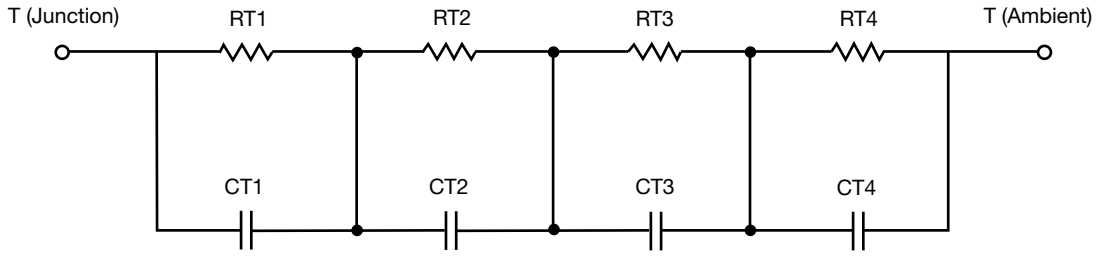
R-C Thermal Model Parameters

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

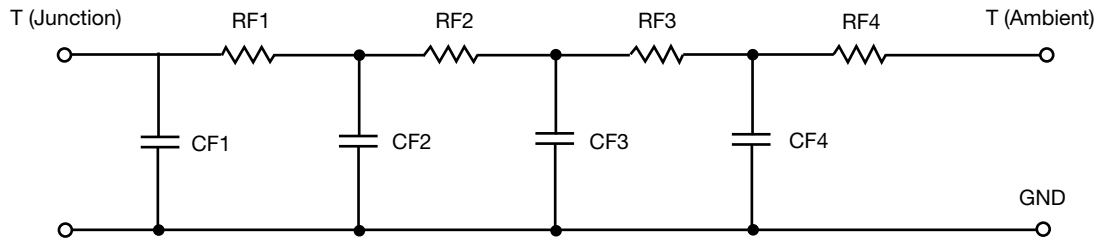


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.9757	1.5933	N/A
RT2	5.0249	1.2240	N/A
RT3	15.9350	2.2225	N/A
RT4	46.7104	1.4591	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	109.2303m	944.8479u	N/A
CT2	404.9592u	242.3365u	N/A
CT3	5.8413m	1.6698m	N/A
CT4	1.5057	2.3934m	N/A

Note
N/A indicates not applicable

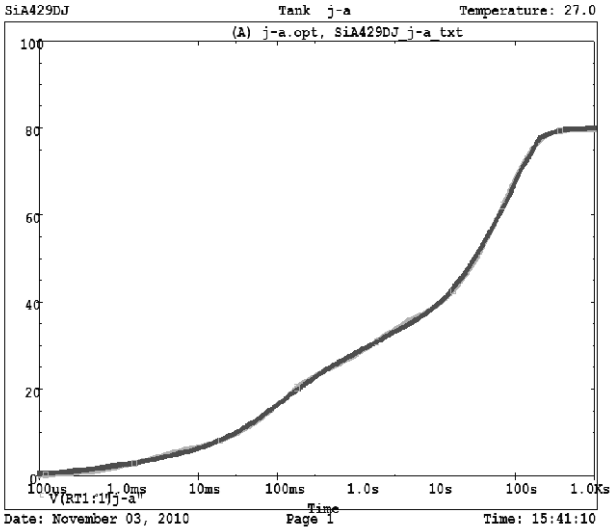
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

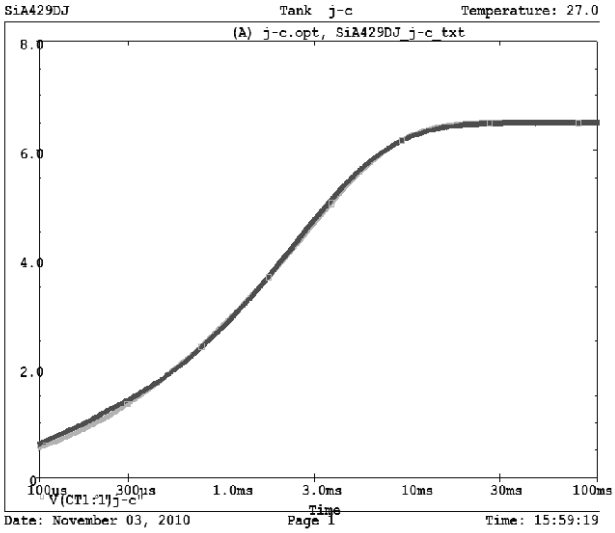
R-C THERMAL MODEL FOR FILTER CONFIGURATION

