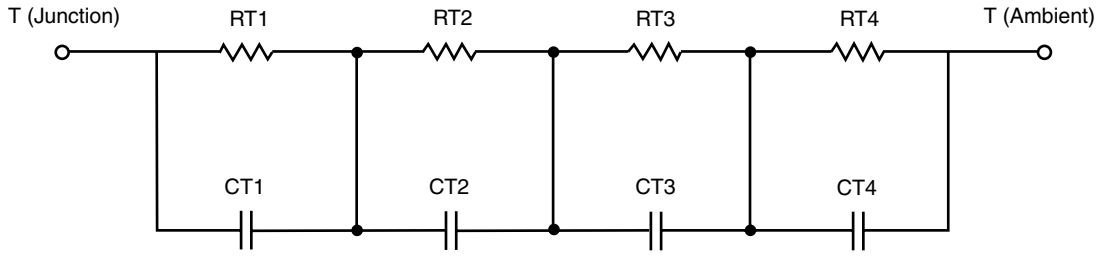
R-C Thermal Model Parameters

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

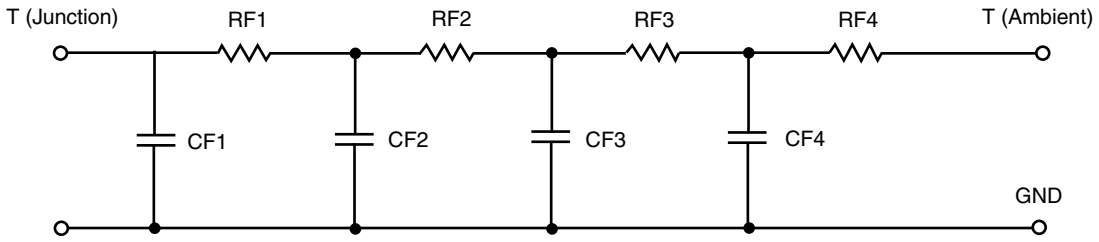


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	16.8338	N/A	607.5712 m
RT2	30.0440	N/A	4.5868
RT3	10.2415	N/A	3.8586
RT4	14.6518	N/A	3.0521
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	13.3943 m	N/A	567.2140 m
CT2	3.5906	N/A	730.5656 u
CT3	232.4559 u	N/A	4.8990 m
CT4	1.0350	N/A	184.9361 u

Note
N/A indicates not applicable

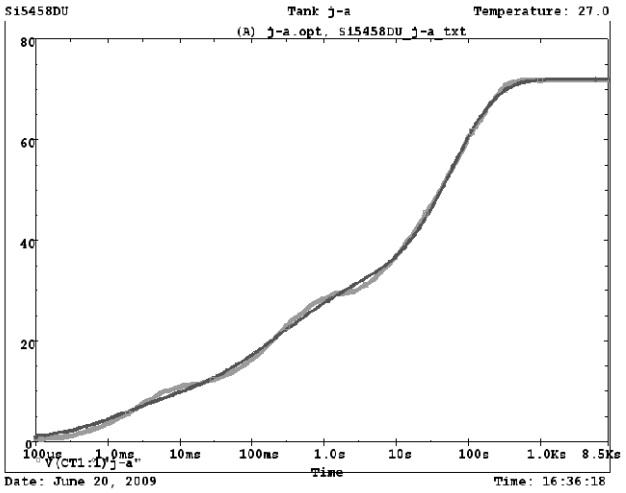
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

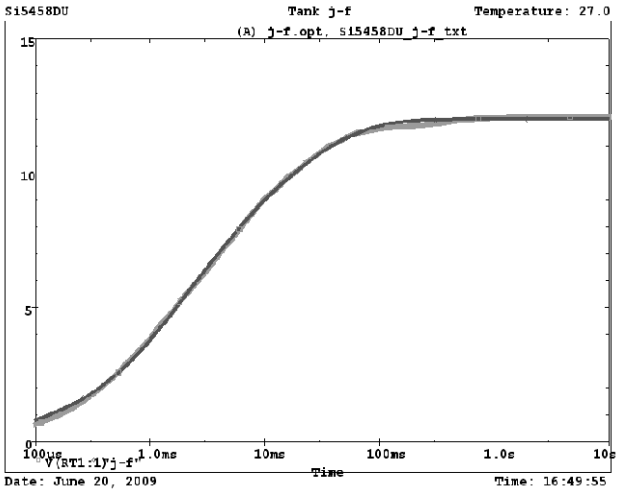
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	10.8413	N/A	4.3236
RF2	16.5674	N/A	5.2482
RF3	19.2345	N/A	2.2996
RF4	24.9344	N/A	61.7418 m
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	228.2529 u	N/A	129.2542 u
CF2	13.3946 m	N/A	631.8230 u
CF3	718.6857 m	N/A	13.3102 m
CF4	2.8555	N/A	26.0582

Note
N/A indicates not applicable


Si5458DU
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si5458DU_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
8.5Ks
V(CT1:1)j-a
Time
Date: June 20, 2009
Time: 16:36:18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Tank j-f
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10
5
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10ms
100ms
1.0s
10s
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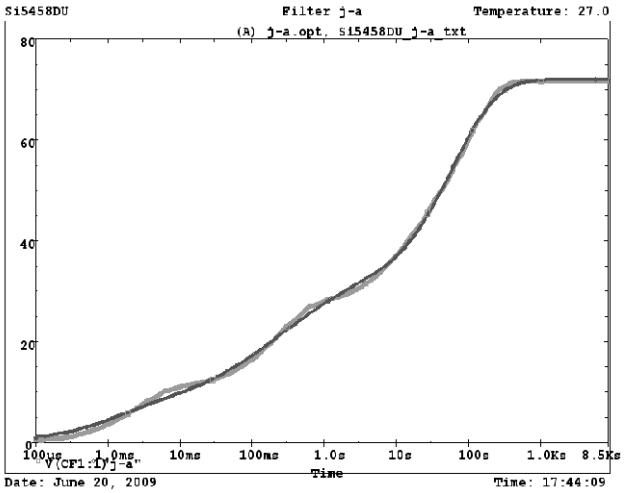
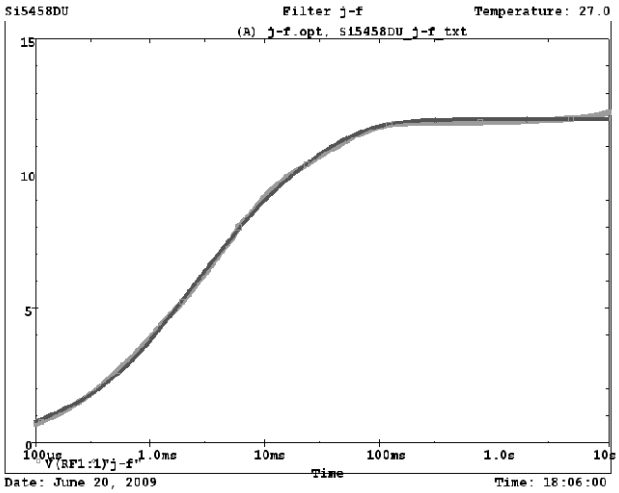
Time
Date: June 20, 2009
Time: 16:49:55


Si5458DU
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si5458DU_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
8.5Ks
V(CF1:1)j-a
Time
Date: June 20, 2009
Time: 17:44:09


Si5458DU
Filter j-f
Temperature: 27.0
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15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RF1:1)j-f
Time
Date: June 20, 2009
Time: 18:06:00