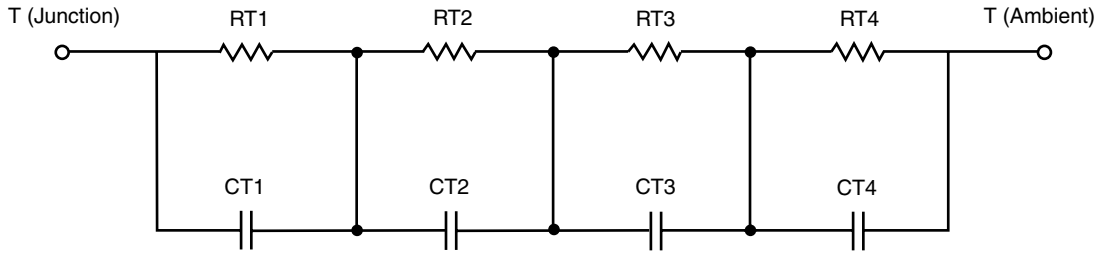
R-C Thermal Model Parameters

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

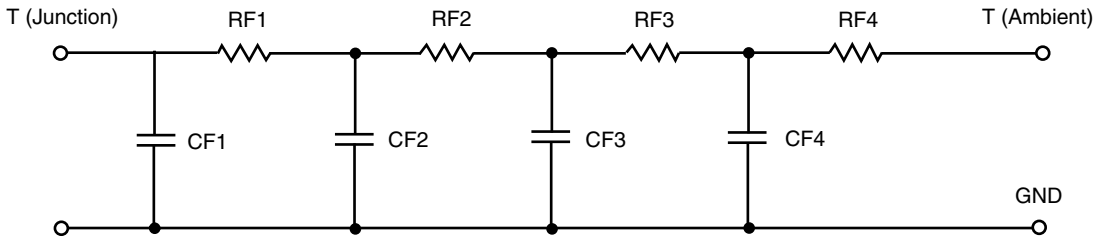


R-C VALUES FOR TANK CONFIGURATION				
THERMAL RESISTANCE (°C/W)				
Junction to	**Ambient NCh**	**Ambient PCh**	**Foot NCh**	**Foot PCh**
RT1	52.8352	53.3233	14.8220	14.8220
RT2	22.0573	25.2052	6.8495	6.8495
RT3	32.8529	23.5833	3.7056	3.7056
RT4	12.2516	7.9958	19.6229	19.6229
THERMAL CAPACITANCE (Joules/°C)				
Junction to	**Ambient NCh**	**Ambient PCh**	**Foot NCh**	**Foot PCh**
CT1	1.7341	1.5106	8.6874 m	8.6874 m
CT2	255.4414 m	95.7363 m	4.4203 m	4.4203 m
CT3	18.4099 m	15.2465 m	236.2442 u	236.2442 u
CT4	1.8398 m	1.4099 m	55.0310 m	55.0310 m

Note
N/A indicates not applicable

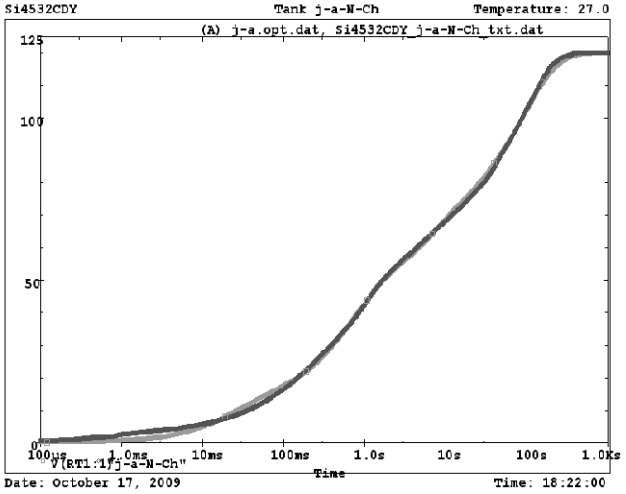
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

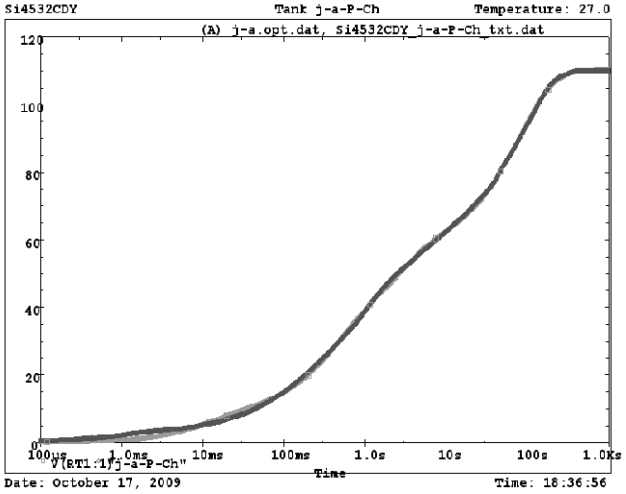
R-C THERMAL MODEL FOR FILTER CONFIGURATION

