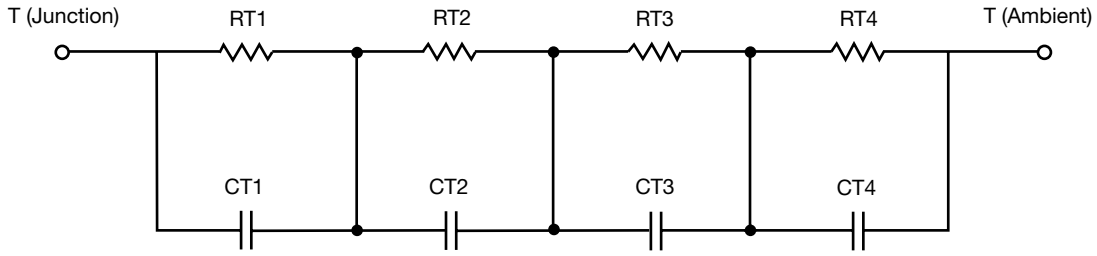
R-C Thermal Model Parameters

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

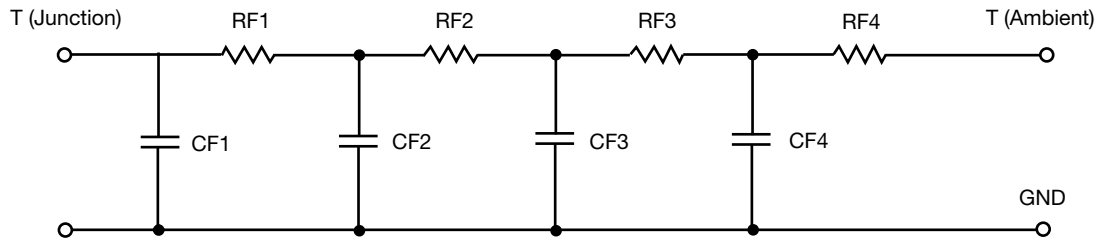


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	38.6603	N/A	112.9183
RT2	61.1163	N/A	73.8081
RT3	141.7832	N/A	52.0263
RT4	114.3407	N/A	31.1470
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	149.9586u	N/A	1.6707m
CT2	1.2739	N/A	517.1635u
CT3	4.5932m	N/A	16.9207m
CT4	900.6076u	N/A	62.8334u

Note
N/A indicates not applicable

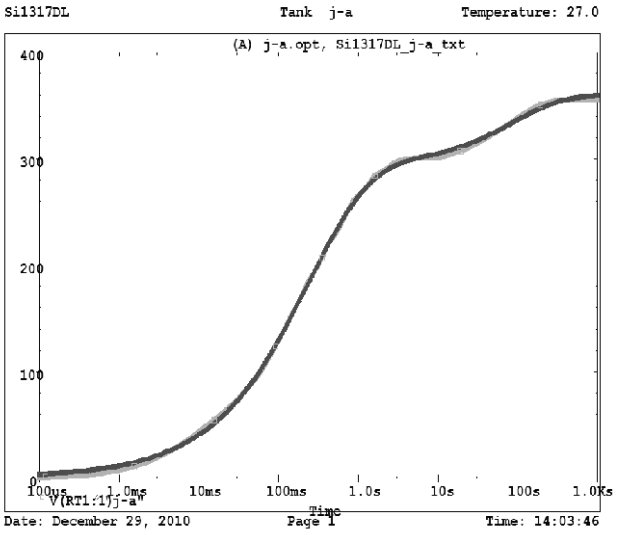
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	43.3189	N/A	49.2700
RF2	160.9603	N/A	141.4344
RF3	94.0156	N/A	74.9087
RF4	58.0117	N/A	3.5854
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	96.0565u	N/A	63.9326u
CF2	637.6193u	N/A	460.2305u
CF3	7.1971m	N/A	5.1558m
CF4	1.4359	N/A	155.3439m

