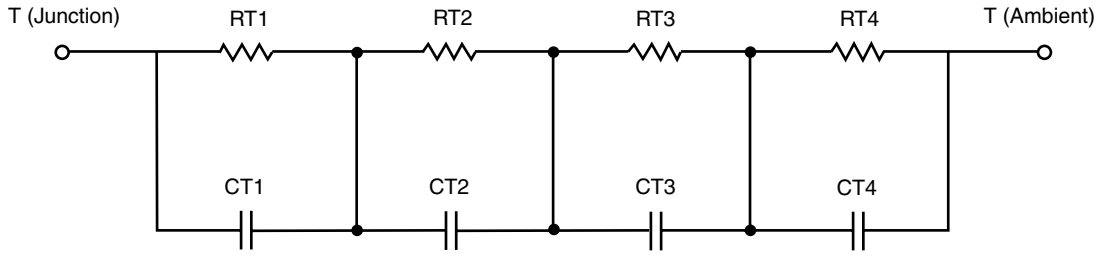
R-C Thermal Model Parameters

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

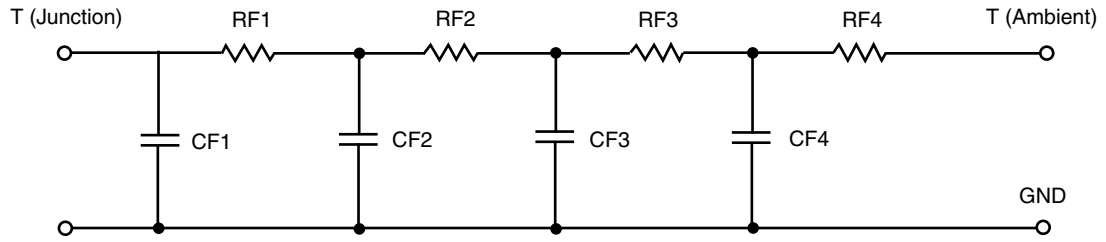


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	18.0231	2.4038	N/A
RT2	42.4108	2.8573	N/A
RT3	6.4198	1.6285	N/A
RT4	14.1463	3.1168	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	18.2195 m	23.6014 m	N/A
CT2	2.2633	122.1793 u	N/A
CT3	653.8279 u	5.3551 m	N/A
CT4	429.5822 m	4.2952 m	N/A

Note
N/A indicates not applicable

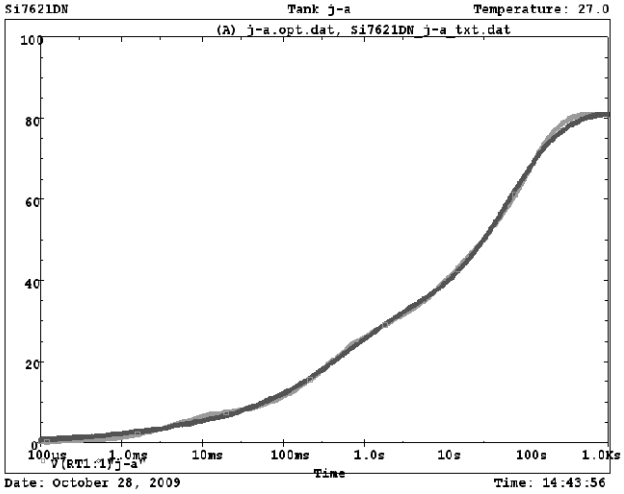
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

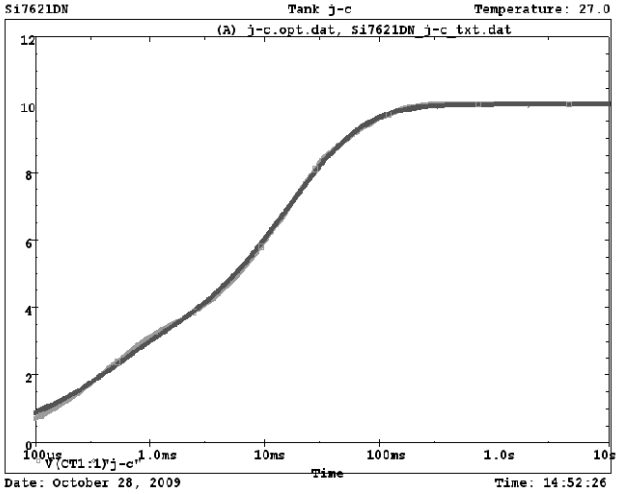
R-C THERMAL MODEL FOR FILTER CONFIGURATION

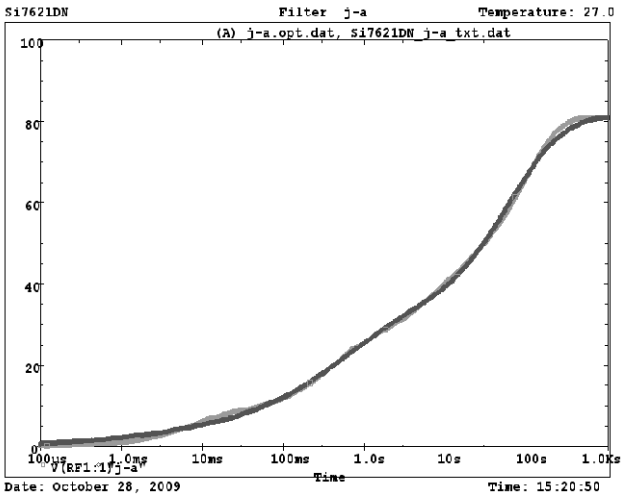


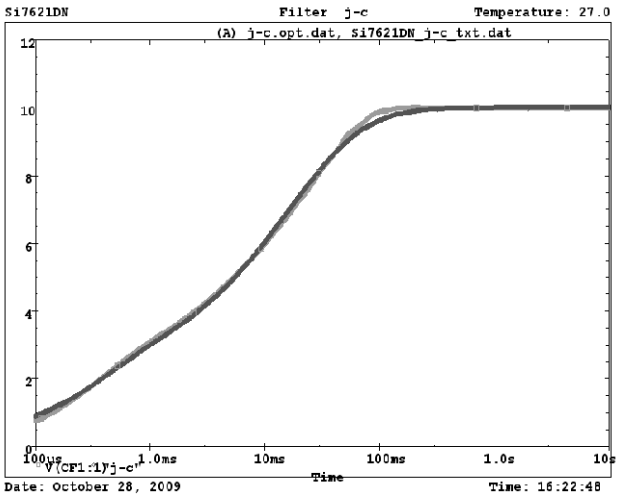
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.2717	2.9706	N/A
RF2	17.6524	2.4836	N/A
RF3	17.0539	1.6679	N/A
RF4	38.0220	2.8770	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	890.0818 u	111.7768 u	N/A
CF2	19.7312 m	1.2551 m	N/A
CF3	314.7588 m	3.0123 m	N/A
CF4	2.1186	3.0853 m	N/A

Note
N/A indicates not applicable


Si7621DN
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7621DN_j-a_txt.dat
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: 14:43:56


Si7621DN
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7621DN_j-c_txt.dat
12
10
8
6
4
2
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: October 28, 2009
Time: 14:52:26


Si7621DN
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7621DN_j-a_txt.dat
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: 15:20:50


Si7621DN
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7621DN_j-c_txt.dat
12
10
8
6
4
2
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: October 28, 2009
Time: 16:22:48