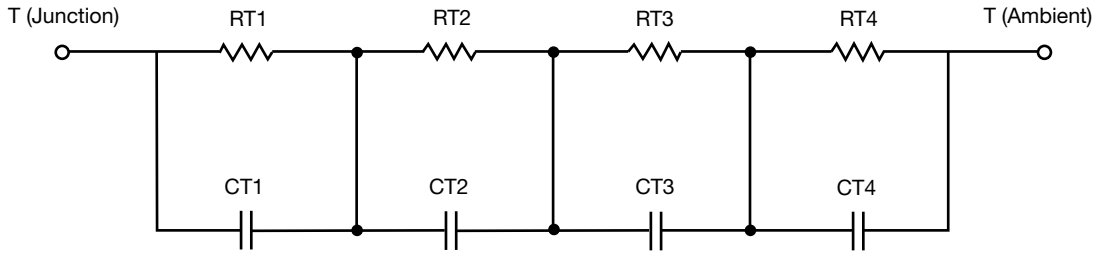
R-C Thermal Model Parameters

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

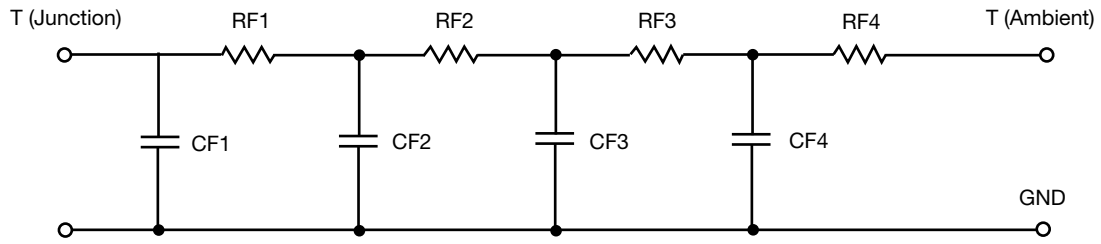


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	21.7832	N/A	15.9999
RT2	71.2016	N/A	47.8562
RT3	84.5332	N/A	42.6490
RT4	52.4820	N/A	33.6137
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	151.9801u	N/A	74.4360u
CT2	1.5707m	N/A	3.3280m
CT3	9.4896m	N/A	14.2830m
CT4	1.7903	N/A	1.7487m

Note
N/A indicates not applicable

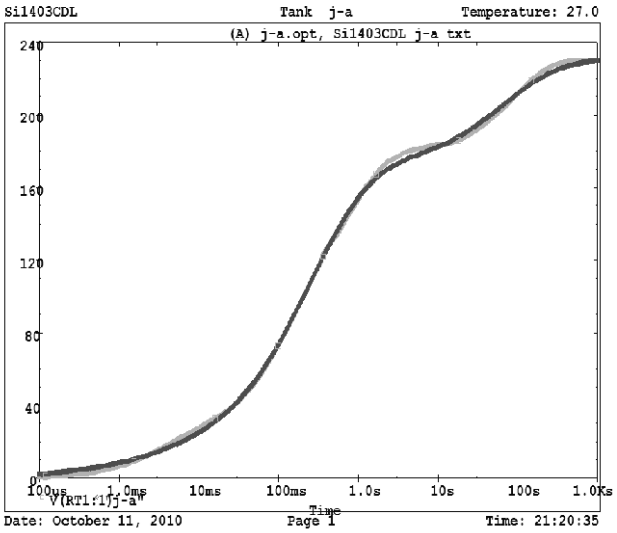
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

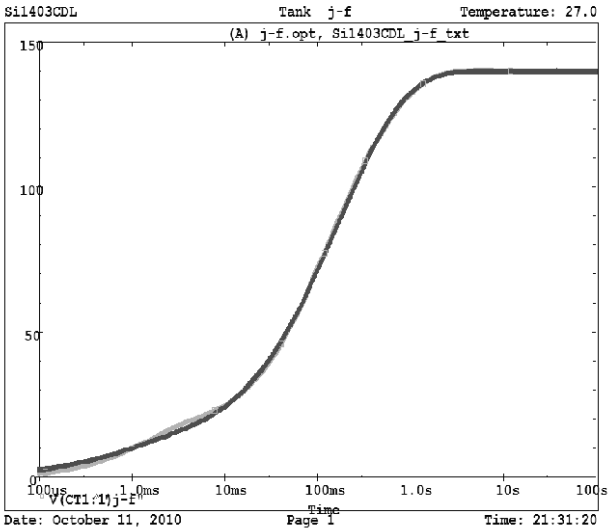
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	30.1077	N/A	22.1081
RF2	114.6807	N/A	64.1943
RF3	37.4877	N/A	28.2236
RF4	47.7239	N/A	25.0919
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	160.0955u	N/A	98.5241u
CF2	1.5995m	N/A	1.0460m
CF3	49.0846m	N/A	4.4566m
CF4	2.1148	N/A	2.8508m

Note
N/A indicates not applicable


Si1403CDL
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si1403CDL_j-a_txt
240
200
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: October 11, 2010
Page 1
Time: 21:20:35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Tank j-f
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150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
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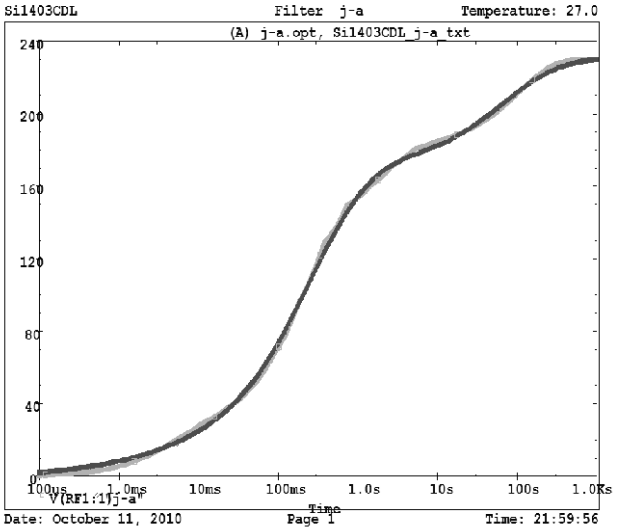
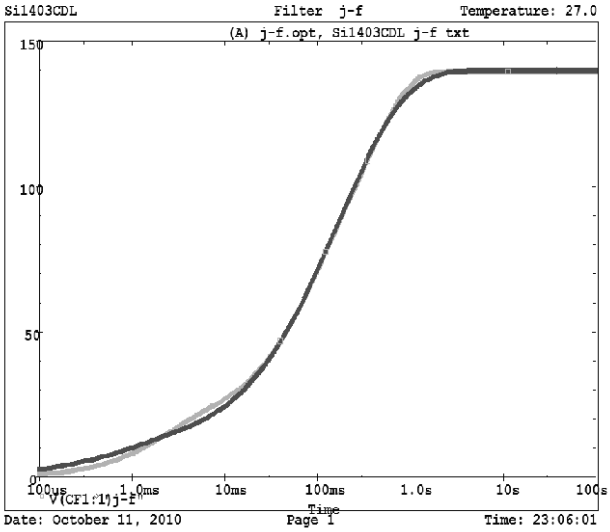
Time
Date: October 11, 2010
Page 1
Time: 21:31:20


Si1403CDL
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si1403CDL_j-a_txt
240
200
160
120
80
40
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: October 11, 2010
Page 1
Time: 21:59:56


Si1403CDL
Filter j-f
Temperature: 27.0
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150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f
Time
Date: October 11, 2010
Page 1
Time: 23:06:01