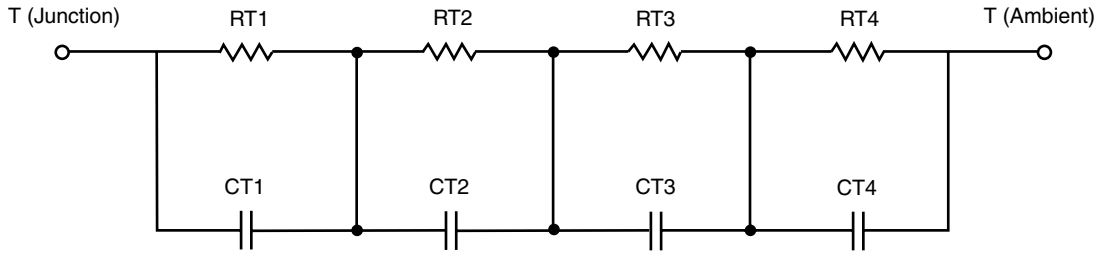
R-C Thermal Model Parameters

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

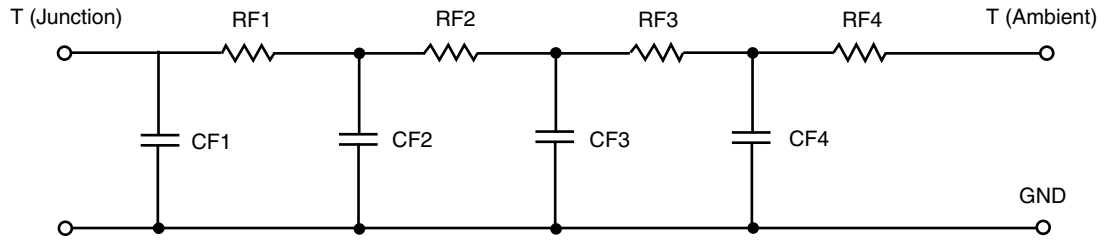


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.2525	319.9238 m	N/A
RT2	7.7612	241.9738 m	N/A
RT3	12.2156	872.5269 m	N/A
RT4	56.7707	960.4094 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	6.7215 m	1.3940 m	N/A
CT2	30.3603 m	4.0031 m	N/A
CT3	114.6204 m	9.7853 m	N/A
CT4	1.2151	19.3069 m	N/A

Note
N/A indicates not applicable

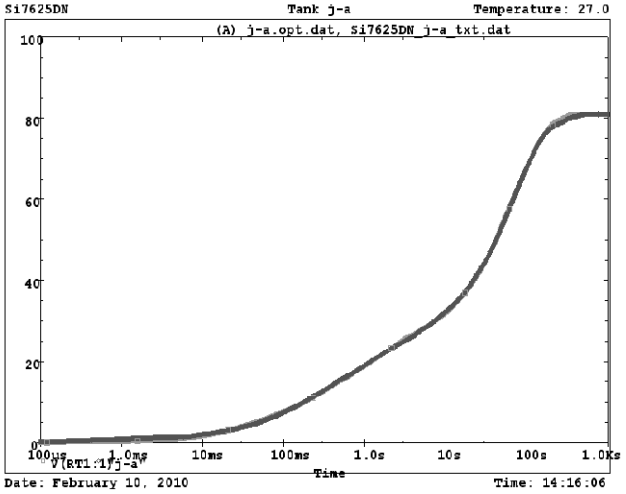
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

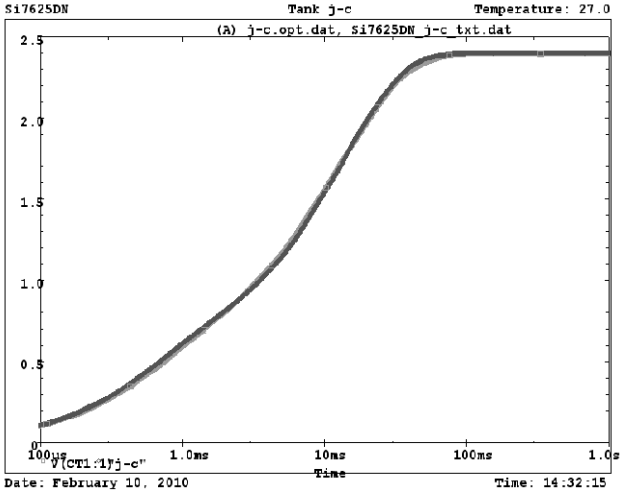
R-C THERMAL MODEL FOR FILTER CONFIGURATION

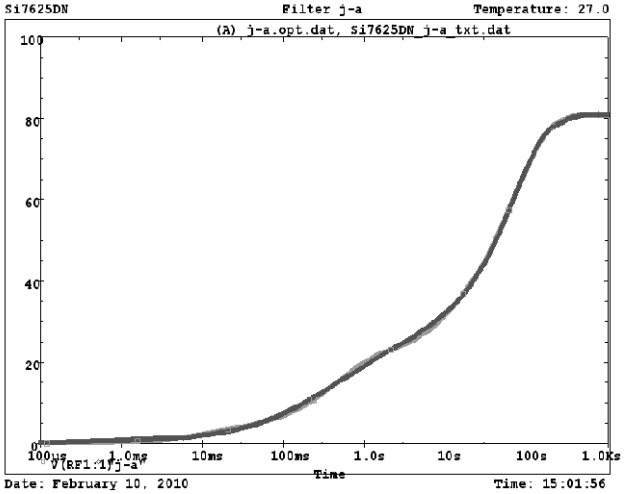


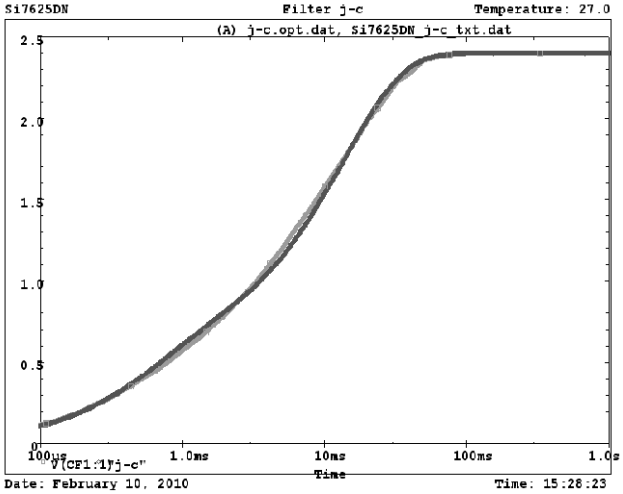
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.9974	528.7994 m	N/A
RF2	17.5082	894.2351 m	N/A
RF3	24.1055	932.3065 m	N/A
RF4	35.1555	44.6590 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.8914 m	783.4118 u	N/A
CF2	21.4805 m	3.0132 m	N/A
CF3	695.5057 m	10.2202 m	N/A
CF4	1.1031	1.3046 m	N/A

Note
N/A indicates not applicable


Si7625DN
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7625DN_j-a_txt.dat
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: February 10, 2010
Time: 14:16:06


Si7625DN
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7625DN_j-c_txt.dat
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c"
Time
Date: February 10, 2010
Time: 14:32:15


Si7625DN
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7625DN_j-a_txt.dat
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: February 10, 2010
Time: 15:01:56


Si7625DN
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7625DN_j-c_txt.dat
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c"
Time
Date: February 10, 2010
Time: 15:28:23