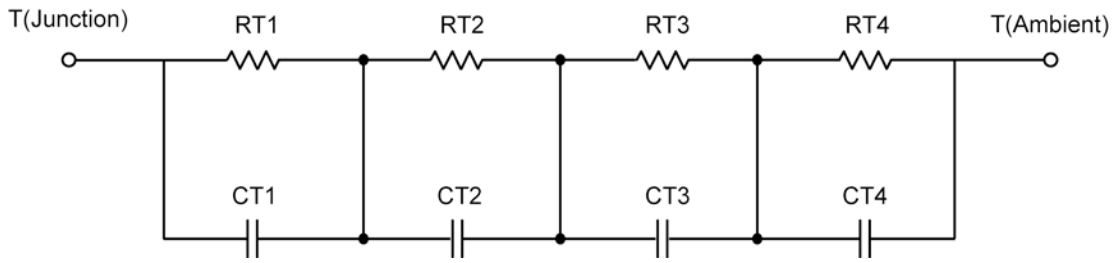
R-C Thermal Model Parameters

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."

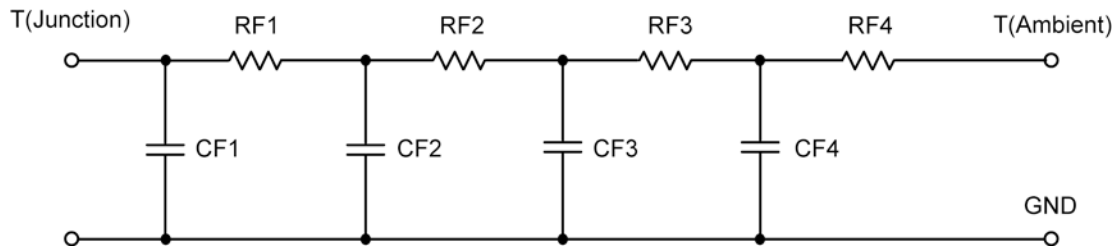
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	2.2188	N/A	5.6185
RT2	9.3874	N/A	1.5458
RT3	25.1681	N/A	4.1159
RT4	48.2257	N/A	13.7198
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.3101 m	N/A	15.1421 m
CT2	22.2166 m	N/A	477.7940 u
CT3	69.8983 m	N/A	7.4209 m
CT4	1.3194	N/A	82.8661 m

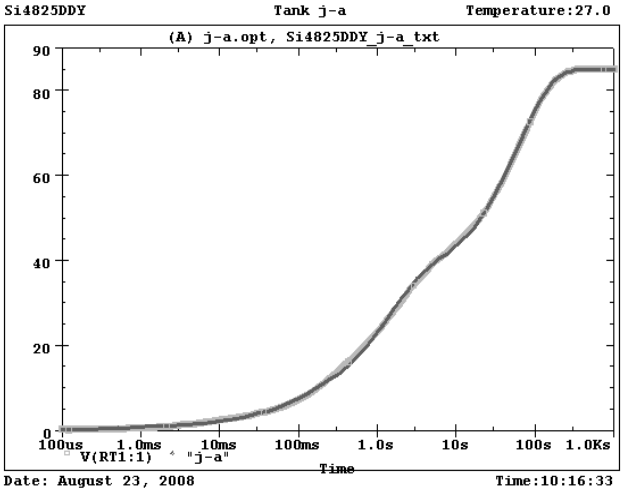
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

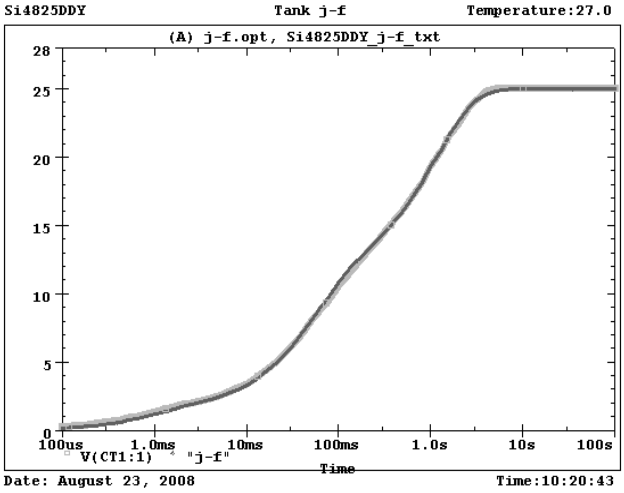
R-C THERMAL MODEL FOR FILTER CONFIGURATION

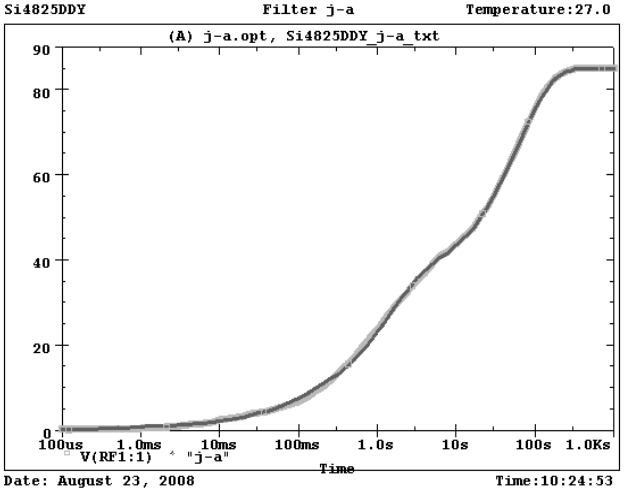


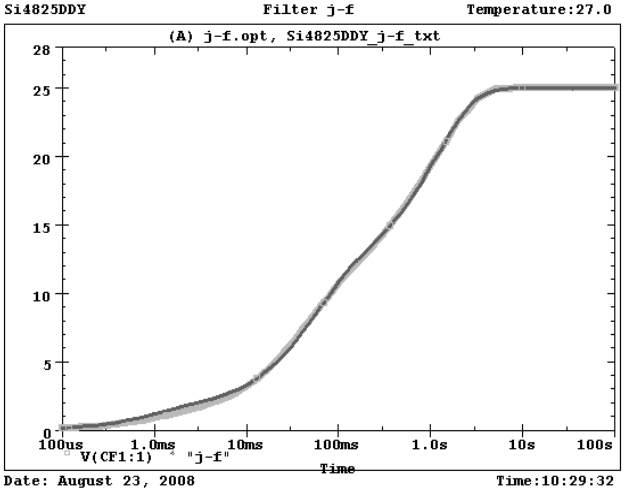
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.6502	N/A	1.5543
RF2	21.5633	N/A	9.0942
RF3	14.5451	N/A	5.8468
RF4	45.2414	N/A	8.5047
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.7949 m	N/A	787.7637 u
CF2	20.7899 m	N/A	3.4318 m
CF3	99.3450 m	N/A	37.5073 m
CF4	1.2184	N/A	83.8493 m

Note
NA indicates not applicable


Si4825DDY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4825DDY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: August 23, 2008
Time:10:16:33


Si4825DDY
Tank j-f
Temperature:27.0
(A) j-f.opt, Si4825DDY_j-f_txt
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)
"j-f"
Time
Date: August 23, 2008
Time:10:20:43


Si4825DDY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4825DDY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: August 23, 2008
Time:10:24:53


Si4825DDY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4825DDY_j-f_txt
28
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date: August 23, 2008
Time:10:29:32