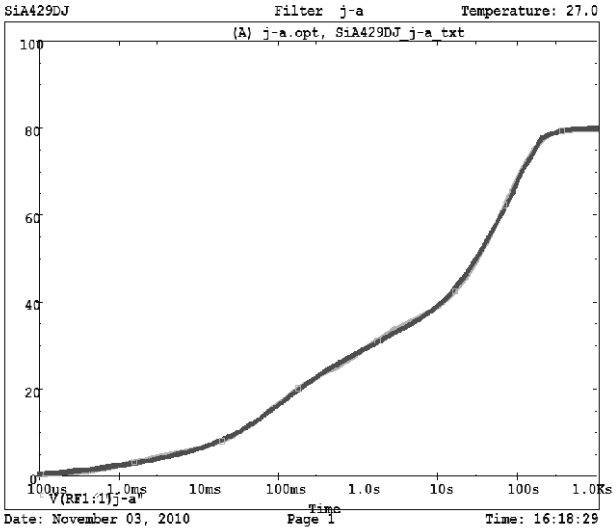


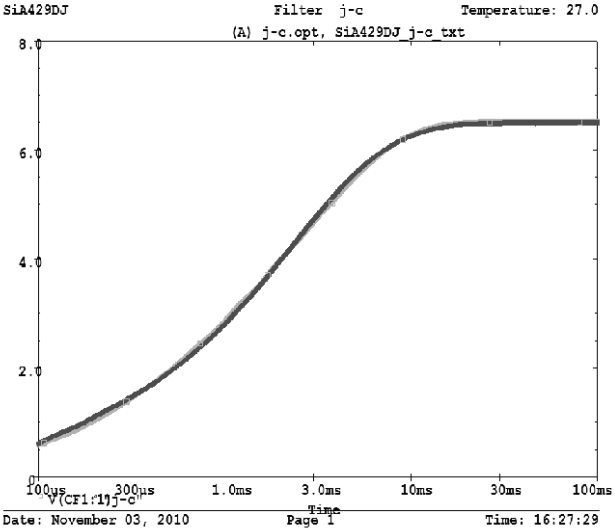
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.9426	2.2106	N/A
RF2	16.3998	2.3846	N/A
RF3	12.8549	583.2911m	N/A
RF4	45.4105	1.3363	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	292.2982u	147.9761u	N/A
CF2	4.4322m	323.3928u	N/A
CF3	80.4584m	826.6535u	N/A
CF4	1.4385	495.9343u	N/A

Note
N/A indicates not applicable


SiA429DJ
Tank j-a
Temperature: 27.0
(A) j-a.opt, SiA429DJ_j-a_txt
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: November 03, 2010
Page 1
Time: 15:41:10


SiA429DJ
Tank j-c
Temperature: 27.0
(A) j-c.opt, SiA429DJ_j-c_txt
8.0
6.0
4.0
2.0
0
100µs
300µs
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)j-c
Time
Date: November 03, 2010
Page 1
Time: 15:59:19


SiA429DJ
Filter j-a
Temperature: 27.0
(A) j-a.opt, SiA429DJ_j-a_txt
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: November 03, 2010
Page 1
Time: 16:18:29


SiA429DJ
Filter j-c
Temperature: 27.0
(A) j-c.opt, SiA429DJ_j-c_txt
8.0
6.0
4.0
2.0
0
100µs
300µs
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)j-c
Time
Date: November 03, 2010
Page 1
Time: 16:27:29