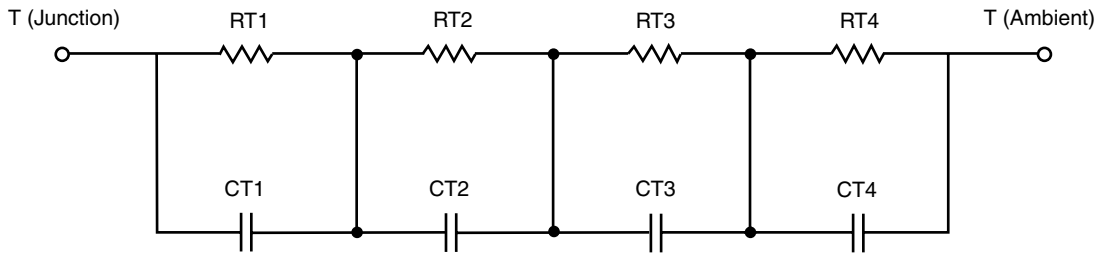
R-C Thermal Model Parameters

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

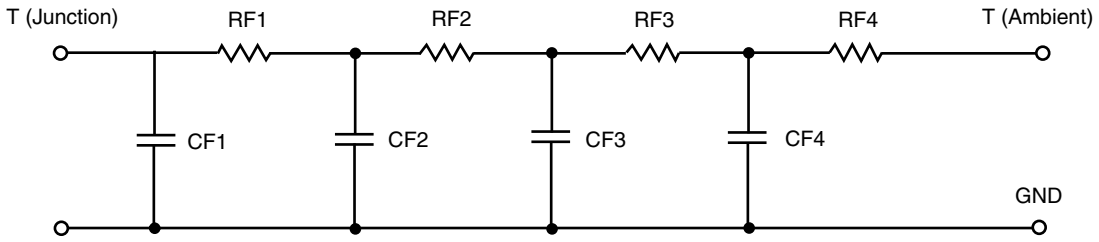


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	15.8637	N/A	4.3021
RT2	3.6963	N/A	8.4825
RT3	14.4578	N/A	6.9521
RT4	50.6176	N/A	1.2650
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	171.1542 m	N/A	547.6579 m
CT2	3.7613 m	N/A	104.9468 m
CT3	39.9770 m	N/A	14.0423 m
CT4	1.6048	N/A	1.3594 m

Note
N/A indicates not applicable

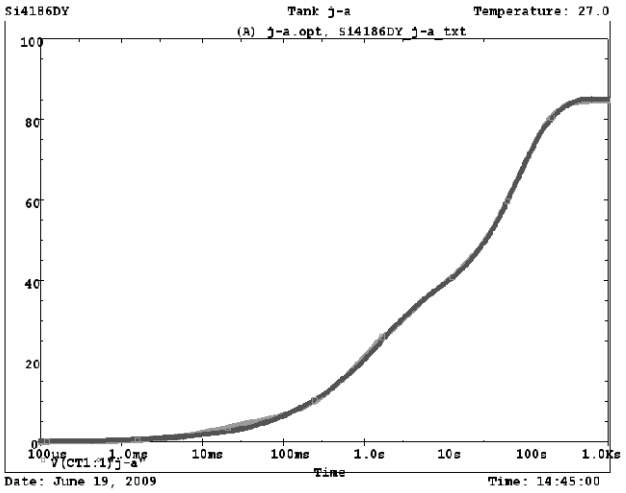
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

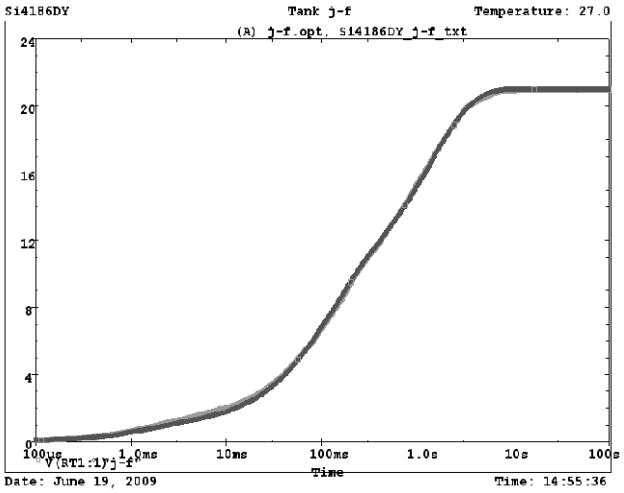
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	4.4029	N/A	1.4426
RF2	23.3362	N/A	9.5857
RF3	14.2961	N/A	4.9325
RF4	42.6930	N/A	4.8740
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	4.0091 m	N/A	1.2971 m
CF2	29.2682 m	N/A	11.4598 m
CF3	378.8343 m	N/A	92.4171 m
CF4	1.5425	N/A	111.5716 m

Note
N/A indicates not applicable


Si4186DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4186DY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CT1:1)j-a
Time
Date: June 19, 2009
Time: 14:45:00


Si4186DY
Tank j-f
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20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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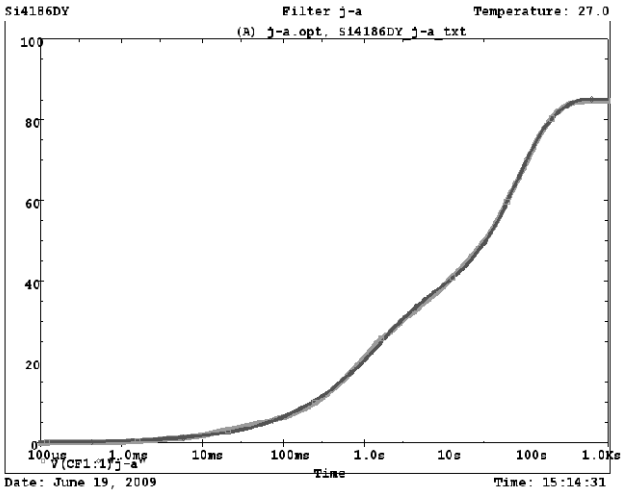
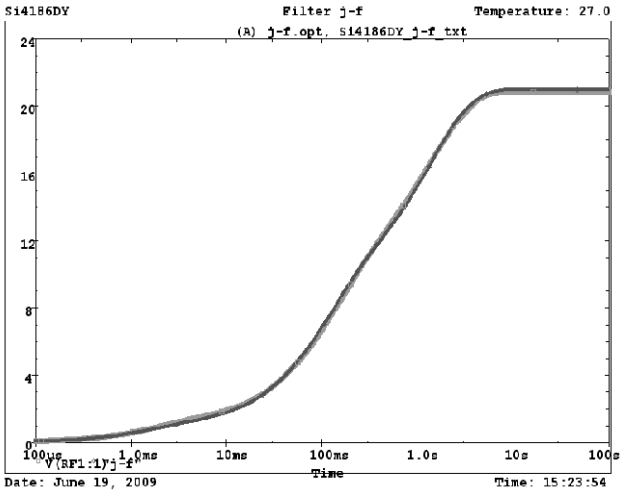
Time
Date: June 19, 2009
Time: 14:55:36


Si4186DY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4186DY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CF1:1)j-a
Time
Date: June 19, 2009
Time: 15:14:31


Si4186DY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4186DY_j-f_txt
24
20
16
12
8
4
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RF1:1)j-f
Time
Date: June 19, 2009
Time: 15:23:54