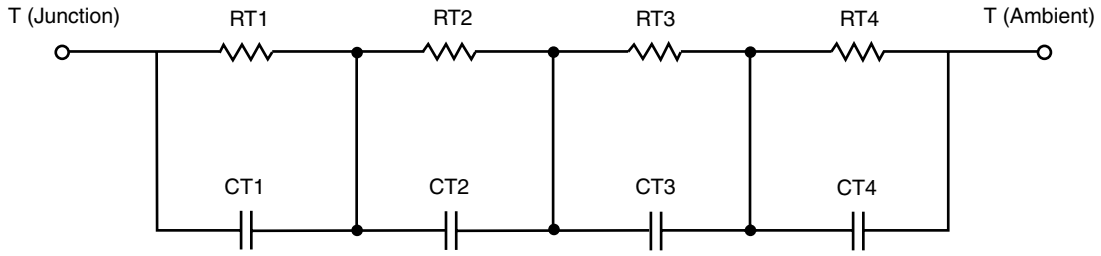
R-C Thermal Model Parameters

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

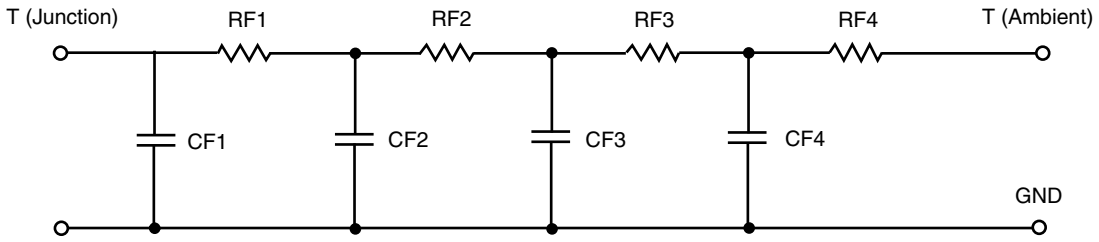


R-C VALUES FOR TANK CONFIGURATION				
THERMAL RESISTANCE (°C/W)				
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Case Ch1**	**Case Ch2**
RT1	14.7082	14.7082	495.3846 m	436.5056 m
RT2	30.5898	30.5898	1.0008	876.3434 m
RT3	6.7054	6.7054	731.4497 m	695.1824 m
RT4	14.9966	14.9966	2.3605	2.1917
THERMAL CAPACITANCE (Joules/°C)				
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Case Ch1**	**Case Ch2**
CT1	26.3066 m	49.1538 m	399.8426 u	223.0694 u
CT2	3.2045	4.3725	19.0079 m	23.3323 m
CT3	2.0534 m	1.6037 m	814.4707 u	775.9209 u
CT4	986.4239 m	1.7440	2.2103 m	2.3236 m

Note
N/A indicates not applicable

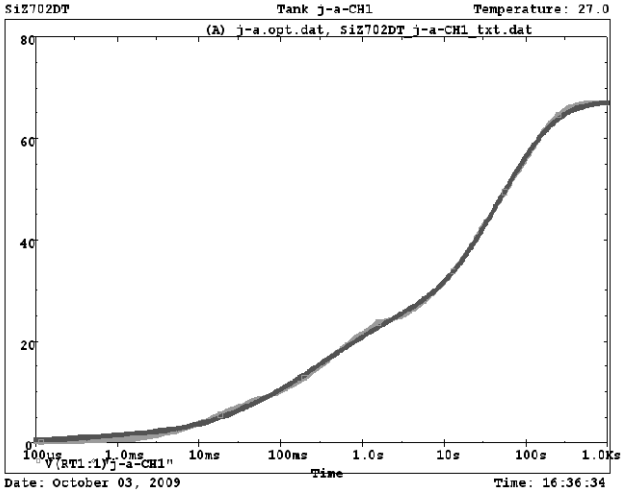
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

