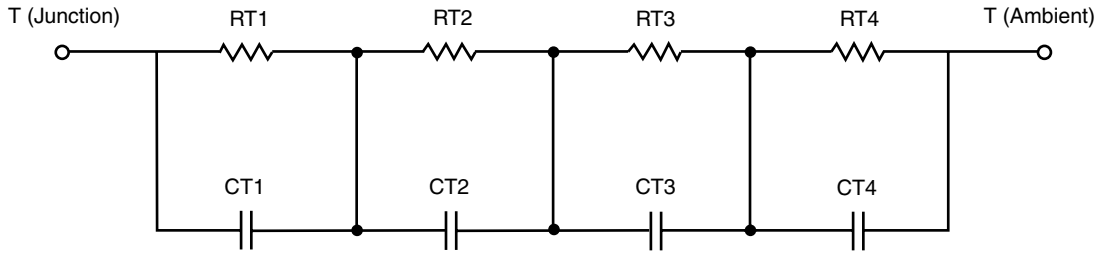
R-C Thermal Model Parameters

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

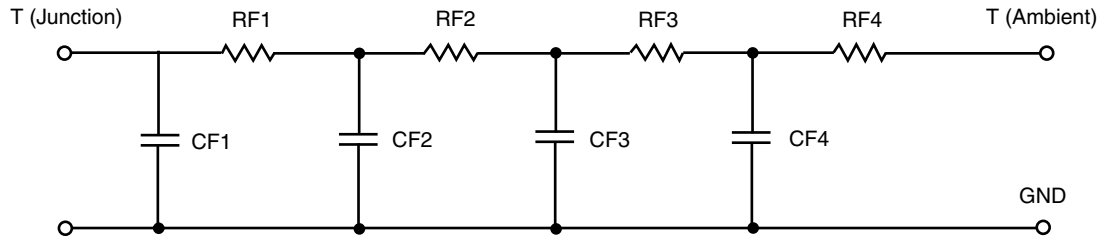


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	23.6265	N/A	12.3708
RT2	20.9029	N/A	14.9717
RT3	11.1101	N/A	3.7841
RT4	53.5518	N/A	8.8159
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	15.0352 m	N/A	113.3485 m
CT2	135.1089 m	N/A	9.1459 m
CT3	1.9921 m	N/A	429.2158 u
CT4	1.3526	N/A	5.5095 m

Note
N/A indicates not applicable

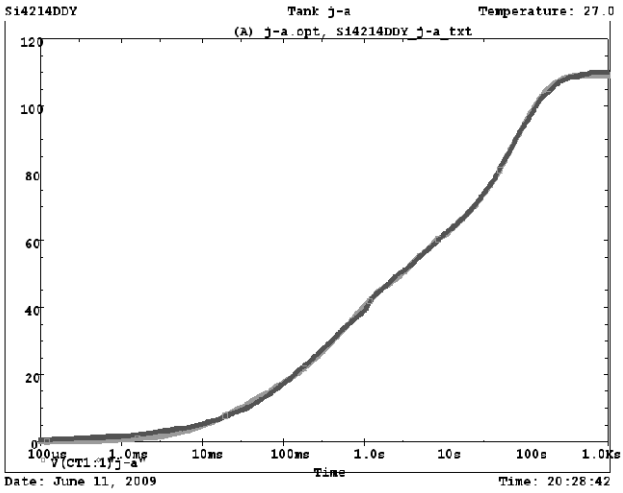
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

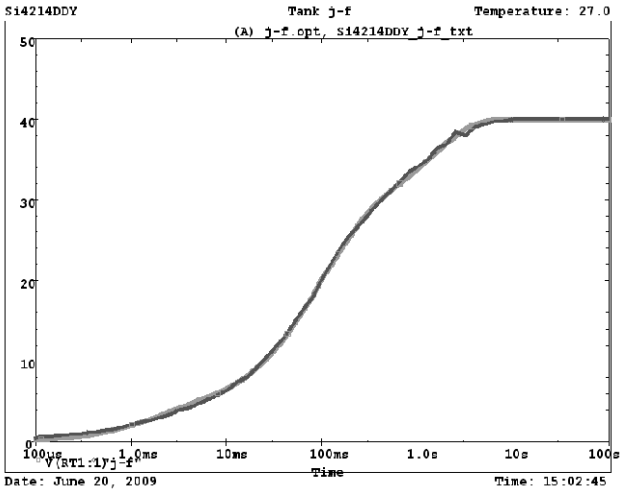
R-C THERMAL MODEL FOR FILTER CONFIGURATION

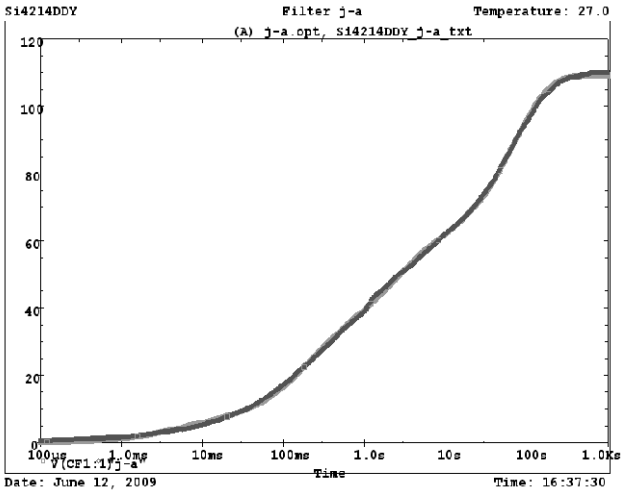


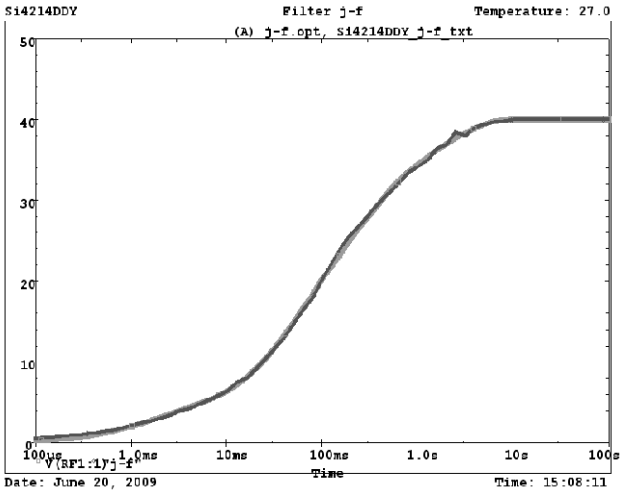
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.3685	N/A	4.1528
RF2	26.9574	N/A	18.1112
RF3	25.0852	N/A	11.5649
RF4	50.7311	N/A	6.2301
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	721.0354 u	N/A	370.3832 u
CF2	6.2261 m	N/A	2.5799 m
CF3	78.1390 m	N/A	20.6769 m
CF4	1.3175	N/A	271.6927 m

Note
N/A indicates not applicable


Si4214DDY
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si4214DDY_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 11, 2009
Time: 20:28:42


Si4214DDY
Tank j-f
Temperature: 27.0
(A) j-f.opt, Si4214DDY_j-f_txt
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RT1:1)j-f
Time
Date: June 20, 2009
Time: 15:02:45


Si4214DDY
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si4214DDY_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 12, 2009
Time: 16:37:30


Si4214DDY
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si4214DDY_j-f_txt
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(RF1:1)j-f
Time
Date: June 20, 2009
Time: 15:08:11