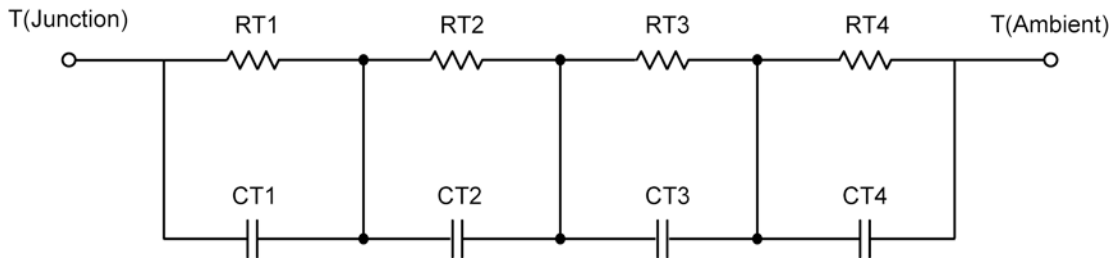
R-C Thermal Model Parameters

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."

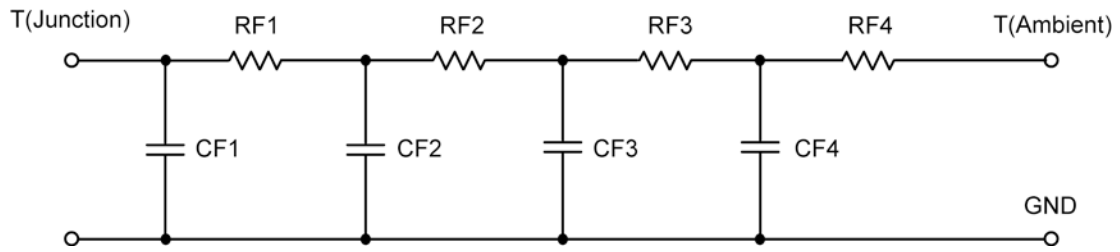
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.8856	N/A	1.7291
RT2	44.8089	N/A	7.3858
RT3	13.5765	N/A	10.2819
RT4	21.7290	N/A	5.6032
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.7094 m	N/A	355.5413 u
CT2	1.4502	N/A	46.2260 m
CT3	24.9886 m	N/A	121.2396 m
CT4	105.2745 m	N/A	6.7200 m

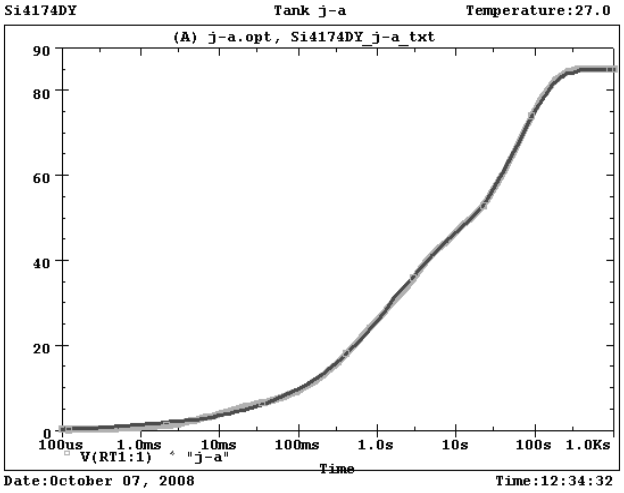
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

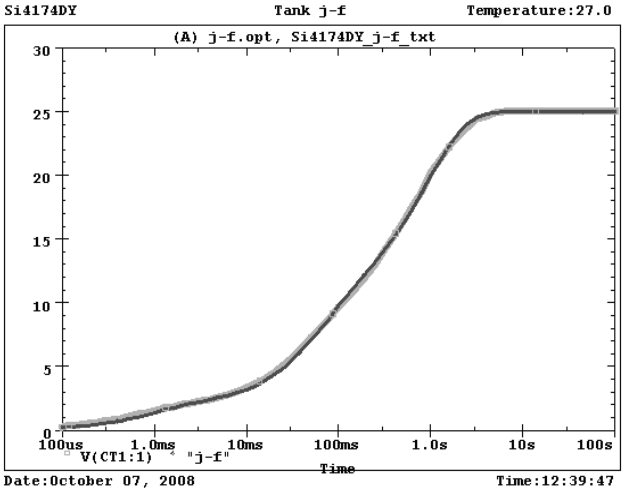
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.9709	N/A	2.5551
RF2	21.1952	N/A	8.4698
RF3	17.4642	N/A	7.3952
RF4	40.3697	N/A	6.5799
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.6152 m	N/A	702.5856 u
CF2	20.2075 m	N/A	6.6043 m
CF3	131.3076 m	N/A	38.0849 m
CF4	1.4794	N/A	77.4605 m

Note
NA indicates not applicable


Si4174DY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4174DY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:October 07, 2008
Time:12:34:32


Si4174DY
Tank j-f
Temperature:27.0
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25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)
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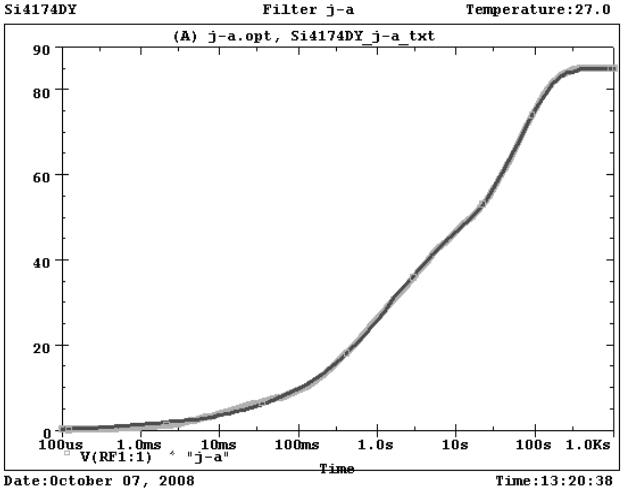
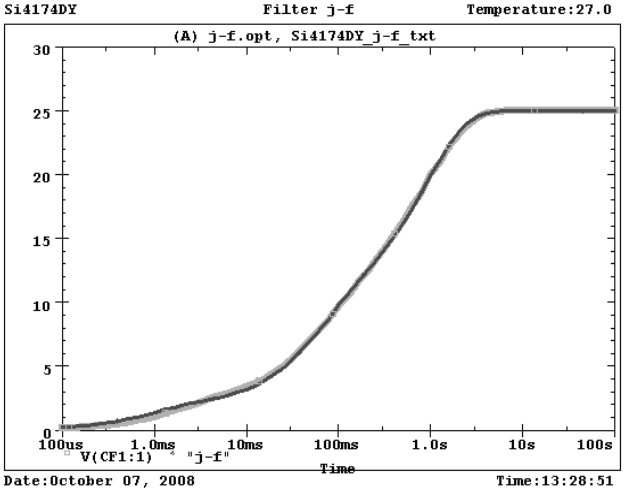
Time
Date:October 07, 2008
Time:12:39:47


Si4174DY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4174DY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:October 07, 2008
Time:13:20:38


Si4174DY
Filter 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(CF1:1)
"j-f"
Time
Date:October 07, 2008
Time:13:28:51