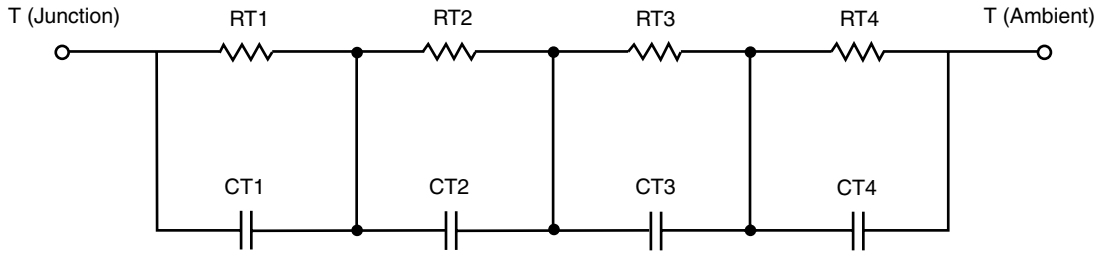
R-C Thermal Model Parameters

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

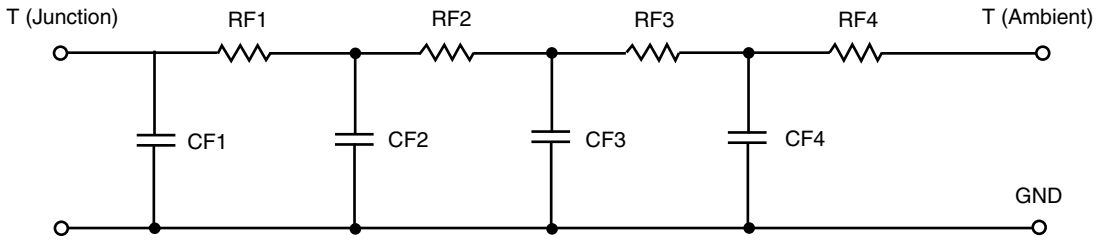


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	5.8024	227.9000 m	N/A
RT2	19.7128	909.8000 m	N/A
RT3	15.3152	1.4214	N/A
RT4	49.1696	1.4409	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.0316 m	262.1468 u	N/A
CT2	13.7508 m	255.2567 u	N/A
CT3	199.8847 m	1.3237 m	N/A
CT4	1.5772	1.2692 m	N/A

Note
N/A indicates not applicable

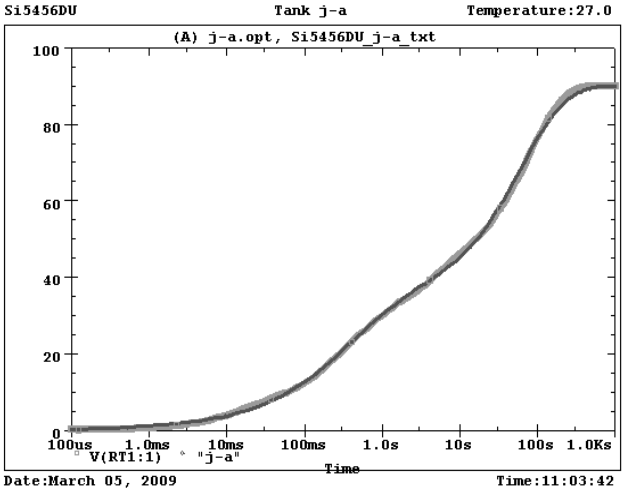
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

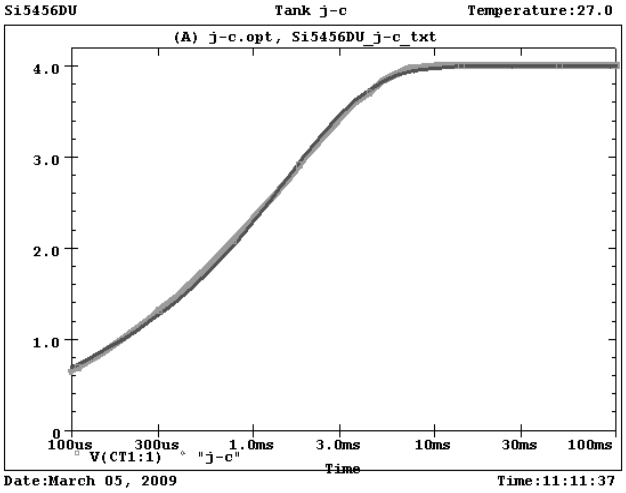
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.4287	1.5953	N/A
RF2	22.4787	1.6822	N/A
RF3	16.4303	591.1917 m	N/A
RF4	44.6623	131.3083 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.5436 m	125.1166 u	N/A
CF2	10.6475 m	553.3575 u	N/A
CF3	209.3966 m	545.8594 u	N/A
CF4	1.5018	55.4171 u	N/A

Note
N/A indicates not applicable


Si5456DU
Tank j-a
Temperature:27.0
(A) j-a.opt, Si5456DU_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:March 05, 2009
Time:11:03:42


Si5456DU
Tank j-c
Temperature:27.0
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4.0
3.0
2.0
1.0
0
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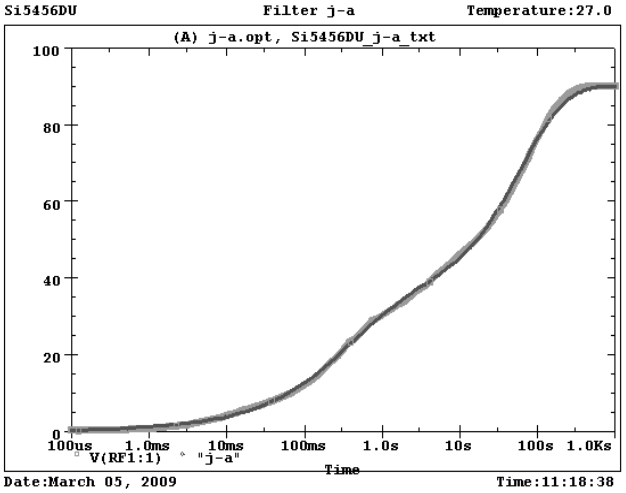
Time
Date:March 05, 2009
Time:11:11:37


Si5456DU
Filter j-a
Temperature:27.0
(A) j-a.opt, Si5456DU_j-a_txt
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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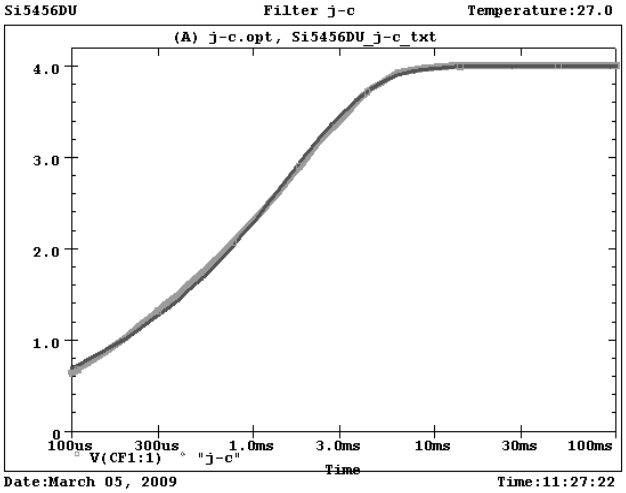
Time
Date:March 05, 2009
Time:11:18:38


Si5456DU
Filter j-c
Temperature:27.0
(A) j-c.opt, Si5456DU_j-c_txt
4.0
3.0
2.0
1.0
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "j-c"
Time
Date:March 05, 2009
Time:11:27:22