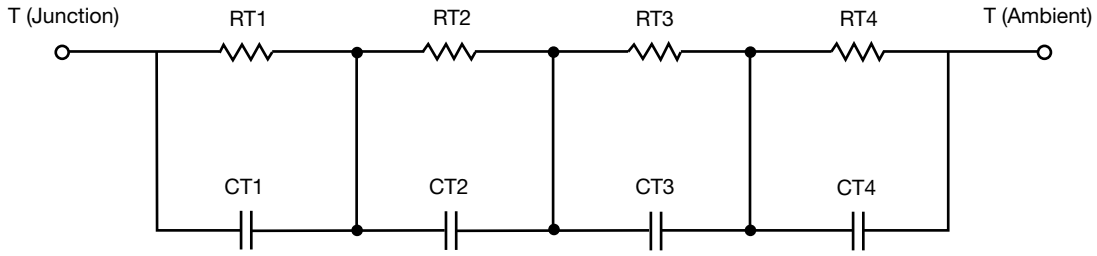
R-C Thermal Model Parameters

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

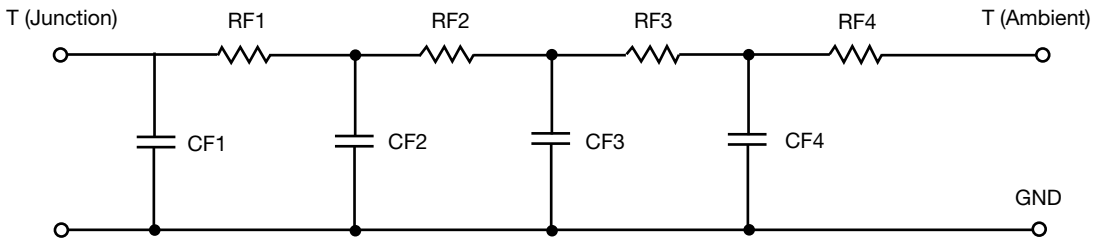


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.0981	N/A	7.8523
RT2	13.4452	N/A	3.6844
RT3	18.8159	N/A	11.4278
RT4	46.5394	N/A	7.0181
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	922.2131u	N/A	5.1849m
CT2	190.4016m	N/A	556.2485u
CT3	30.8150m	N/A	126.9661m
CT4	1.2889	N/A	43.1959m

Note
N/A indicates not applicable

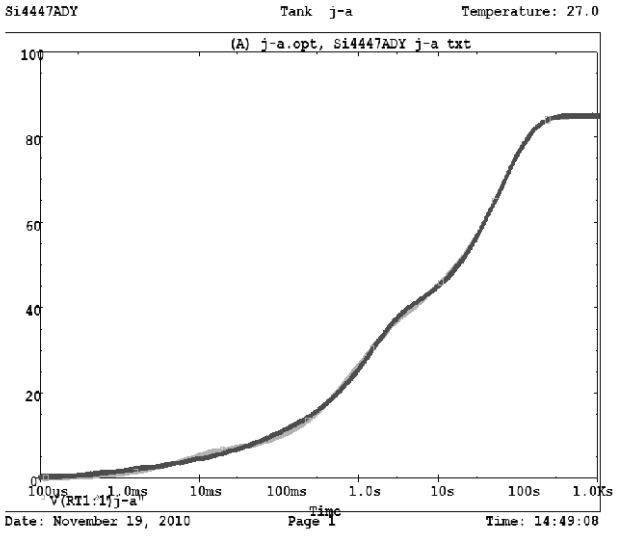
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