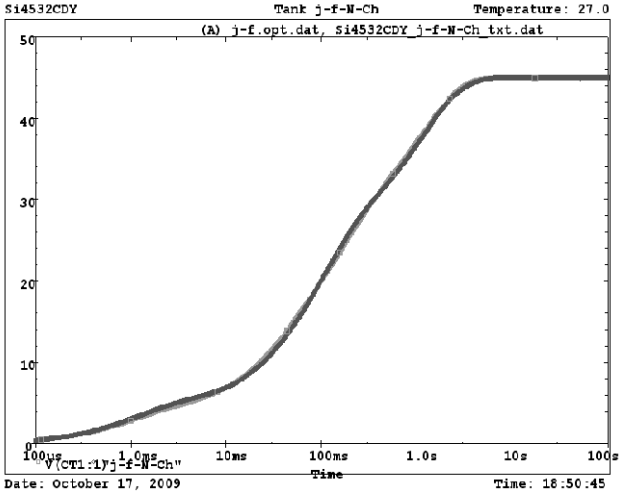


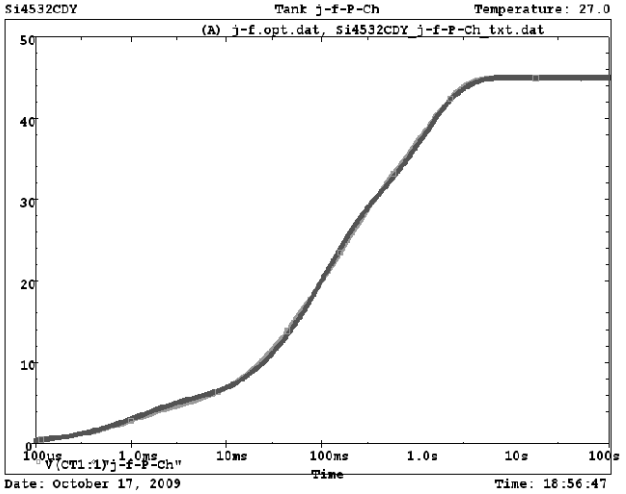
R-C VALUES FOR FILTER CONFIGURATION				
THERMAL RESISTANCE (°C/W)				
Junction to	**Ambient NCh**	**Ambient PCh**	**Foot NCh**	**Foot PCh**
RF1	17.6927	9.2939	5.8436	5.8436
RF2	42.5855	33.9552	21.9899	21.9899
RF3	24.4834	19.1386	4.7985	4.7985
RF4	35.2384	47.5084	12.3680	12.3680
THERMAL CAPACITANCE (Joules/°C)				
Junction to	**Ambient NCh**	**Ambient PCh**	**Foot NCh**	**Foot PCh**
CF1	2.0928 m	1.1169 m	303.3104 u	303.3104 u
CF2	22.5725 m	12.9591 m	4.0071 m	4.0071 m
CF3	958.7321 m	173.4186 m	50.6580 m	50.6580 m
CF4	789.0242 m	1.5086	5.1352 m	5.1352 m