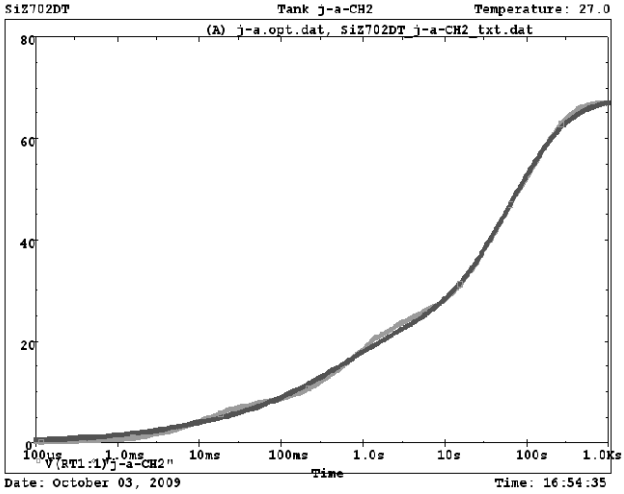
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION				
THERMAL RESISTANCE (°C/W)				
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Case Ch1**	**Case Ch2**
RF1	4.4943	4.4943	1.2621	1.2621
RF2	12.8155	12.8155	1.5857	1.5857
RF3	17.4763	17.4763	1.7430	1.7430
RF4	32.2139	32.2139	9.1895 m	9.1895 m
THERMAL CAPACITANCE (Joules/°C)				
Junction to	**Ambient Ch1**	**Ambient Ch2**	**Case Ch1**	**Case Ch2**
CF1	1.0224 m	793.7508 u	228.6402 u	260.2379 u
CF2	10.0350 m	18.8985 m	1.0973 m	1.2811 m
CF3	276.3036 m	495.3337 m	3.7966 m	5.5779 m
CF4	2.2346	2.8156	330.8974 u	4.0578 m

Note
N/A indicates not applicable


SiZ702DT
Tank j-a-CH1
Temperature: 27.0
(A) j-a.opt.dat, SiZ702DT_j-a-CH1_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a-CH1"
Time
Date: October 03, 2009
Time: 16:36:34


SiZ702DT
Tank j-a-CH2
Temperature: 27.0
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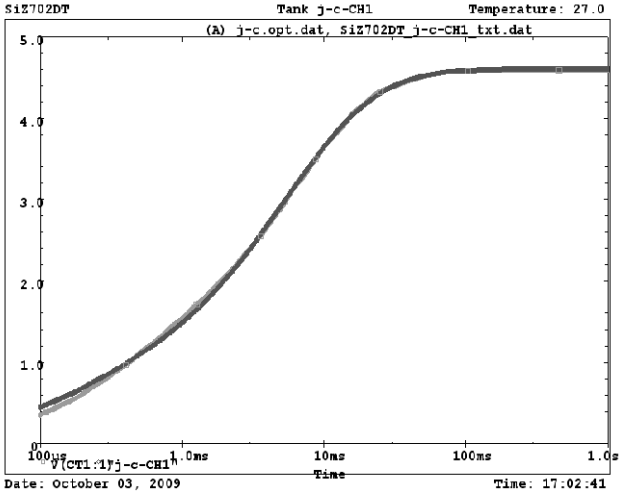
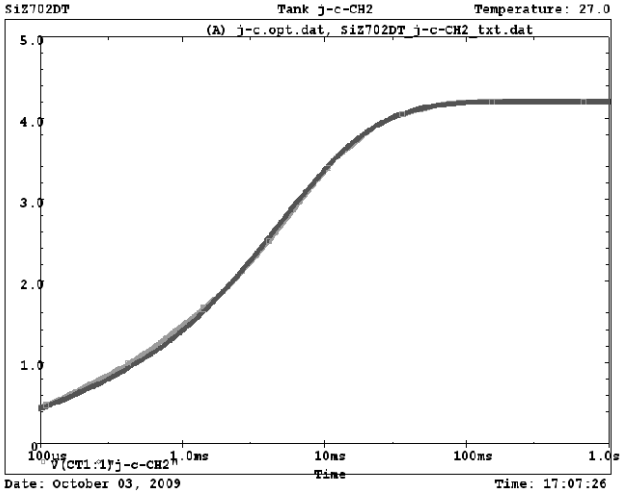
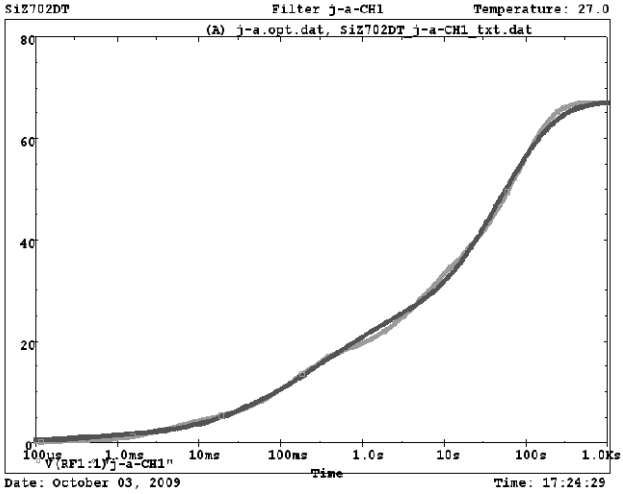
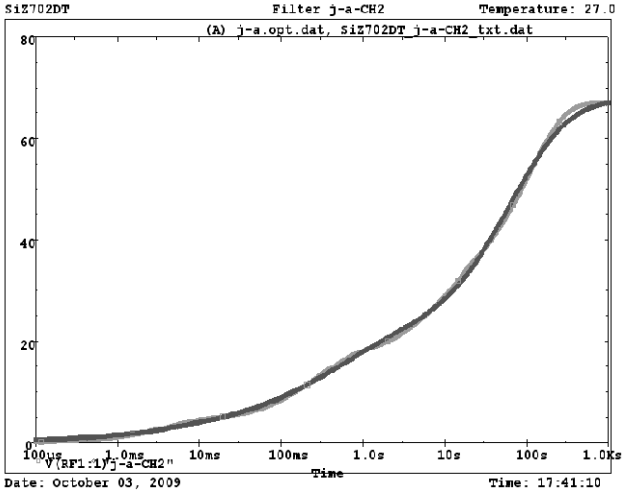
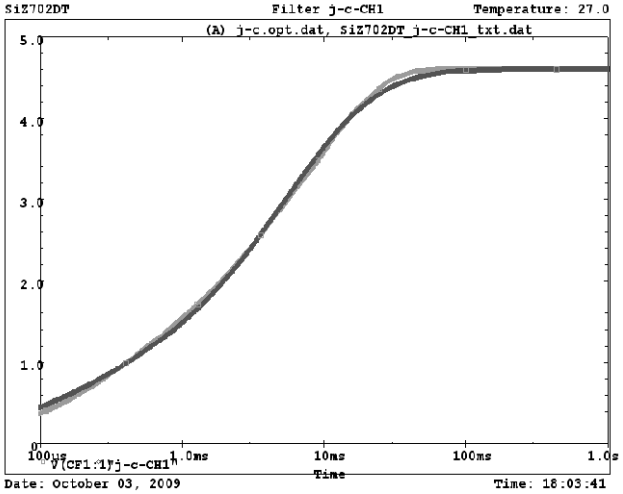
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a-CH2"
Time
Date: October 03, 2009
Time: 16:54:35