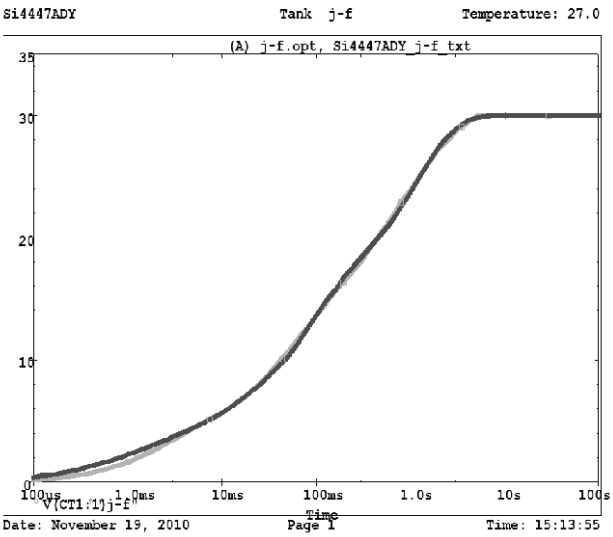
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.2034	N/A	3.1465
RF2	16.1274	N/A	12.0632
RF3	19.3048	N/A	11.5211
RF4	44.2136	N/A	3.1769
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	649.2022u	N/A	232.6182u
CF2	16.3033m	N/A	3.9154m
CF3	62.1758m	N/A	58.1324m
CF4	1.2563	N/A	179.2158m

Note
N/A indicates not applicable


Si4447ADY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4447ADY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: November 19, 2010
Page 1
Time: 14:49:08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Tank j-f
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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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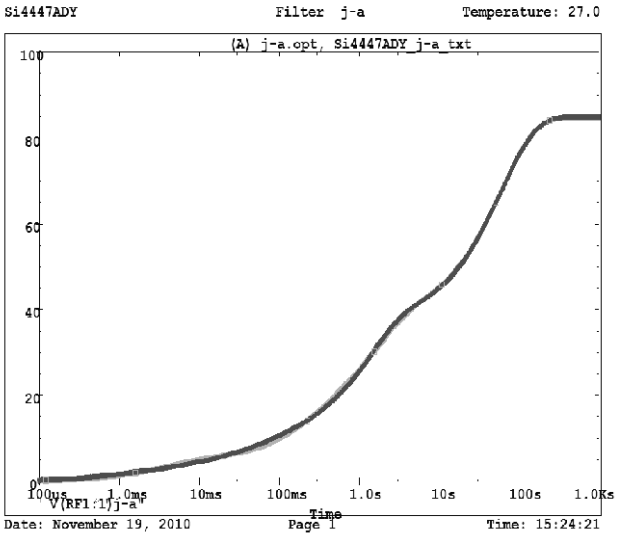
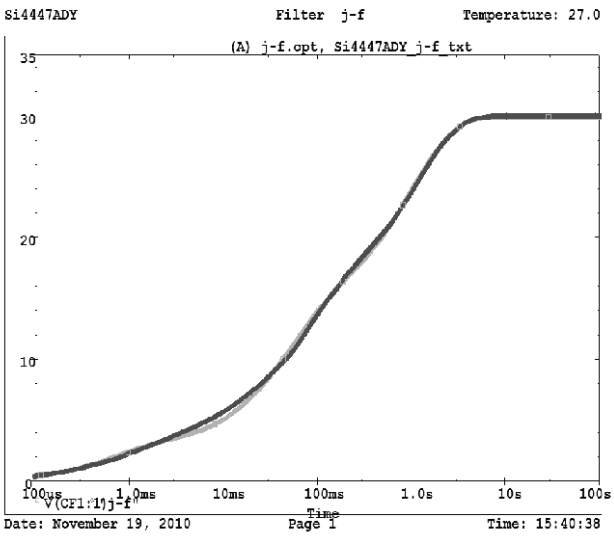
Time
Date: November 19, 2010
Page 1
Time: 15:13:55


Si4447ADY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4447ADY_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: November 19, 2010
Page 1
Time: 15:24:21


Si4447ADY
Filter j-f
Temperature: 27.0
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30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: November 19, 2010
Page 1
Time: 15:40:38