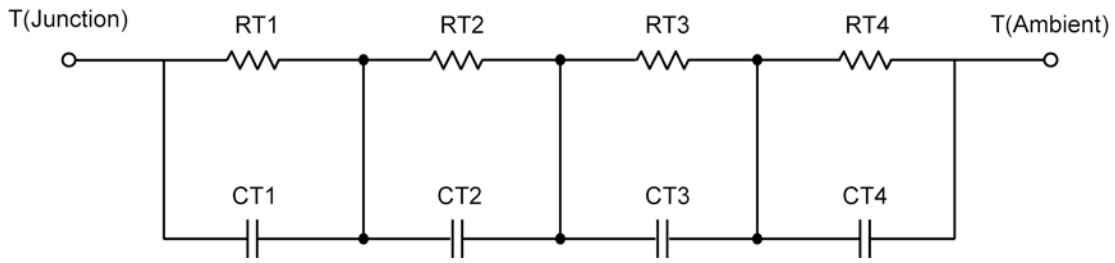
R-C Thermal Model Parameters

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."

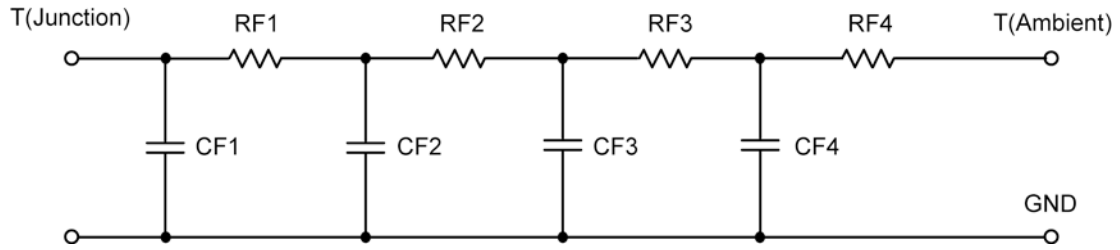
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.2250	1.3798	N/A
RT2	16.7287	819.4812 m	N/A
RT3	12.6248	1.4520	N/A
RT4	36.4215	548.7188 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	800.0279 u	12.5323 m	N/A
CT2	754.7866 m	283.5006 u	N/A
CT3	44.6836 m	5.1422 m	N/A
CT4	2.9215	6.1922 m	N/A

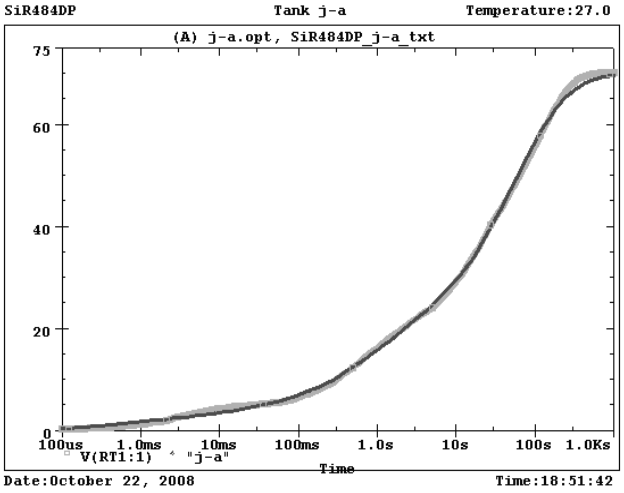
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

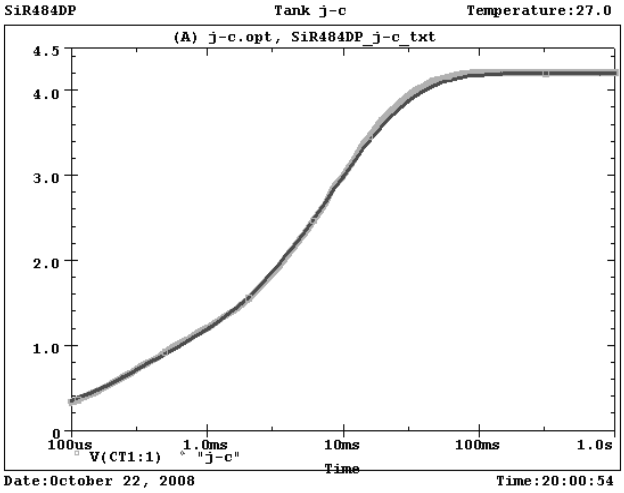
R-C THERMAL MODEL FOR FILTER CONFIGURATION

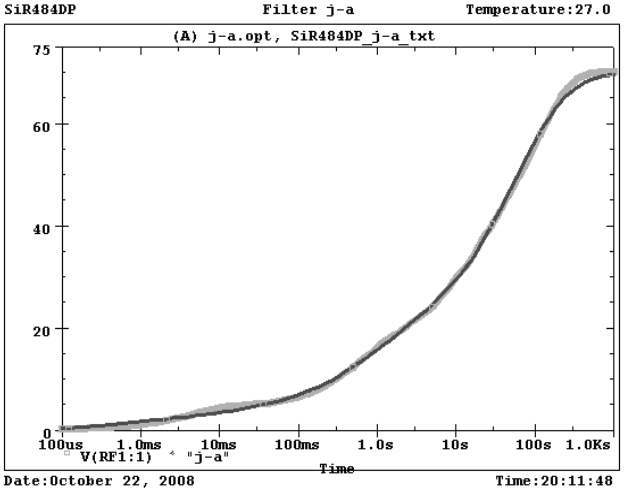


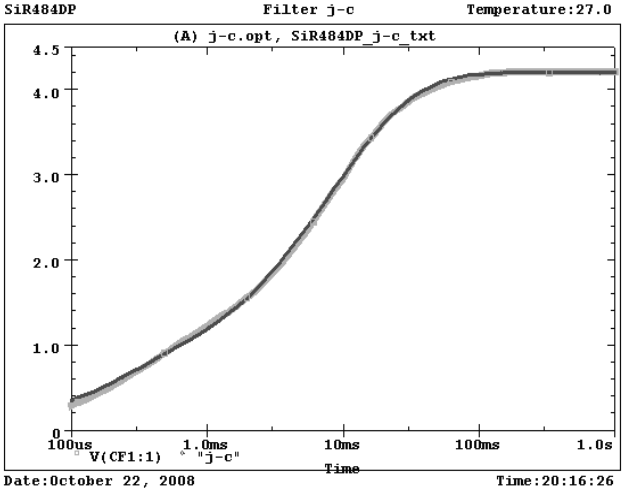
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.4913	1.1452	N/A
RF2	13.8995	2.5536	N/A
RF3	22.3017	339.5355 m	N/A
RF4	29.3075	161.6645 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	821.5487 u	292.5995 u	N/A
CF2	41.2282 m	2.6100 m	N/A
CF3	527.0164 m	44.5830 m	N/A
CF4	2.9283	98.1116 m	N/A

Note
NA indicates not applicable


SiR484DP
Tank j-a
Temperature:27.0
(A) j-a.opt, SiR484DP_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:October 22, 2008
Time:18:51:42


SiR484DP
Tank j-c
Temperature:27.0
(A) j-c.opt, SiR484DP_j-c_txt
4.5
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:October 22, 2008
Time:20:00:54


SiR484DP
Filter j-a
Temperature:27.0
(A) j-a.opt, SiR484DP_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:October 22, 2008
Time:20:11:48


SiR484DP
Filter j-c
Temperature:27.0
(A) j-c.opt, SiR484DP_j-c_txt
4.5
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:October 22, 2008
Time:20:16:26