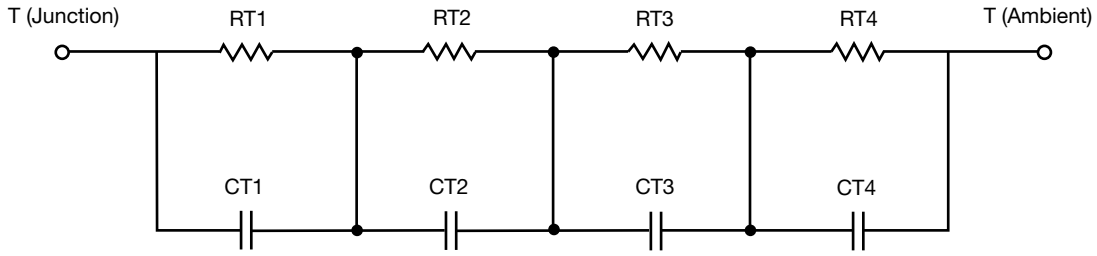
R-C Thermal Model Parameters

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

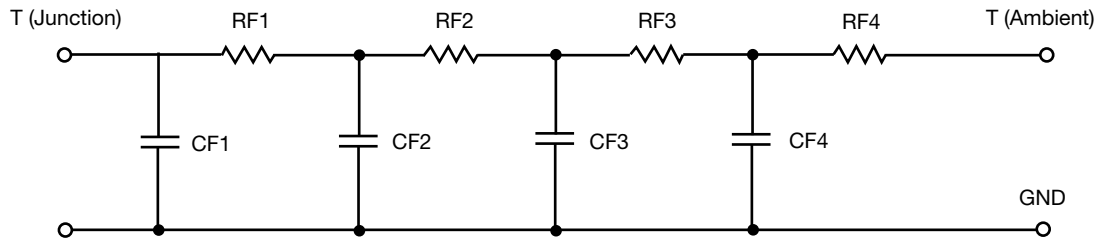


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	9.0993	1.6649	N/A
RT2	11.2693	1.4466	N/A
RT3	17.1948	3.1099	N/A
RT4	42.4366	1.9069	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	252.4424u	124.2532u	N/A
CT2	375.2537m	844.1844u	N/A
CT3	8.9592m	1.7439m	N/A
CT4	2.0618	1.1919m	N/A

Note
N/A indicates not applicable

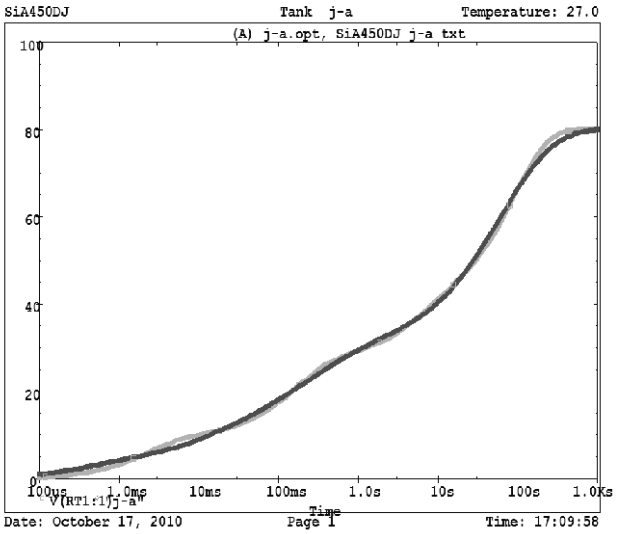
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