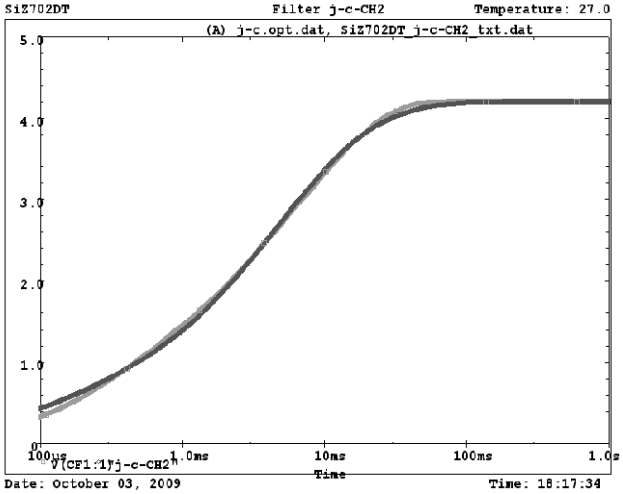

SiZ702DT
Tank j-c-CH1
Temperature: 27.0
(A) j-c.opt.dat, SiZ702DT_j-c-CH1_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c-CH1"
Time
Date: October 03, 2009
Time: 17:02:41


SiZ702DT
Tank j-c-CH2
Temperature: 27.0
(A) j-c.opt.dat, SiZ702DT_j-c-CH2_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c-CH2"
Time
Date: October 03, 2009
Time: 17:07:26


SiZ702DT
Filter j-a-CH1
Temperature: 27.0
(A) j-a.opt.dat, SiZ702DT_j-a-CH1_txt.dat
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a-CH1"
Time
Date: October 03, 2009
Time: 17:24:29


SiZ702DT
Filter j-a-CH2
Temperature: 27.0
(A) j-a.opt.dat, SiZ702DT_j-a-CH2_txt.dat
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a-CH2"
Time
Date: October 03, 2009
Time: 17:41:10


SiZ702DT
Filter j-c-CH1
Temperature: 27.0
(A) j-c.opt.dat, SiZ702DT_j-c-CH1_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100µs
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c-CH1"
Time
Date: October 03, 2009
Time: 18:03:41


SiZ702DT
Filter j-c-CH2
Temperature: 27.0
(A) j-c.opt.dat, SiZ702DT_j-c-CH2_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100µs
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c-CH2"
Time
Date: October 03, 2009
Time: 18:17:34