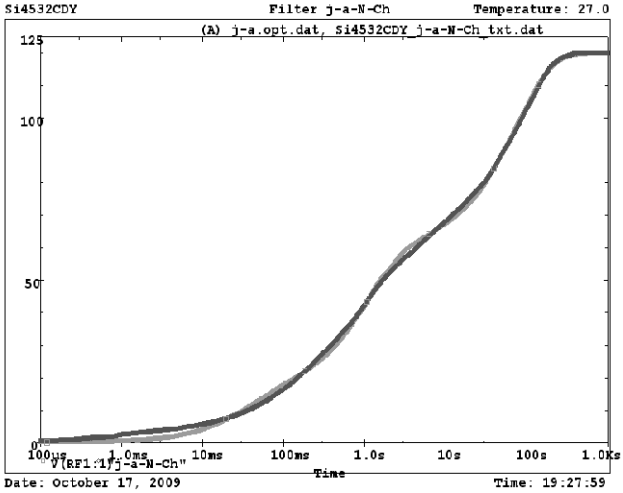
Note
N/A indicates not applicable

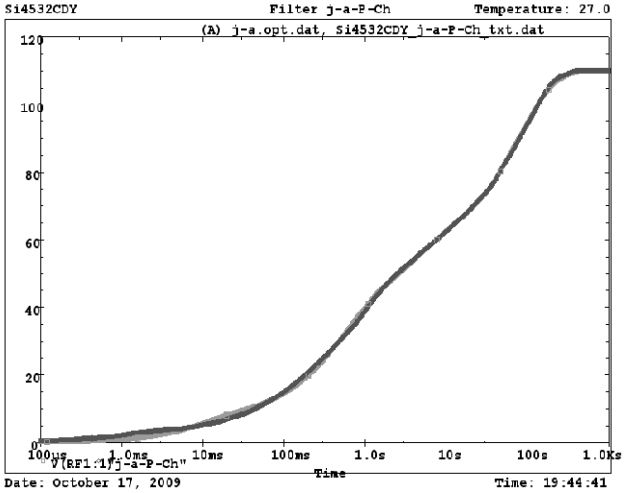

Si4532CDY
Tank j-a-N-Ch
Temperature: 27.0
(A) j-a.opt.dat, Si4532CDY_j-a-N-Ch_txt.dat
125
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a-N-Ch"
Time
Date: October 17, 2009
Time: 18:22:00

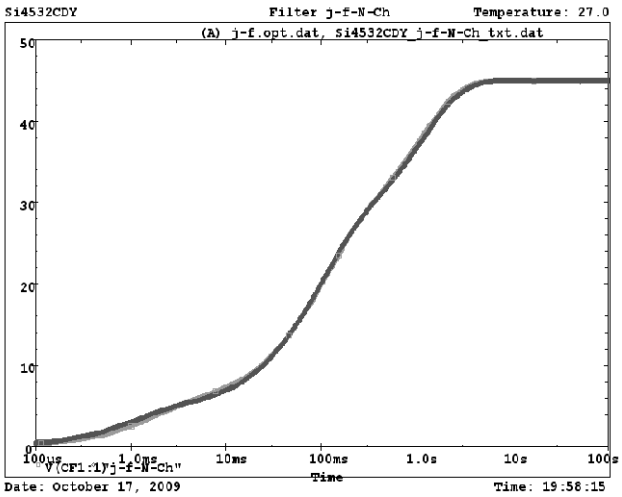

Si4532CDY
Tank j-a-P-Ch
Temperature: 27.0
(A) j-a.opt.dat, Si4532CDY_j-a-P-Ch_txt.dat
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a-P-Ch"
Time
Date: October 17, 2009
Time: 18:36:56

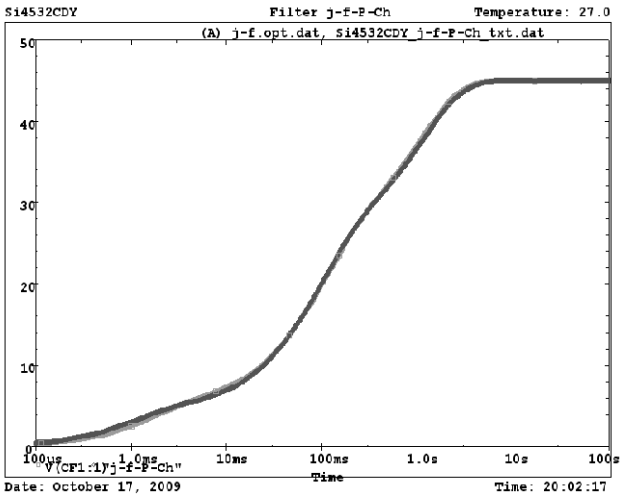

Si4532CDY
Tank j-f-N-Ch
Temperature: 27.0
(A) j-f.opt.dat, Si4532CDY_j-f-N-Ch_txt.dat
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)j-f-N-Ch"
Time
Date: October 17, 2009
Time: 18:50:45


Si4532CDY
Tank j-f-P-Ch
Temperature: 27.0
(A) j-f.opt.dat, Si4532CDY_j-f-P-Ch_txt.dat
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)j-f-P-Ch"
Time
Date: October 17, 2009
Time: 18:56:47


Si4532CDY
Filter j-a-N-Ch
Temperature: 27.0
(A) j-a.opt.dat, Si4532CDY_j-a-N-Ch_txt.dat
125
100
50
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a-N-Ch"
Time
Date: October 17, 2009
Time: 19:27:59


Si4532CDY
Filter j-a-P-Ch
Temperature: 27.0
(A) j-a.opt.dat, Si4532CDY_j-a-P-Ch_txt.dat
120
100
80
60
40
20
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a-P-Ch"
Time
Date: October 17, 2009
Time: 19:44:41


Si4532CDY
Filter j-f-N-Ch
Temperature: 27.0
(A) j-f.opt.dat, Si4532CDY_j-f-N-Ch_txt.dat
50
40
30
20
10
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f-N-Ch"
Time
Date: October 17, 2009
Time: 19:58:15


Si4532CDY
Filter j-f-P-Ch
Temperature: 27.0
(A) j-f.opt.dat, Si4532CDY_j-f-P-Ch_txt.dat
50
40
30
20
10
0
100µs
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)j-f-P-Ch"
Time
Date: October 17, 2009
Time: 20:02:17