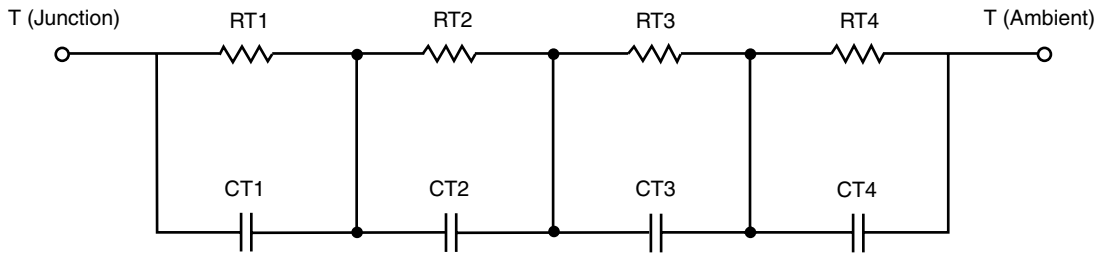
R-C Thermal Model Parameters

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

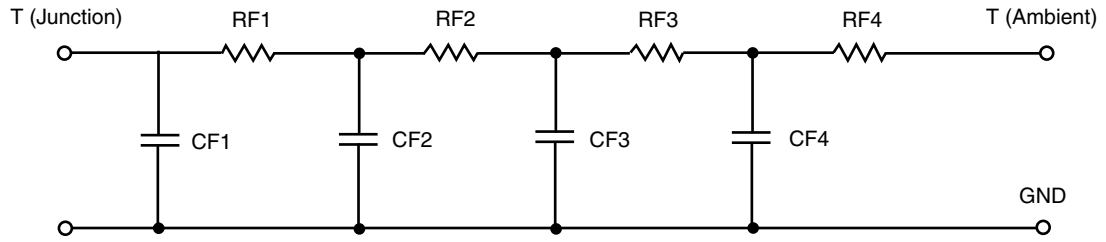


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	20.9407	N/A	449.4400 m
RT2	5.6342	N/A	7.4167
RT3	13.7017	N/A	14.7107
RT4	44.7234	N/A	2.4302
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	112.3995 m	N/A	115.9094 m
CT2	2.0522 m	N/A	10.7458 m
CT3	29.1756 m	N/A	64.3712 m
CT4	1.4579	N/A	683.5545 u

Note
N/A indicates not applicable

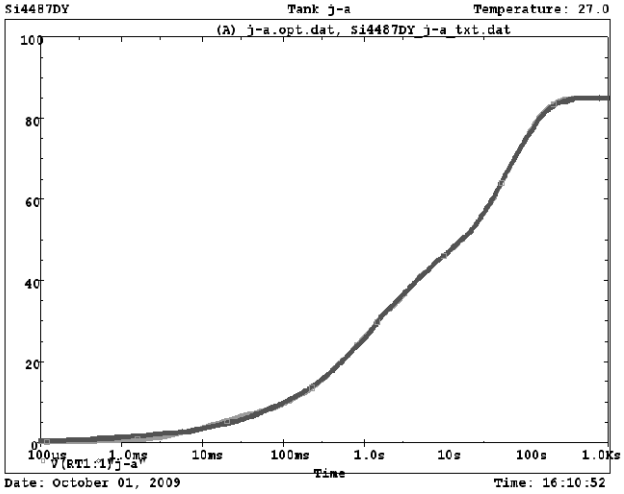
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

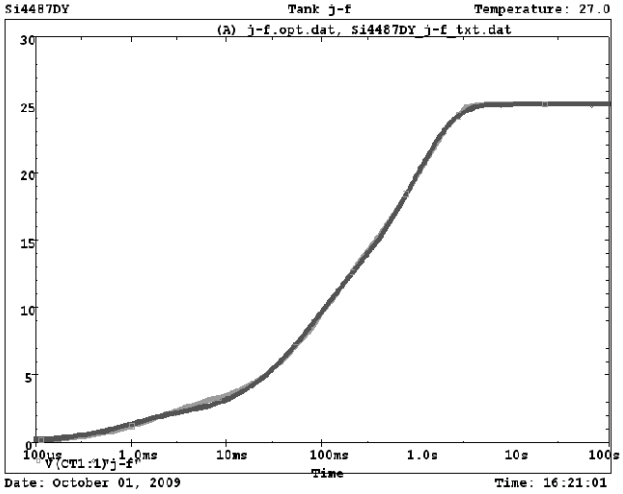
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	7.2318	N/A	2.5081
RF2	16.3322	N/A	9.0885
RF3	19.4499	N/A	7.3296
RF4	41.9861	N/A	5.9813
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.2619 m	N/A	689.9011 u
CF2	20.3378 m	N/A	6.6513 m
CF3	74.4774 m	N/A	57.5032 m
CF4	1.4474	N/A	1.5928 m

Note
N/A indicates not applicable


Si4487DY
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si4487DY_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: October 01, 2009
Time: 16:10:52


Si4487DY
Tank j-f
Temperature: 27.0
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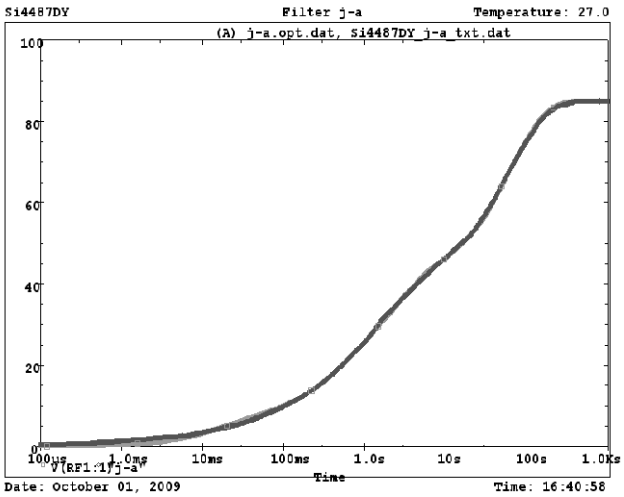
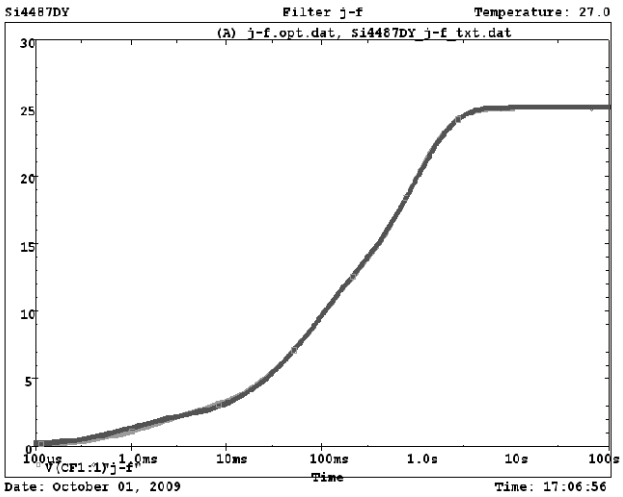
30
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)j-f
Time
Date: October 01, 2009
Time: 16:21:01


Si4487DY
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si4487DY_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: October 01, 2009
Time: 16:40:58


Si4487DY
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, Si4487DY_j-f_txt.dat
30
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: October 01, 2009
Time: 17:06:56