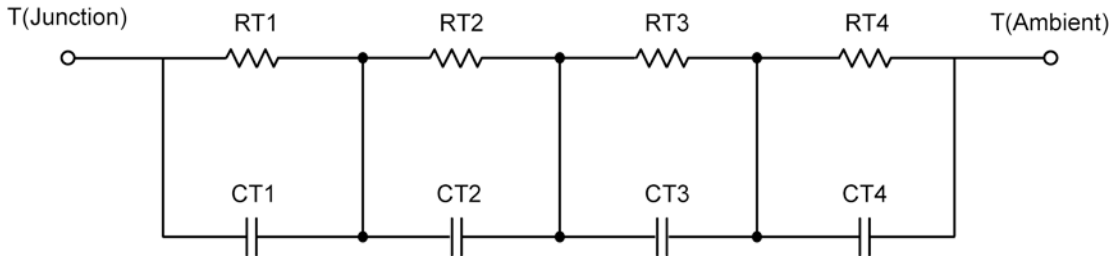
R-C Thermal Model Parameters

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."

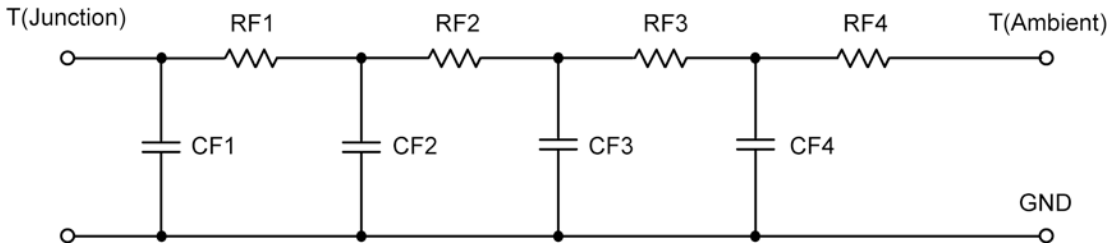
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.7828	2.4018	N/A
RT2	34.1395	6.8064	N/A
RT3	10.2674	468.2439 m	N/A
RT4	41.8103	1.4250	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	266.3948 u	68.0774 u	N/A
CT2	1.1738 m	397.5839 u	N/A
CT3	123.6454 m	111.1075 m	N/A
CT4	1.2506	1.6817 m	N/A

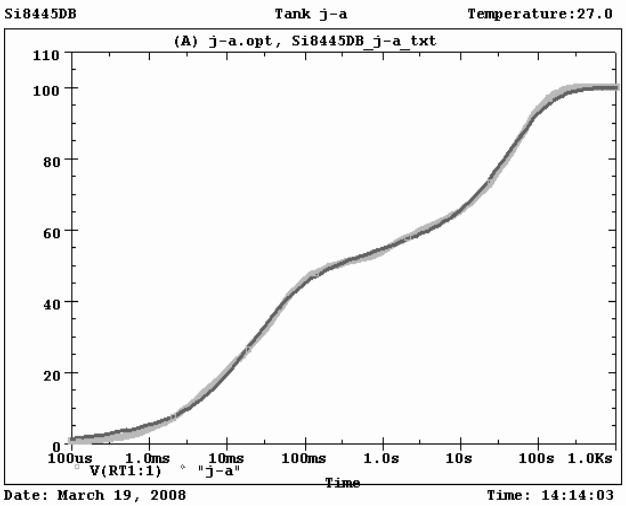
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

