: 16:47:02


Si5980DU
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si5980DU_j-c_txt.dat
20
15
10
5
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: October 28, 2009
Time: 17:12:42


Si5980DU
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si5980DU_j-a_txt.dat
120
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: October 28, 2009
Time: 17:29:47


Si5980DU
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si5980DU_j-c_txt.dat
18
15
10
5
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: October 28, 2009
Time: 18:32:23