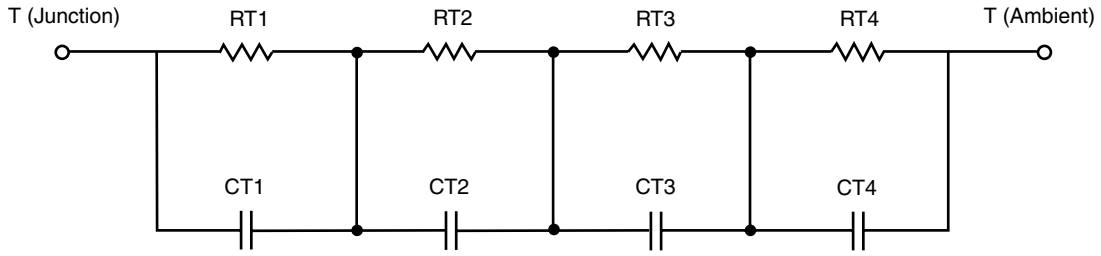
R-C Thermal Model Parameters

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

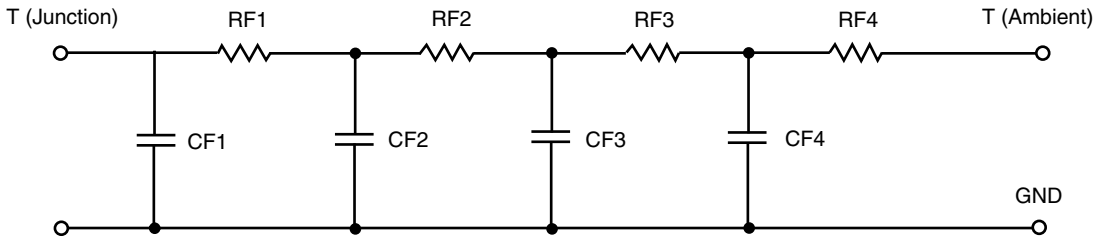


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	29.5154	N/A	12.0798
RT2	9.2379	N/A	3.3324
RT3	23.2836	N/A	6.2241
RT4	47.9631	N/A	13.3637
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	5.6788 m	N/A	3.4784 m
CT2	565.9659 u	N/A	284.3910 u
CT3	43.6139 m	N/A	6.7485 m
CT4	1.4878	N/A	21.8206 m

Note
N/A indicates not applicable

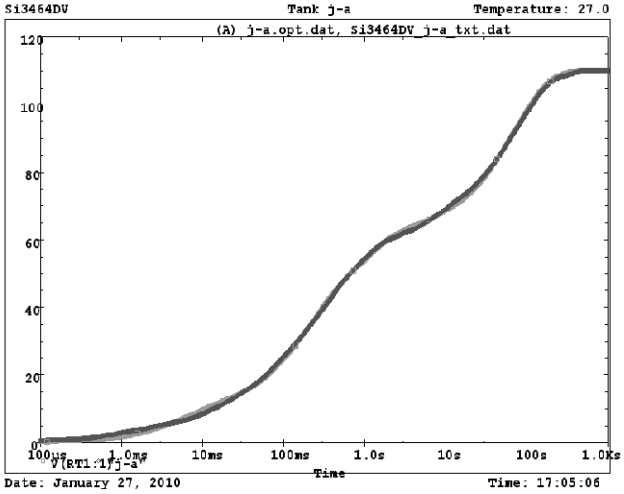
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

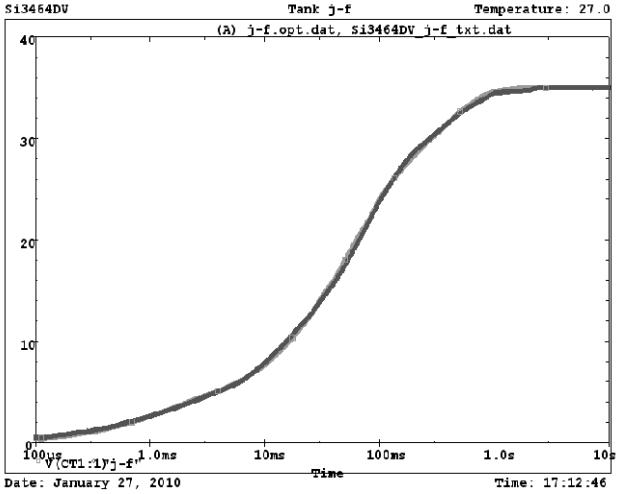
R-C THERMAL MODEL FOR FILTER CONFIGURATION

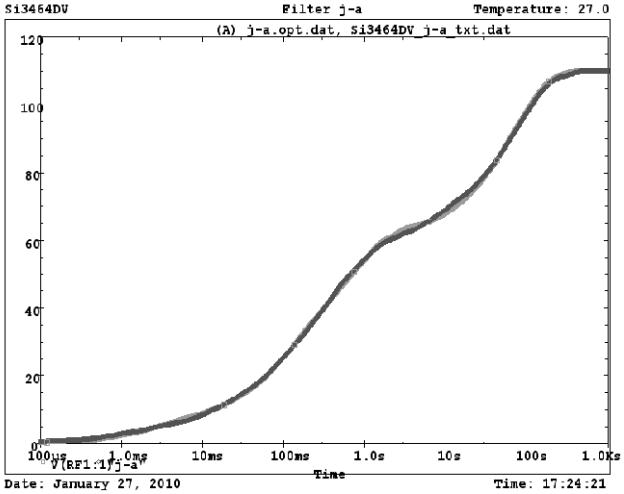


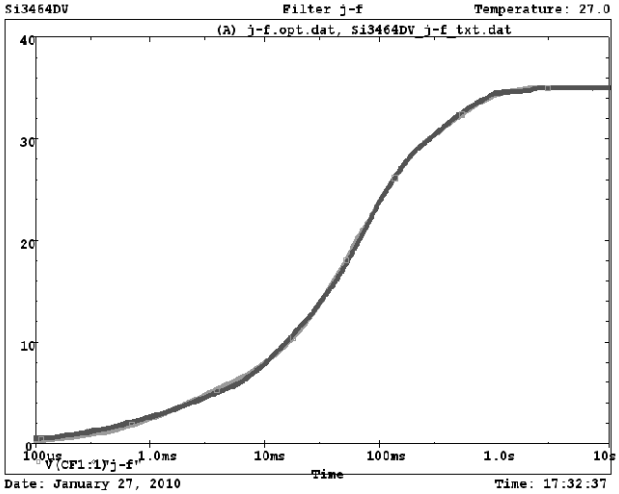
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.0820	N/A	5.3220
RF2	29.4395	N/A	19.4480
RF3	25.0224	N/A	3.8642
RF4	47.4561	N/A	6.3658
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	362.9708 u	N/A	309.0180 u
CF2	3.2471 m	N/A	2.1366 m
CF3	23.0910 m	N/A	5.7175 m
CF4	1.4460	N/A	52.6932 m

Note
N/A indicates not applicable


Si3464DV
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si3464DV_j-a_txt.dat
120
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: January 27, 2010
Time: 17:05:06


Si3464DV
Tank j-f
Temperature: 27.0
(A) j-f.opt.dat, Si3464DV_j-f_txt.dat
40
30
20
10
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-f
Time
Date: January 27, 2010
Time: 17:12:46


Si3464DV
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si3464DV_j-a_txt.dat
120
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: January 27, 2010
Time: 17:24:21


Si3464DV
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, Si3464DV_j-f_txt.dat
40
30
20
10
0
100µs
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: January 27, 2010
Time: 17:32:37