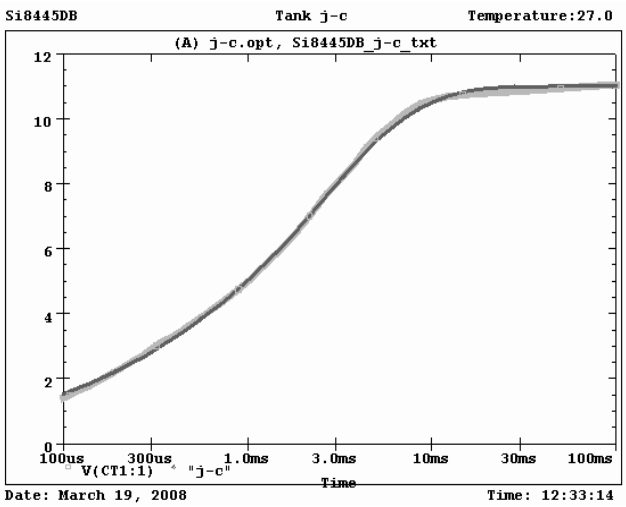
R-C THERMAL MODEL FOR FILTER CONFIGURATION

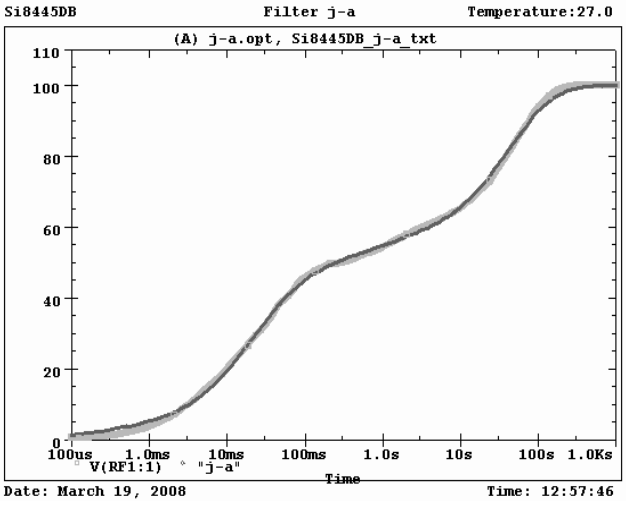


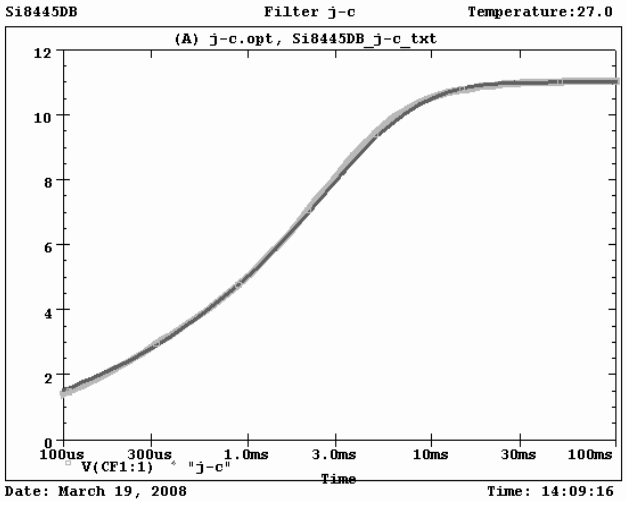
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	21.3540	3.2599	N/A
RF2	26.9020	7.0261	N/A
RF3	11.5156	487.5123 m	N/A
RF4	40.2284	226.4877 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	232.6465 u	55.6486 u	N/A
CF2	1.1494 m	261.4637 u	N/A
CF3	98.9079 m	10.6946 m	N/A
CF4	1.1750	802.5108 u	N/A

Note: NA indicates not applicable


Si8445DB
Tank j-a
Temperature:27.0
(A) j-a.opt, Si8445DB_j-a_txt
110
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: March 19, 2008
Time: 14:14:03


Si8445DB
Tank j-c
Temperature:27.0
(A) j-c.opt, Si8445DB_j-c_txt
12
10
8
6
4
2
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)
"j-c"
Time
Date: March 19, 2008
Time: 12:33:14


Si8445DB
Filter j-a
Temperature:27.0
(A) j-a.opt, Si8445DB_j-a_txt
110
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: March 19, 2008
Time: 12:57:46


Si8445DB
Filter j-c
Temperature:27.0
(A) j-c.opt, Si8445DB_j-c_txt
12
10
8
6
4
2
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)
"j-c"
Time
Date: March 19, 2008
Time: 14:09:16