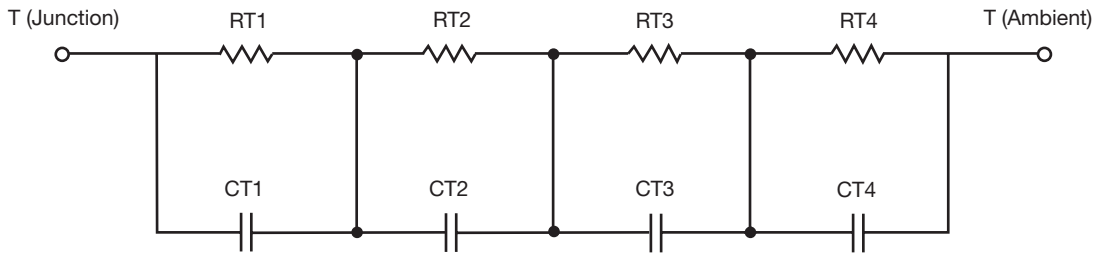
R-C Thermal Model Parameters

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

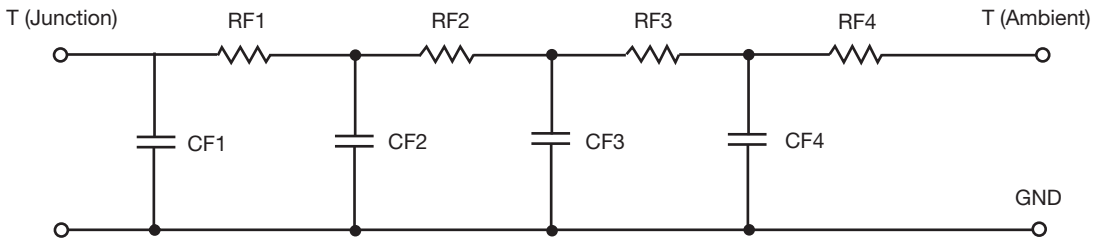


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	29.8971	N/A	5.9597
RT2	28.5940	N/A	12.1828
RT3	8.7170	N/A	7.2530
RT4	42.7919	N/A	4.5090
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.9595m	N/A	22.9277m
CT2	28.3374m	N/A	1.9394m
CT3	267.2811u	N/A	17.2834m
CT4	1.0043	N/A	177.1793u

Note
N/A indicates not applicable

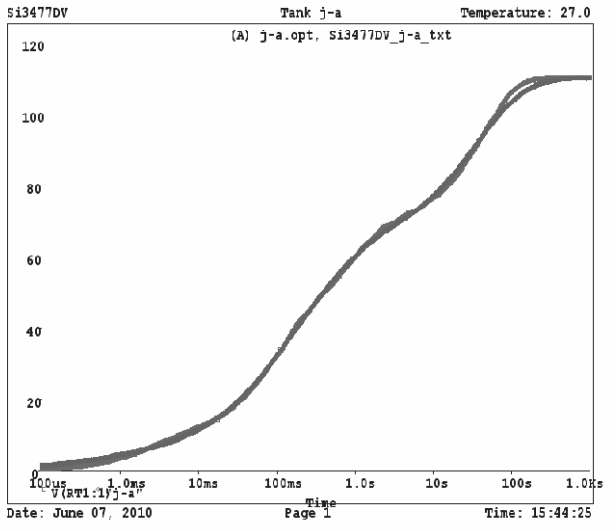
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.6207	N/A	5.0398
RF2	36.8685	N/A	14.1687
RF3	23.4521	N/A	10.0782
RF4	41.0587	N/A	1.1018
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	169.6936u	N/A	148.9148u
CF2	2.3562m	N/A	1.3406m
CF3	33.9719m	N/A	7.5349m
CF4	1.0323	N/A	1.6161

Note
N/A indicates not applicable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Tank j-a
Temperature: 27.0
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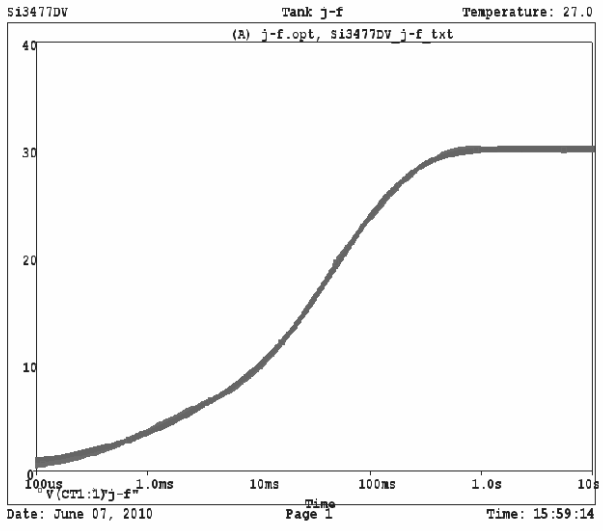
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: June 07, 2010
Page 1
Time: 15:44:25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30
20
10
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100ms
1.0s
10s
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Time
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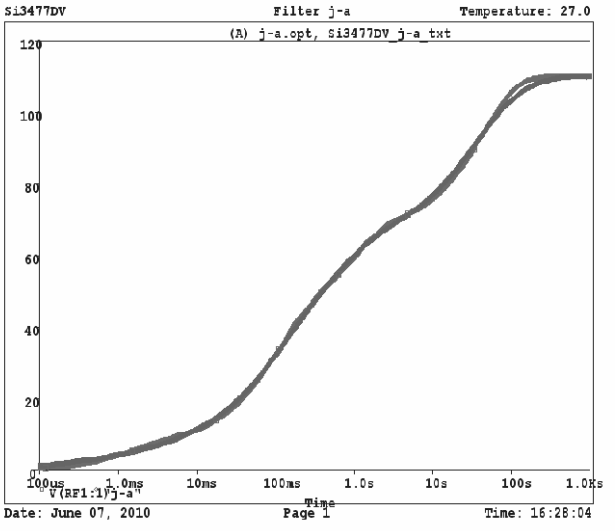
Page 1
Time: 15:59:14


Si3477DV
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
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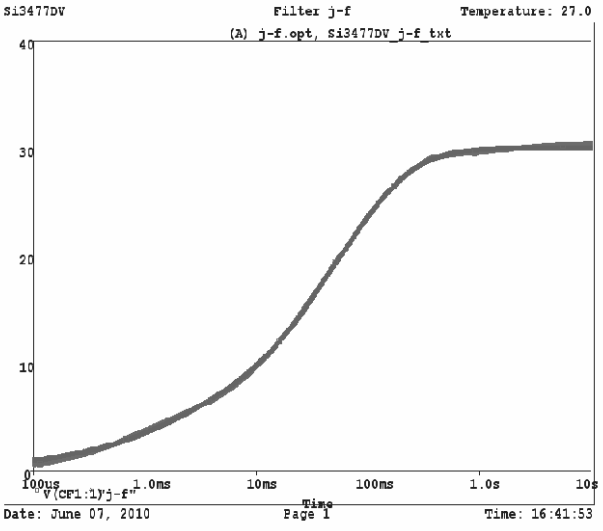
Time
Date: June 07, 2010
Page 1
Time: 16:28:04


Si3477DV
Filter j-f
Temperature: 27.0
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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: June 07, 2010
Page 1
Time: 16:41:53