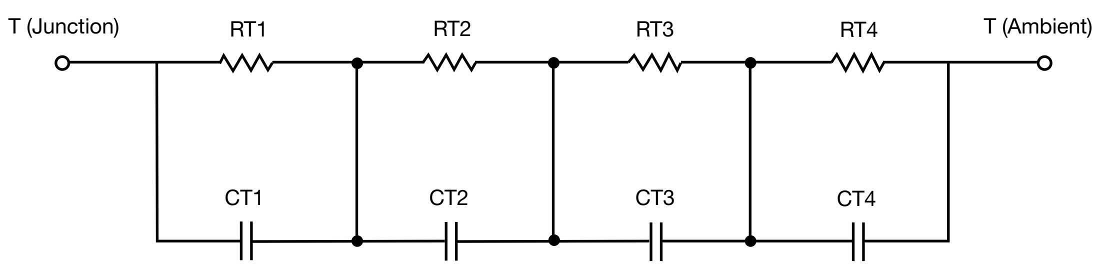
R-C Thermal Model Parameters

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

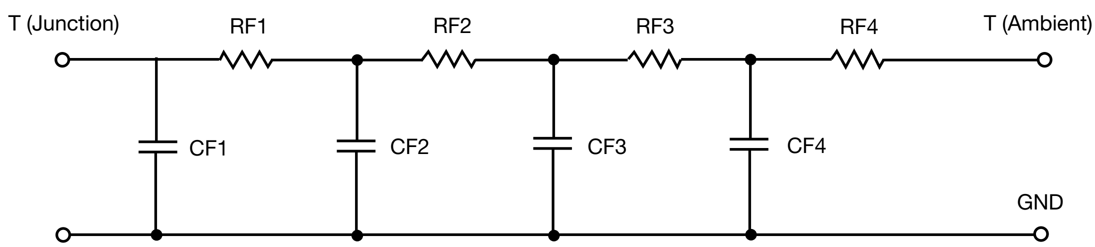


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	12.5953	1.1486	N/A
RT2	4.9120	1.6922	N/A
RT3	13.8186	428.3096m	N/A
RT4	38.8639	727.3022m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.0409	4.1412m	N/A
CT2	1.7785m	21.7503m	N/A
CT3	58.7049m	730.8424u	N/A
CT4	1.9880	121.9035m	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.

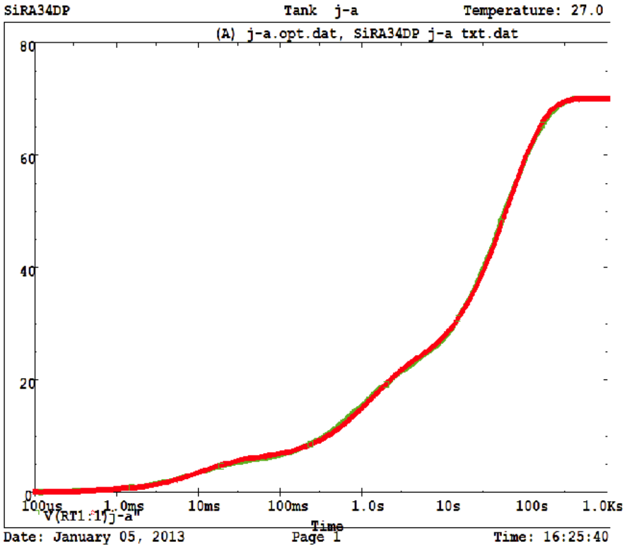
R-C THERMAL MODEL FOR FILTER CONFIGURATION

