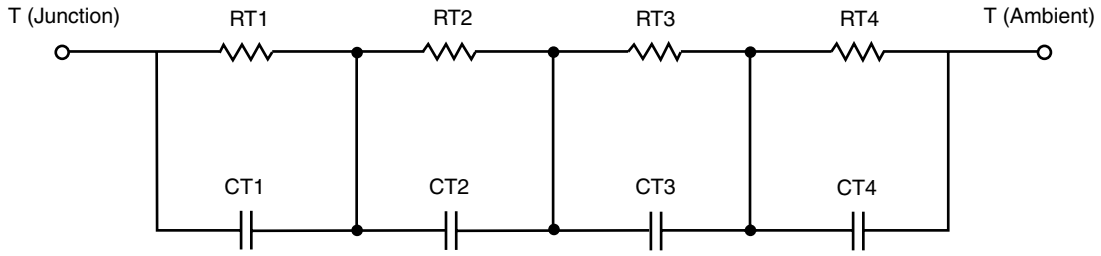
R-C Thermal Model Parameters

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

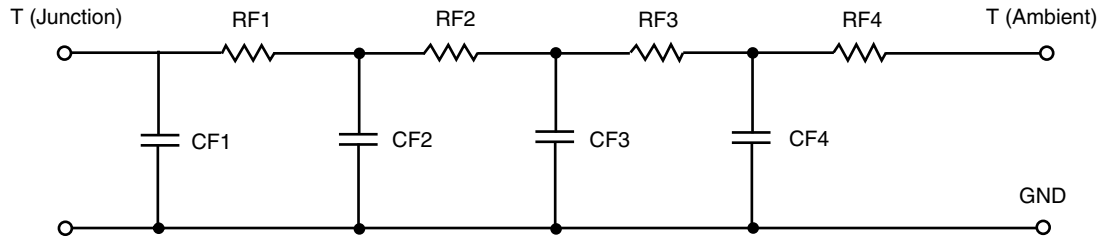


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	15.1547	N/A	1.7555
RT2	33.8637	N/A	2.5490
RT3	9.9352	N/A	3.0595
RT4	12.5317	N/A	4.1479
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	11.5927 m	N/A	17.7954 m
CT2	2.2868	N/A	1.1826 m
CT3	223.9675 u	N/A	195.2591 u
CT4	475.5204 m	N/A	1.3837 m

Note
N/A indicates not applicable

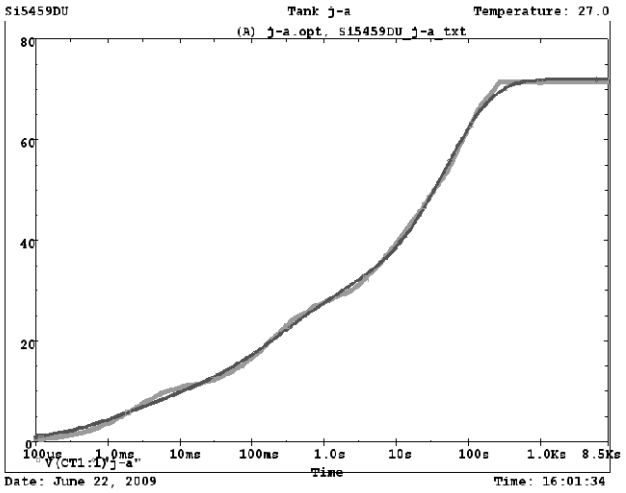
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

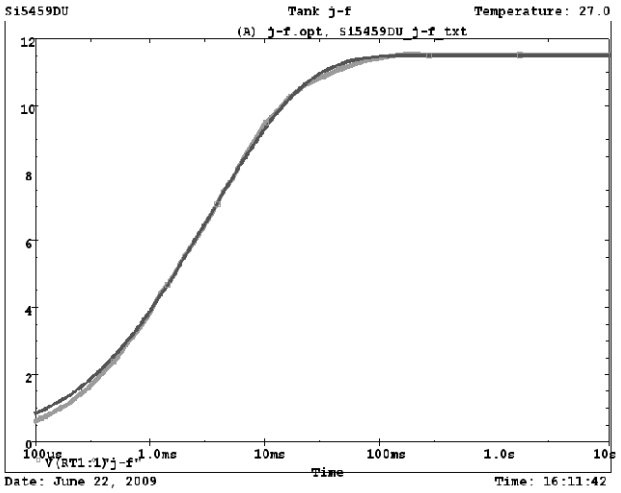
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	10.6240	N/A	4.2661
RF2	16.5386	N/A	5.1781
RF3	20.1574	N/A	2.0927
RF4	24.3092	N/A	21.3131 m
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	237.9655 u	N/A	117.4259 u
CF2	12.7317 m	N/A	567.8190 u
CF3	541.4025 m	N/A	8.7346 m
CF4	2.7773	N/A	253.5126

Note
N/A indicates not applicable


Si5459DU
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si5459DU_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 22, 2009
Time: 16:01:34


Si5459DU
Tank j-f
Temperature: 27.0
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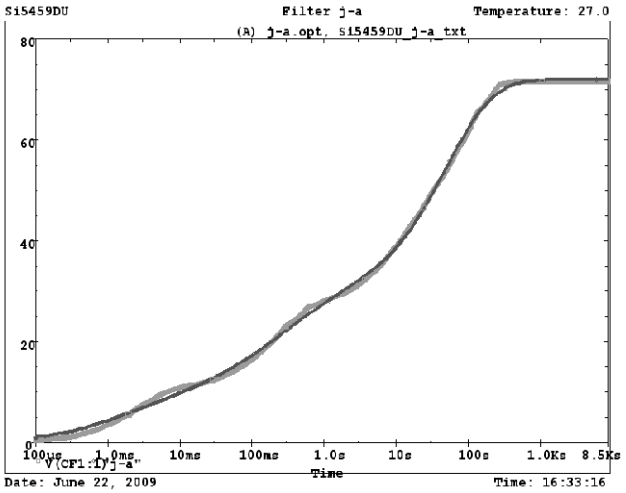
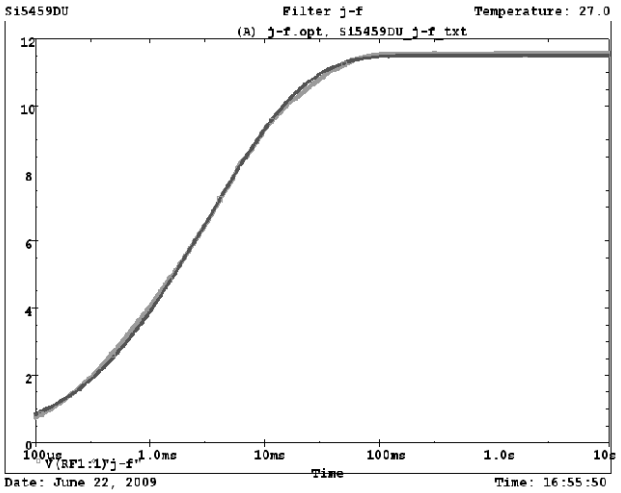
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RT1:1)j-f
Time
Date: June 22, 2009
Time: 16:11:42


Si5459DU
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si5459DU_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 22, 2009
Time: 16:33:16


Si5459DU
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si5459DU_j-f_txt
12
10
8
6
4
2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RF1:1)j-f
Time
Date: June 22, 2009
Time: 16:55:50