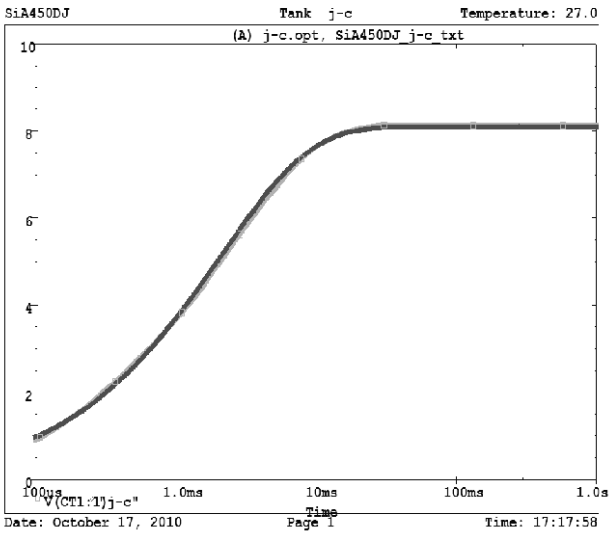
R-C THERMAL MODEL FOR FILTER CONFIGURATION

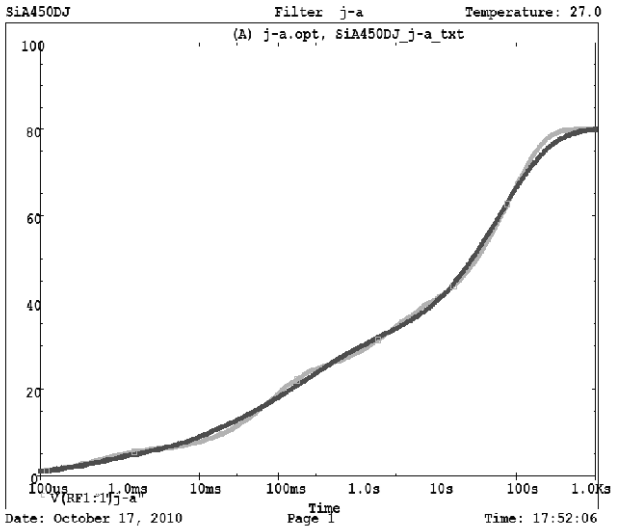


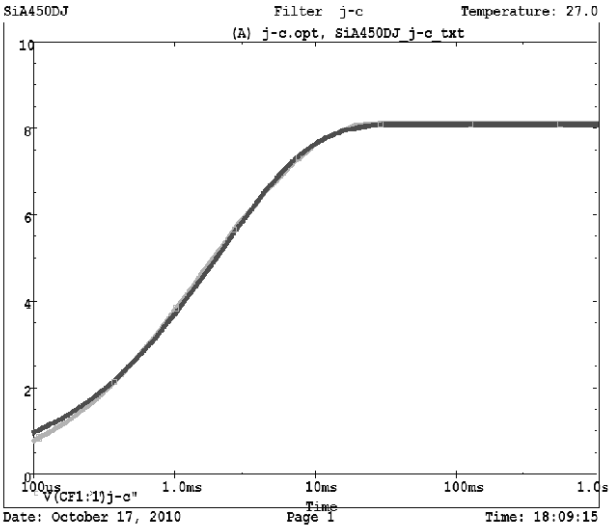
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.7692	2.7648	N/A
RF2	18.3361	2.9681	N/A
RF3	14.3636	2.0929	N/A
RF4	41.5311	277.5440m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	91.9999u	110.1720u	N/A
CF2	4.0841m	211.3046u	N/A
CF3	156.9107m	1.4369m	N/A
CF4	1.8115	5.6854m	N/A

Note
N/A indicates not applicable


SiA450DJ
Tank j-a
Temperature: 27.0
(A) j-a.opt, SiA450DJ_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a"
Time
Date: October 17, 2010
Page 1
Time: 17:09:58


SiA450DJ
Tank j-c
Temperature: 27.0
(A) j-c.opt, SiA450DJ_j-c_txt
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c"
Time
Date: October 17, 2010
Page 1
Time: 17:17:58


SiA450DJ
Filter j-a
Temperature: 27.0
(A) j-a.opt, SiA450DJ_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a"
Time
Date: October 17, 2010
Page 1
Time: 17:52:06


SiA450DJ
Filter j-c
Temperature: 27.0
(A) j-c.opt, SiA450DJ_j-c_txt
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c"
Time
Date: October 17, 2010
Page 1
Time: 18:09:15