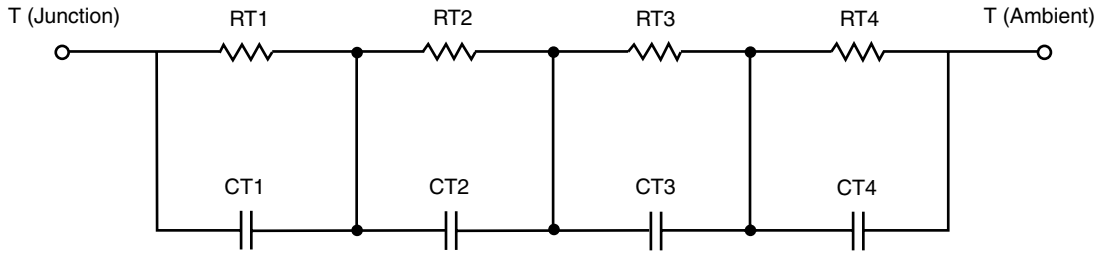
R-C Thermal Model Parameters

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

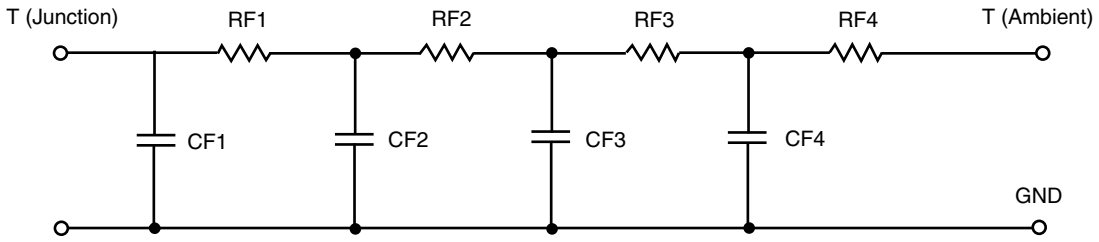


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	27.7998	N/A	3.6725
RT2	29.6608	N/A	8.1710
RT3	6.9886	N/A	5.2865
RT4	15.7533	N/A	1.8275
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	39.6860 u	N/A	365.1770 m
CT2	1.3740	N/A	87.1244 m
CT3	2.3087 m	N/A	12.8402 m
CT4	7.3960	N/A	840.9657 u

Note
N/A indicates not applicable

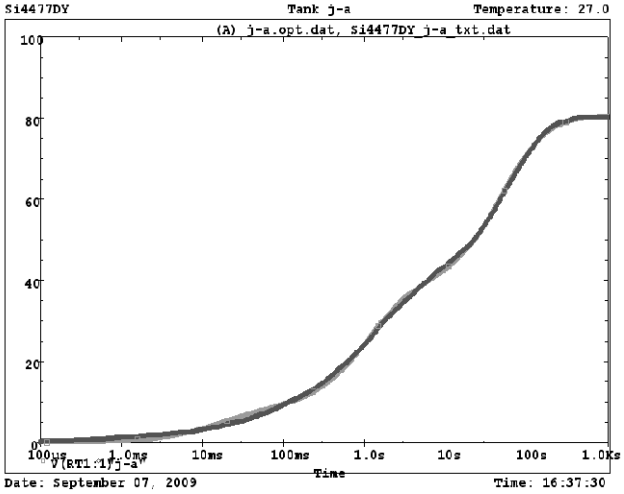
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

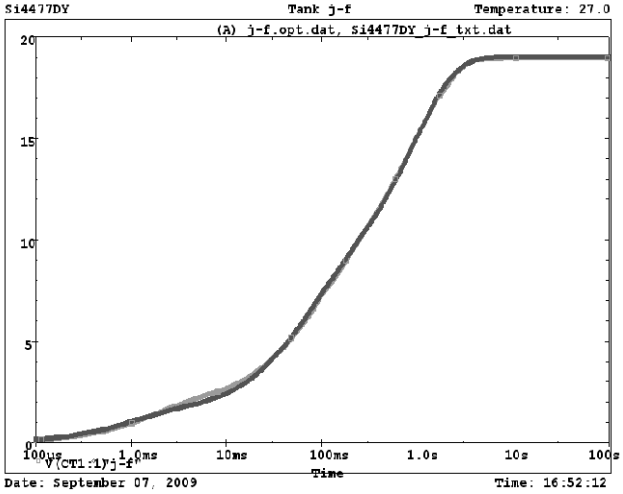
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.0355	N/A	1.2653
RF2	17.8872	N/A	6.7297
RF3	17.3099	N/A	10.3956
RF4	38.4950	N/A	617.0341 m
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.0088 m	N/A	591.6021 u
CF2	21.1538 m	N/A	6.3182 m
CF3	105.9984 m	N/A	65.6033 m
CF4	1.5432	N/A	2.6059

Note
N/A indicates not applicable


Si4477DY
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si4477DY_j-a_txt.dat
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: September 07, 2009
Time: 16:37:30


Si4477DY
Tank j-f
Temperature: 27.0
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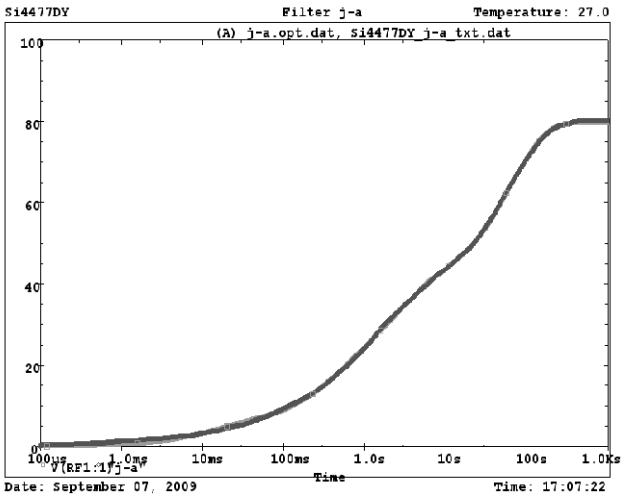
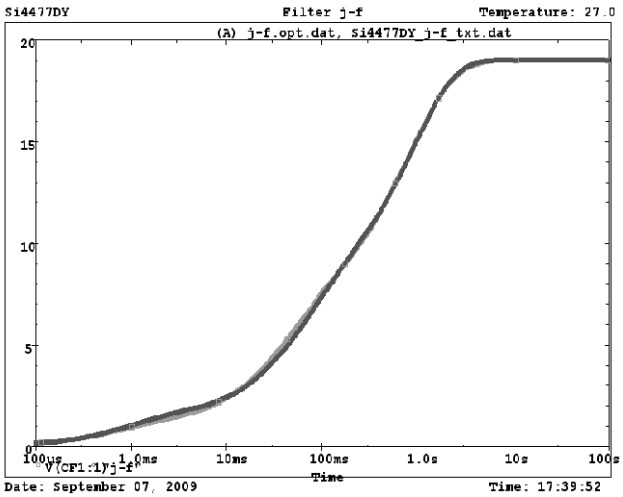
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)j-f
Time
Date: September 07, 2009
Time: 16:52:12


Si4477DY
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si4477DY_j-a_txt.dat
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: September 07, 2009
Time: 17:07:22


Si4477DY
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, Si4477DY_j-f_txt.dat
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: September 07, 2009
Time: 17:39:52