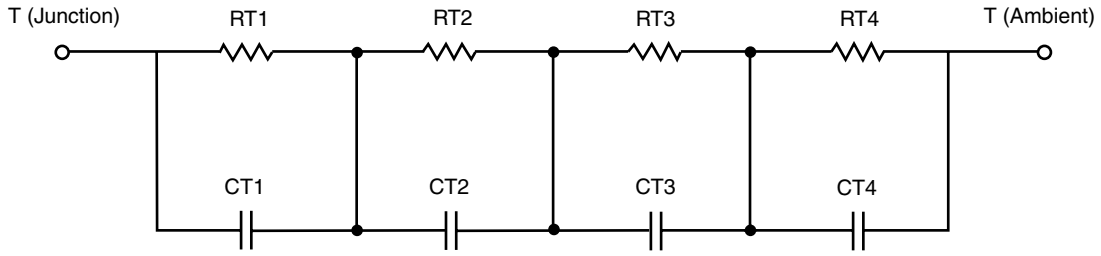
R-C Thermal Model Parameters

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

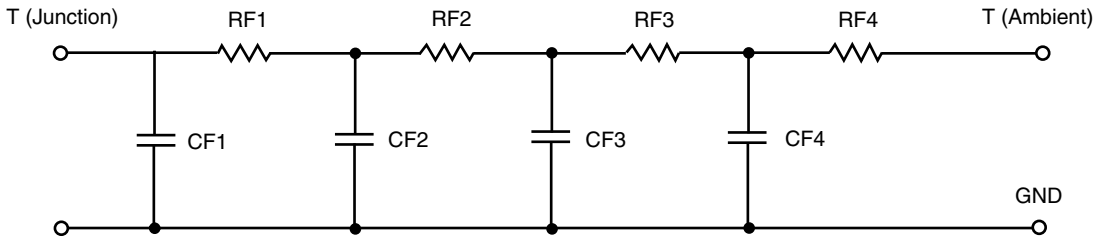


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	53.4765	N/A	14.4528
RT2	22.1046	N/A	5.7622
RT3	25.4982	N/A	4.9229
RT4	8.8428	N/A	19.9448
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.3632	N/A	12.0919 m
CT2	77.7025 m	N/A	8.6216 m
CT3	20.1195 m	N/A	356.8766 u
CT4	907.0516 u	N/A	60.7886 m

Note
N/A indicates not applicable

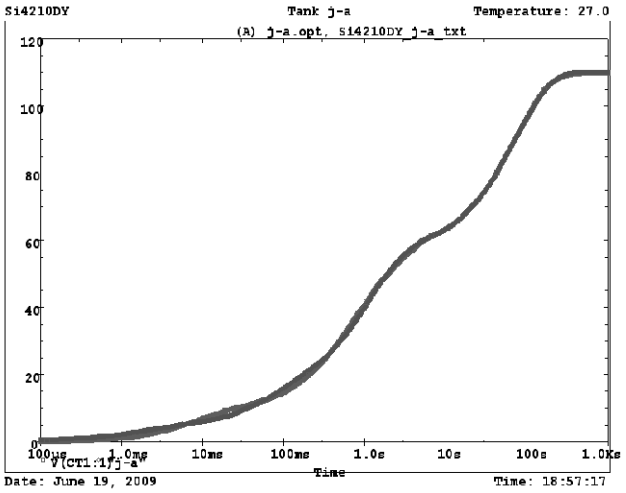
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

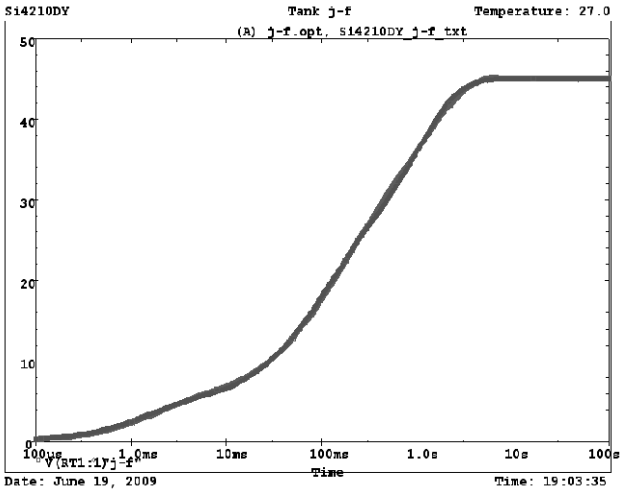
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.3127	N/A	4.0544
RF2	42.3768	N/A	19.8871
RF3	15.7401	N/A	7.4008
RF4	39.5215	N/A	13.5360
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.2860 m	N/A	232.3903 u
CF2	18.9312 m	N/A	3.6830 m
CF3	737.7805 m	N/A	40.8297 m
CF4	986.5641 m	N/A	1.5238 m

Note
N/A indicates not applicable


Si4210DY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4210DY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CT1:1)j-a
Time
Date: June 19, 2009
Time: 18:57:17


Si4210DY
Tank j-f
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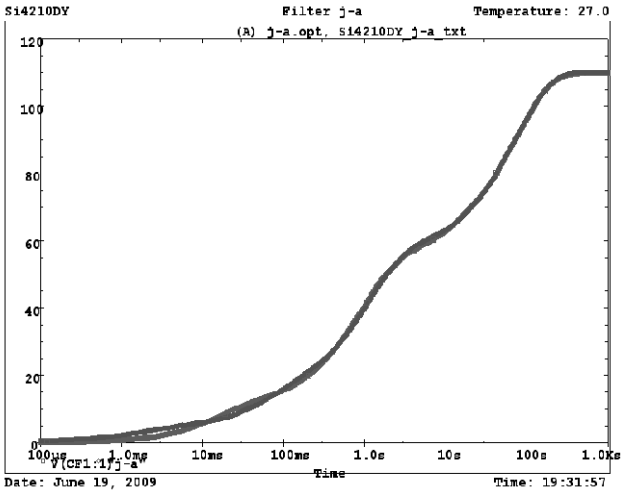
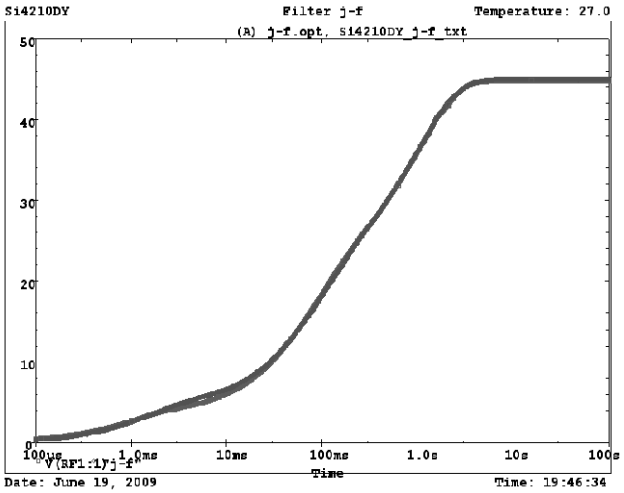
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RT1:1)j-f
Time
Date: June 19, 2009
Time: 19:03:35


Si4210DY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4210DY_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CF1:1)j-a
Time
Date: June 19, 2009
Time: 19:31:57


Si4210DY
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RF1:1)j-f
Time
Date: June 19, 2009
Time: 19:46:34