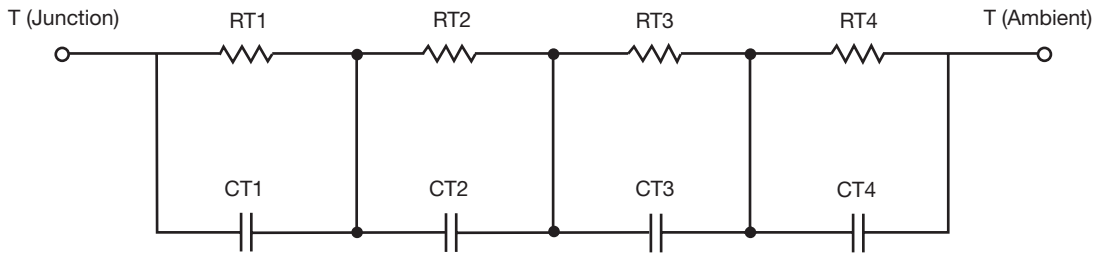
R-C Thermal Model Parameters

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

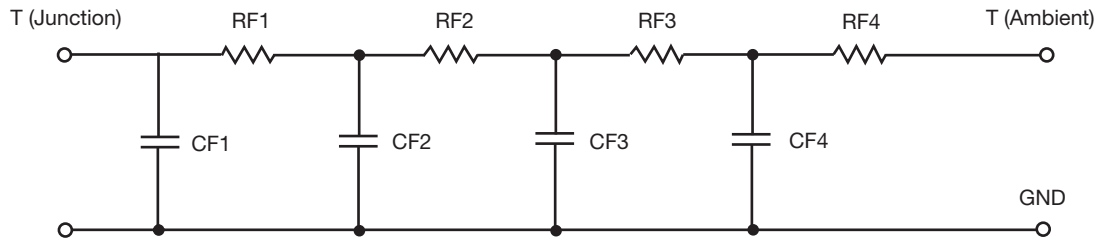


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.6138	363.4275m	N/A
RT2	19.7281	964.6343m	N/A
RT3	3.2300	858.9385m	N/A
RT4	36.7003	412.9629m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	104.9934m	5.5893m	N/A
CT2	1.3457	14.7885m	N/A
CT3	13.9713m	16.9450m	N/A
CT4	2.6431	1.0542m	N/A

Note
N/A indicates not applicable

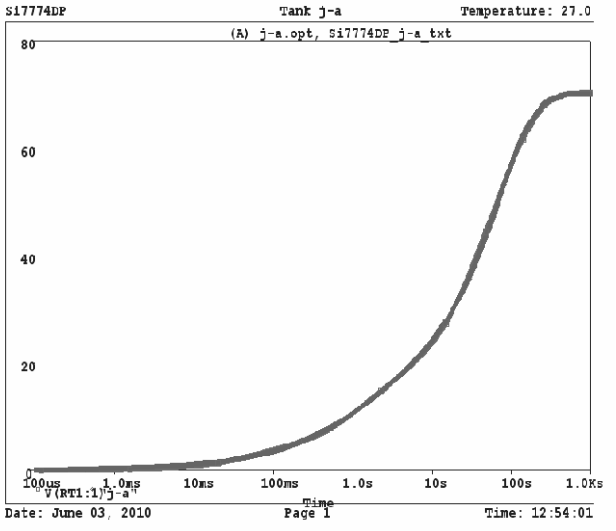
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

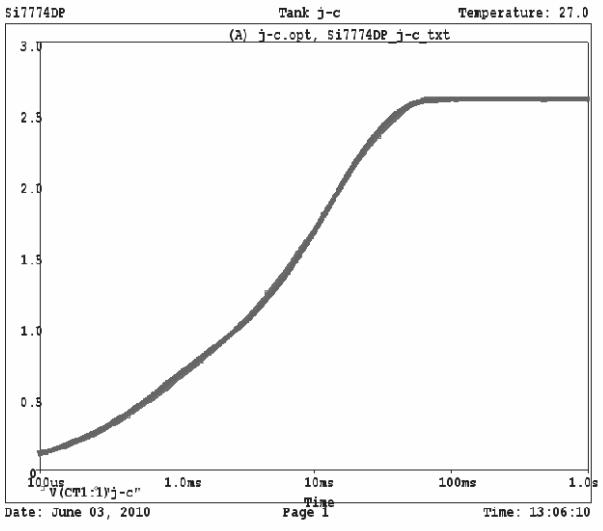
R-C THERMAL MODEL FOR FILTER CONFIGURATION

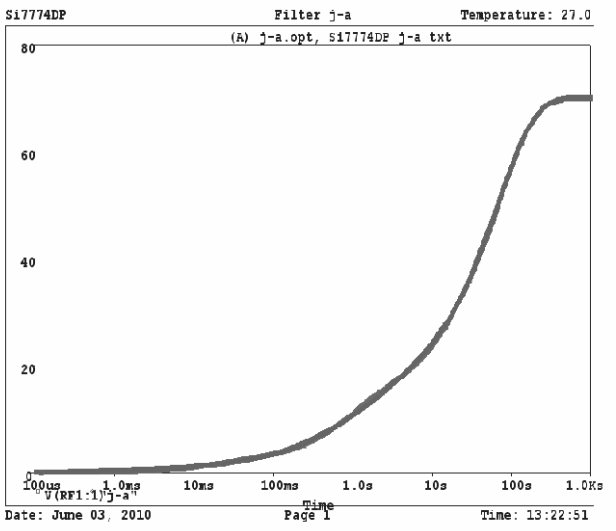


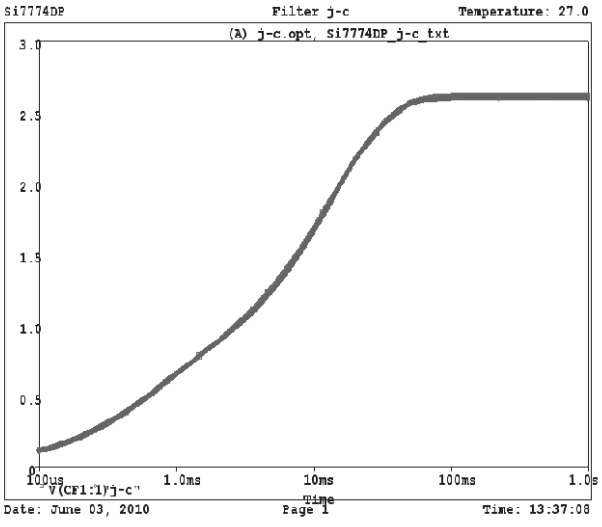
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.5379	797.2619m	N/A
RF2	12.8550	1.5176	N/A
RF3	27.5505	291.6687m	N/A
RF4	26.9810	13.3501m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.1885m	818.9519u	N/A
CF2	61.5123m	5.6993m	N/A
CF3	773.4249m	34.7009m	N/A
CF4	1.6425	18.6493m	N/A

Note
N/A indicates not applicable


Si7774DP
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7774DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
"V(RT1:1)"j-a"
Time
Date: June 03, 2010
Page 1
Time: 12:54:01


Si7774DP
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si7774DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
"V(CT1:1)"j-c"
Time
Date: June 03, 2010
Page 1
Time: 13:06:10


Si7774DP
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7774DP_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
"V(RF1:1)"j-a"
Time
Date: June 03, 2010
Page 1
Time: 13:22:51


Si7774DP
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7774DP_j-c_txt
3.0
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
"V(CF1:1)"j-c"
Time
Date: June 03, 2010
Page 1
Time: 13:37:08