Note
N/A indicates not applicable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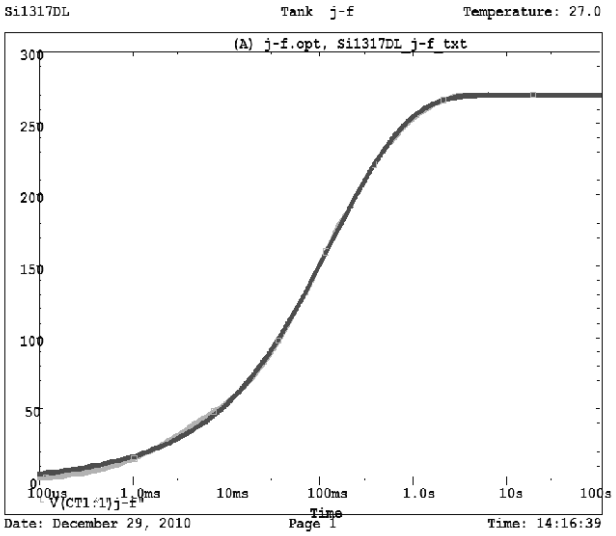
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si1317DL_j-a_txt
400
300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: December 29, 2010
Page 1
Time: 14:03:46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150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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Time
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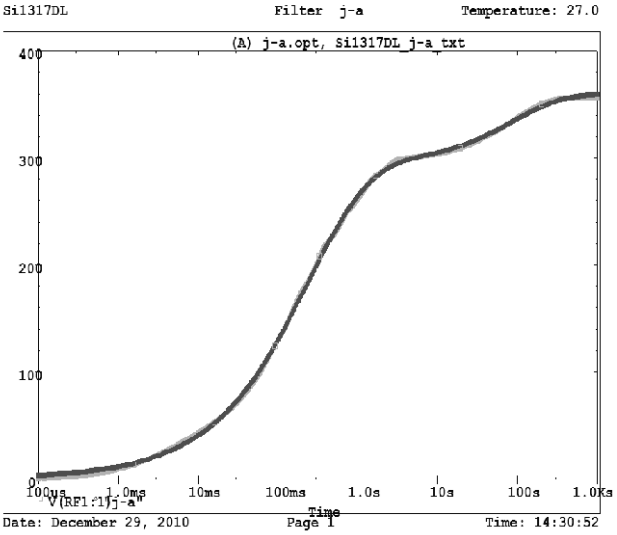
Page 1
Time: 14:16:39


Si1317DL
Filter j-a
Temperature: 27.0
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300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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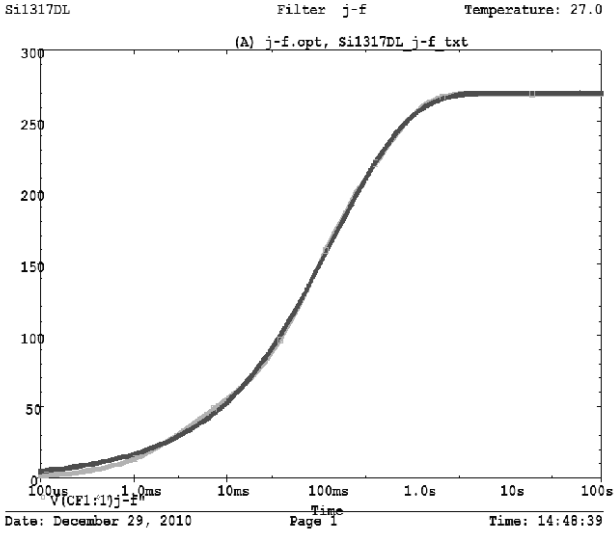
Time
Date: December 29, 2010
Page 1
Time: 14:30:52


Si1317DL
Filter j-f
Temperature: 27.0
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250
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: December 29, 2010
Page 1
Time: 14:48:39