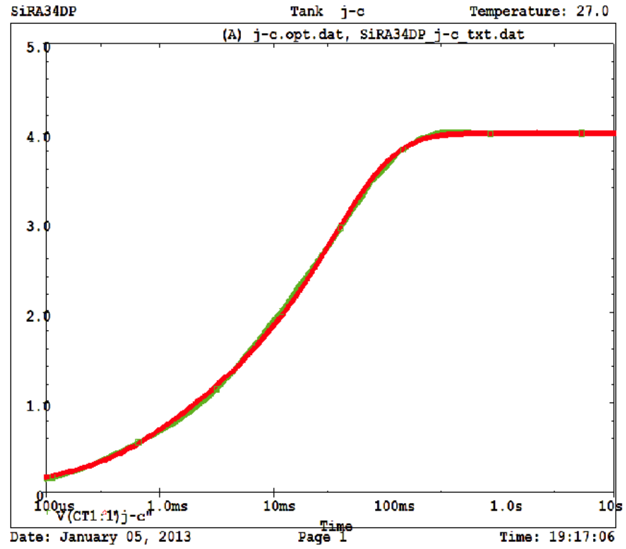


R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.9804	1.1973	N/A
RF2	7.6915	1.6502	N/A
RF3	10.6180	837.9780m	N/A
RF4	45.6079	308.0003m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.5051m	951.0750u	N/A
CF2	49.9288m	8.5964m	N/A
CF3	112.9529m	28.8165m	N/A
CF4	1.2381	80.3674u	N/A

Note

- n/a indicates not applicable


SiRA34DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SiRA34DP 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: January 05, 2013
Page 1
Time: 16:25:40


SiRA34DP
Tank j-c
Temperature: 27.0
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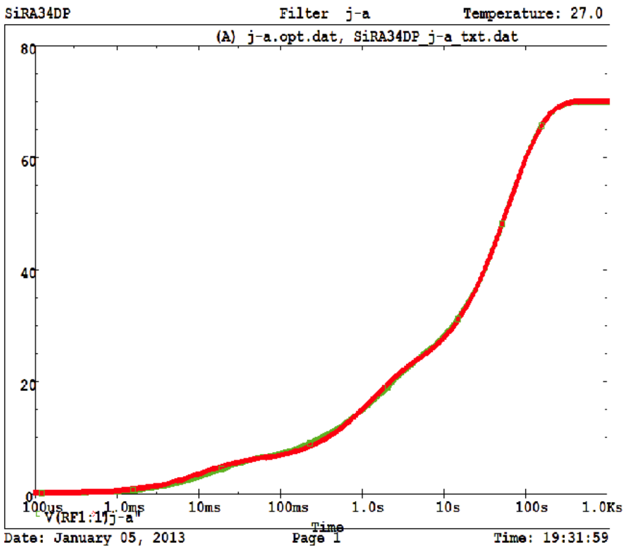
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1) j-c"
Time
Date: January 05, 2013
Page 1
Time: 19:17:06


SiRA34DP
Filter j-a
Temperature: 27.0
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80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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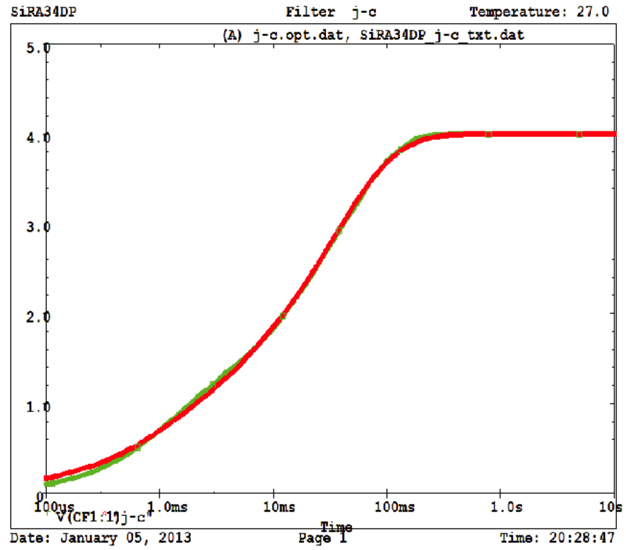
Time
Date: January 05, 2013
Page 1
Time: 19:31:59


SiRA34DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiRA34DP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) j-c"
Time
Date: January 05, 2013
Page 1
Time: 20:28:47