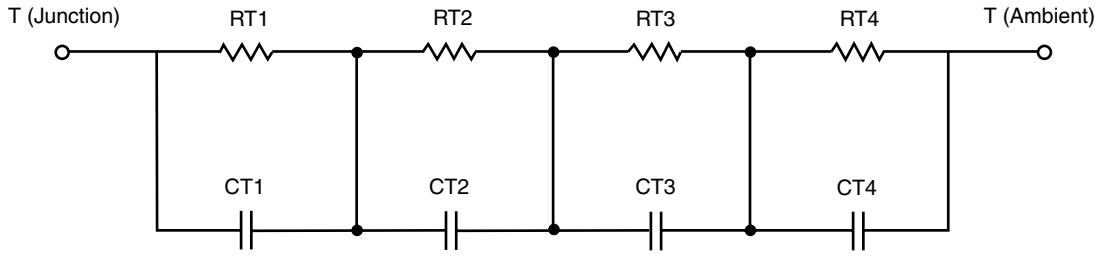
R-C Thermal Model Parameters

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

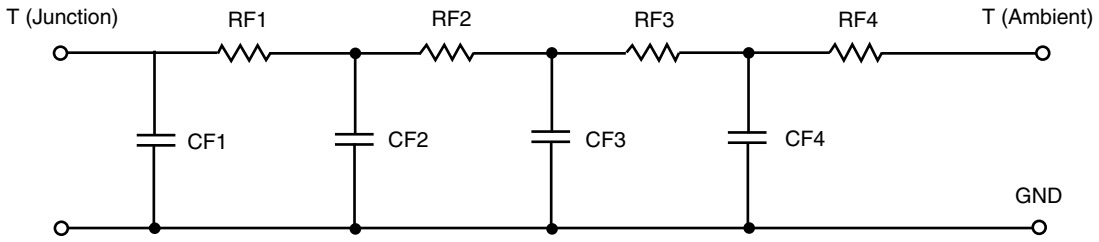


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.5567	447.1352 m	N/A
RT2	3.0658	312.3937 m	N/A
RT3	11.9177	820.7353 m	N/A
RT4	55.0960	822.6814 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	21.5735 m	4.7671 m	N/A
CT2	3.8756 m	788.2331 u	N/A
CT3	172.6386 m	17.6755 m	N/A
CT4	1.2877	18.6510 m	N/A

Note
N/A indicates not applicable

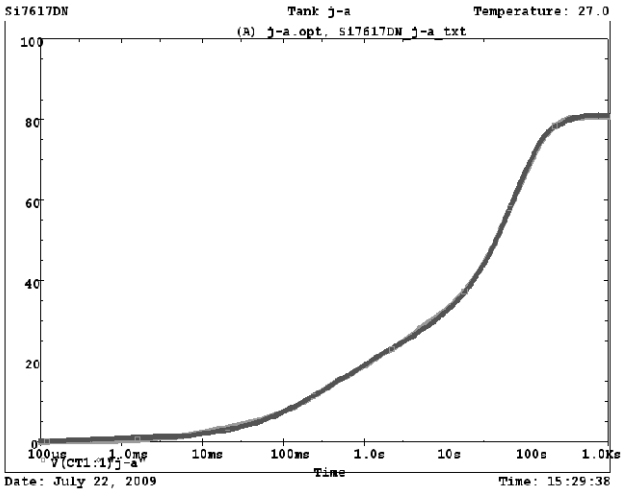
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

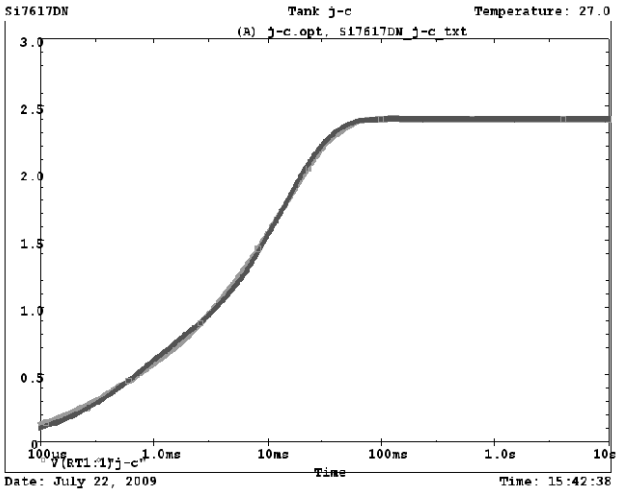
R-C THERMAL MODEL FOR FILTER CONFIGURATION

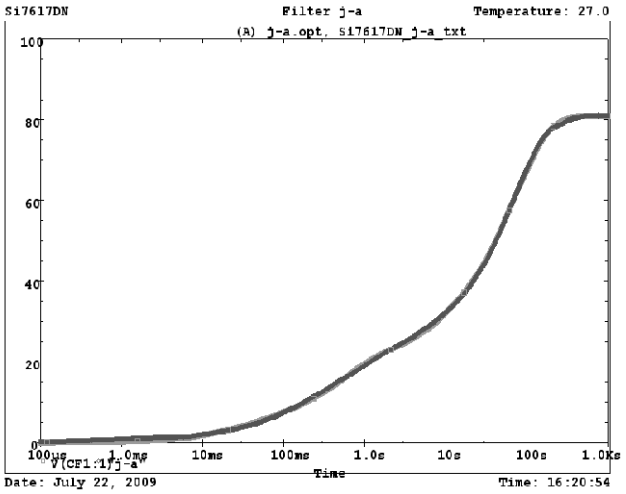


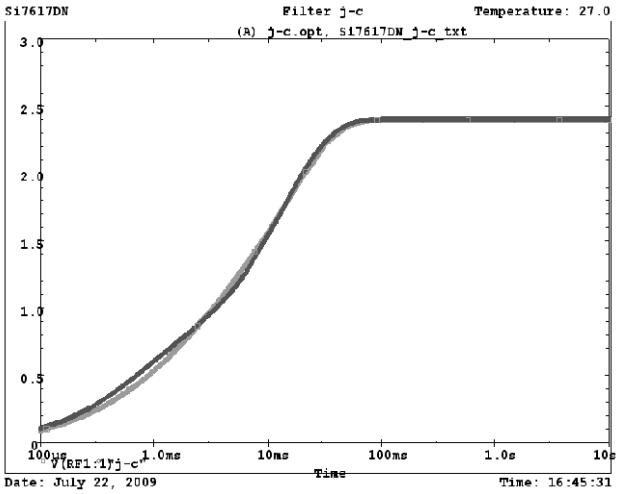
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.5445	458.8221 m	N/A
RF2	15.0925	406.9025 m	N/A
RF3	17.1421	453.9205 m	N/A
RF4	42.2209	1.0756	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.8040 m	934.8209 u	N/A
CF2	28.0473 m	1.4303 m	N/A
CF3	581.5215 m	1.8558 m	N/A
CF4	988.1870 m	8.4769 m	N/A

Note
N/A indicates not applicable


Si7617DN
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7617DN_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CT1:1)j-a
Time
Date: July 22, 2009
Time: 15:29:38


Si7617DN
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si7617DN_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RT1:1)j-c
Time
Date: July 22, 2009
Time: 15:42:38


Si7617DN
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7617DN_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CF1:1)j-a
Time
Date: July 22, 2009
Time: 16:20:54


Si7617DN
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7617DN_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RF1:1)j-c
Time
Date: July 22, 2009
Time: 16:45:31