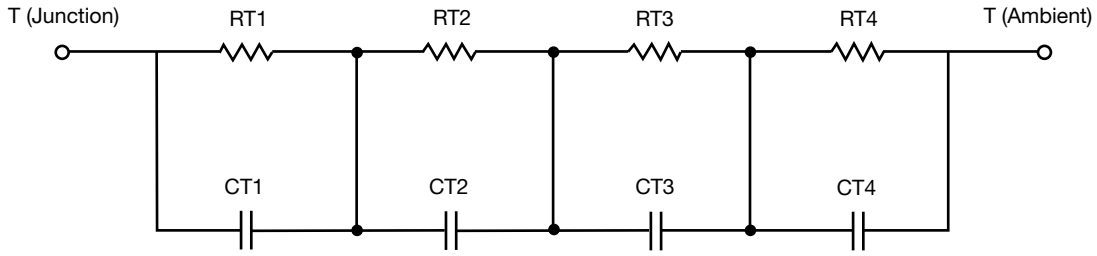
R-C Thermal Model Parameters

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

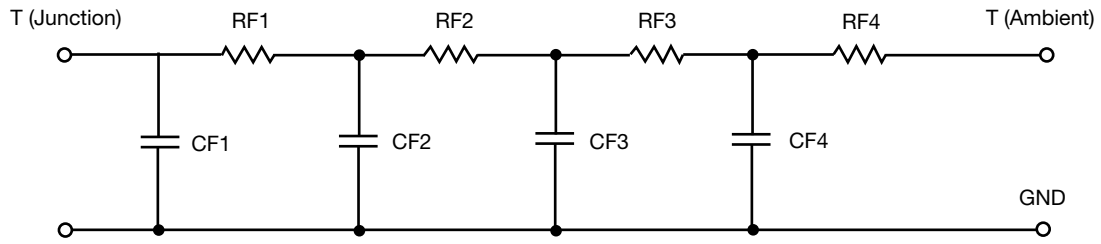


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	10.7093	N/A	3.7706
RT2	39.5822	N/A	13.7556
RT3	10.6596	N/A	5.6364
RT4	49.6244	N/A	17.8015
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	7.3840m	N/A	441.5431u
CT2	24.0152m	N/A	55.3084m
CT3	2.7043m	N/A	128.9292m
CT4	1.0683	N/A	4.3363m

Note
N/A indicates not applicable

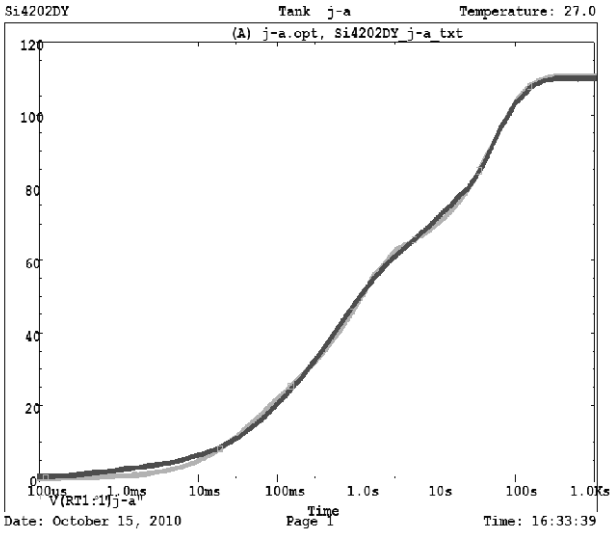
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

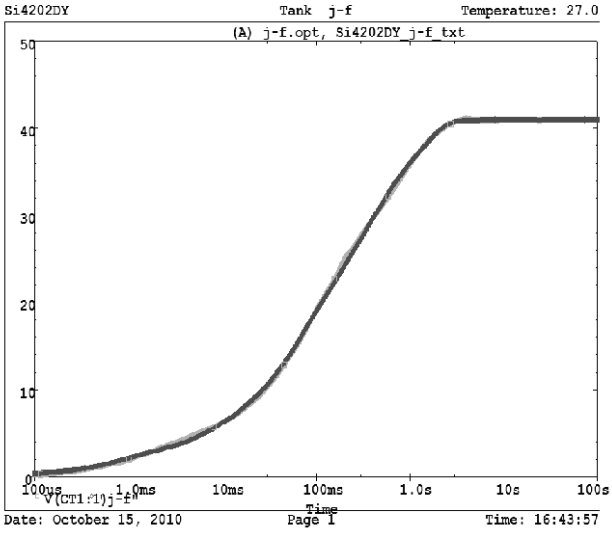
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.2298	N/A	4.5018
RF2	29.4118	N/A	18.5492
RF3	22.4321	N/A	12.1346
RF4	44.8724	N/A	6.0216
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.2175m	N/A	417.3089u
CF2	7.2923m	N/A	3.1542m
CF3	54.2439m	N/A	26.7069m
CF4	1.1061	N/A	106.8017m

Note
N/A indicates not applicable


Si4202DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4202DY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: October 15, 2010
Page 1
Time: 16:33:39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Tank j-f
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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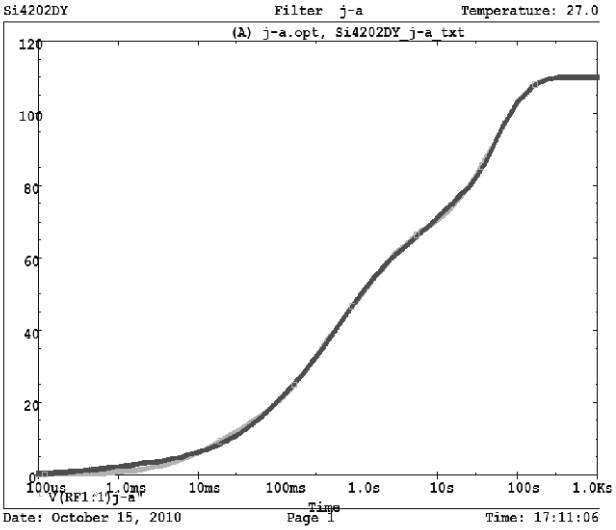
Time
Date: October 15, 2010
Page 1
Time: 16:43:57


Si4202DY
Filter j-a
Temperature: 27.0
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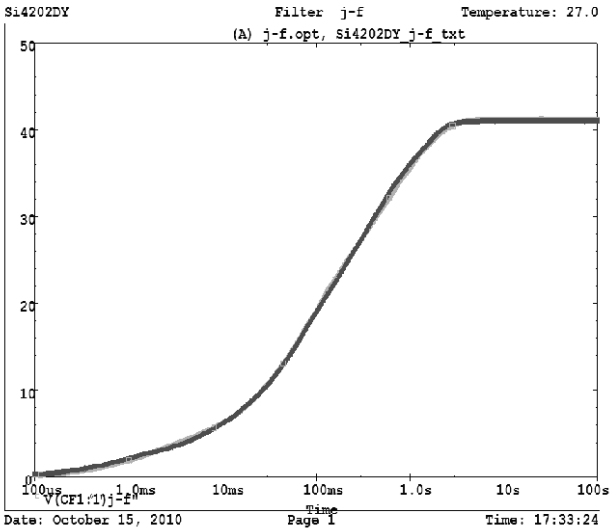
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: October 15, 2010
Page 1
Time: 17:11:06


Si4202DY
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: October 15, 2010
Page 1
Time: 17:33:24