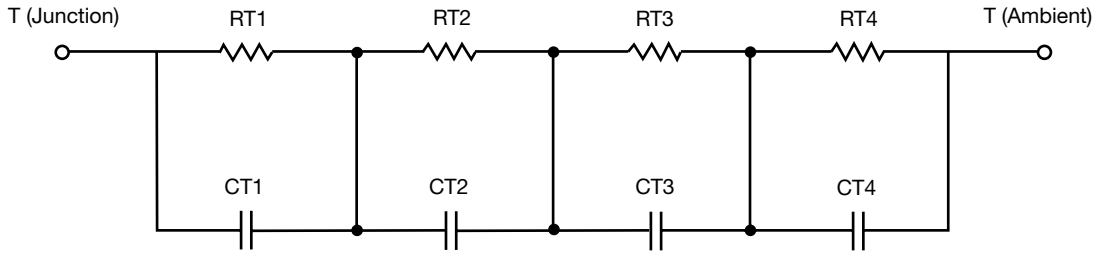
R-C Thermal Model Parameters

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

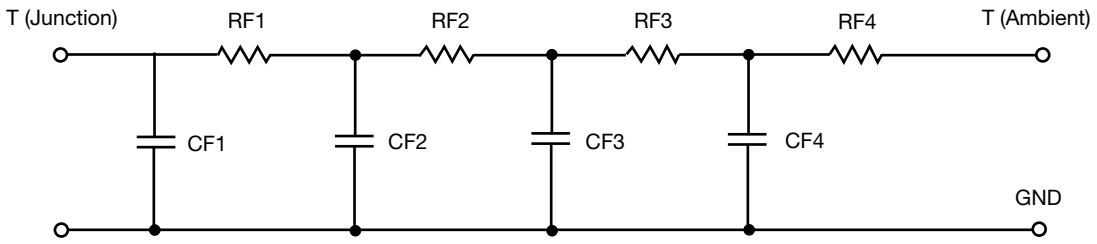


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	26.6524	1.3018	N/A
RT2	26.3028	1.0968	N/A
RT3	12.2041	388.7323 m	N/A
RT4	4.9121	1.4152	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.6320	6.3406 m	N/A
CT2	3.5560	631.6678 u	N/A
CT3	86.4381 m	23.3380 m	N/A
CT4	4.0228 m	7.2555 m	N/A

Note
N/A indicates not applicable

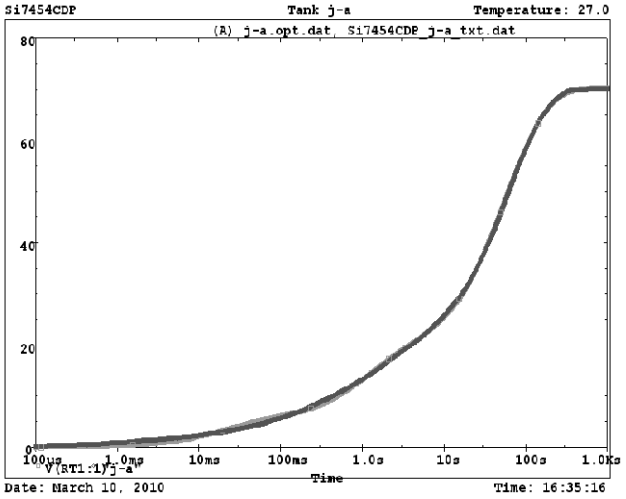
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

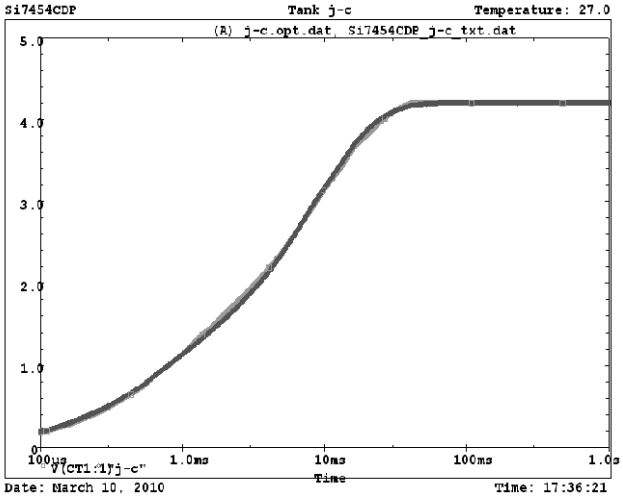
R-C THERMAL MODEL FOR FILTER CONFIGURATION

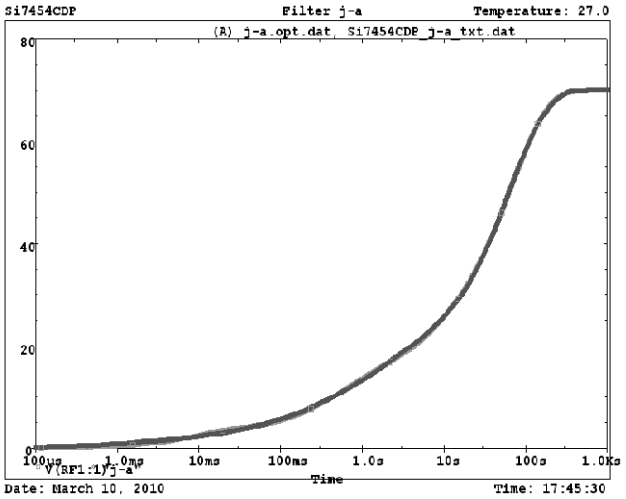


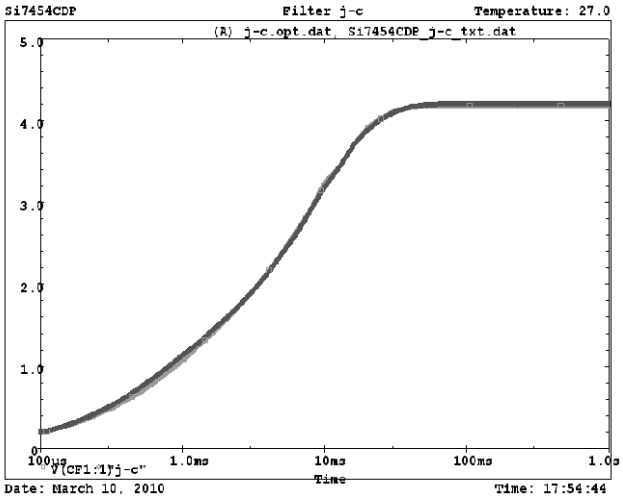
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.7390	607.0769 m	N/A
RF2	11.2478	916.7931 m	N/A
RF3	16.3022	2.6489	N/A
RF4	38.5866	10.3528 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.3642 m	445.5729 u	N/A
CF2	42.7243 m	322.0158 u	N/A
CF3	521.3272 m	2.1839 m	N/A
CF4	1.1414	2.9312 m	N/A

Note
N/A indicates not applicable


Si7454CDP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7454CDP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)/j-a
Time
Date: March 10, 2010
Time: 16:35:16


Si7454CDP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7454CDP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)/j-c"
Time
Date: March 10, 2010
Time: 17:36:21


Si7454CDP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7454CDP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)/j-a"
Time
Date: March 10, 2010
Time: 17:45:30


Si7454CDP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7454CDP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)/j-c"
Time
Date: March 10, 2010
Time: 17:54:44