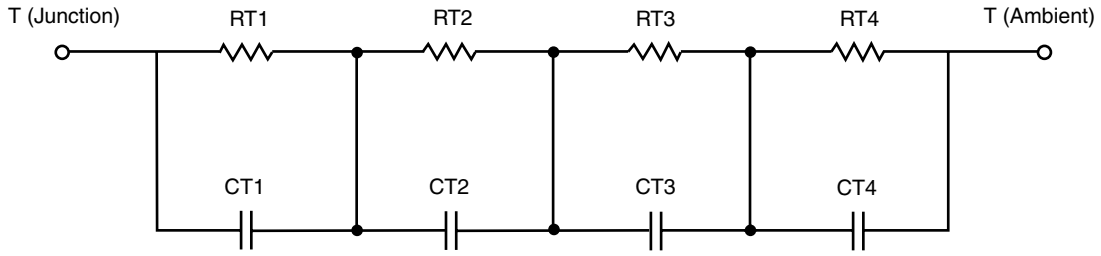
R-C Thermal Model Parameters

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

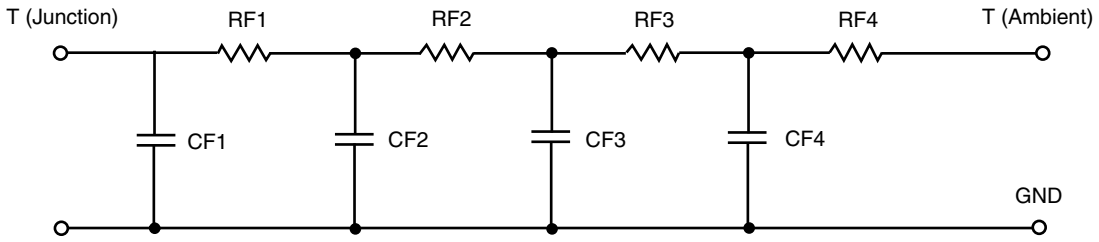


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	3.8849	510.3499 m	N/A
RT2	8.2386	94.1594 m	N/A
RT3	13.5996	447.9433 m	N/A
RT4	28.2769	145.3600 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	26.7460 m	27.1531 m	N/A
CT2	218.1842 m	89.1225 m	N/A
CT3	1.9208	205.8036 m	N/A
CT4	4.0711	1.1651 m	N/A

Note
N/A indicates not applicable

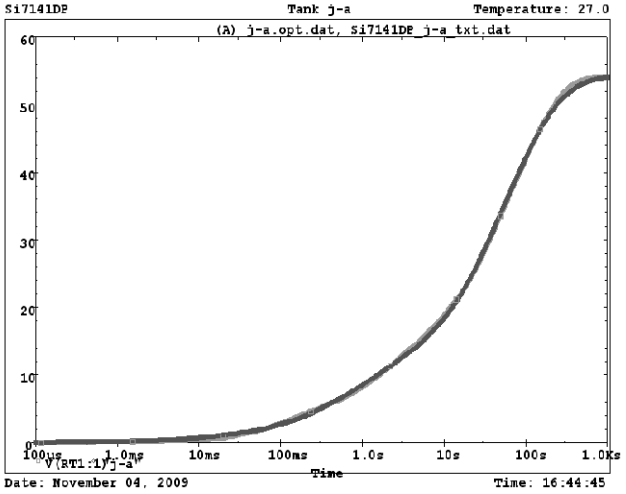
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

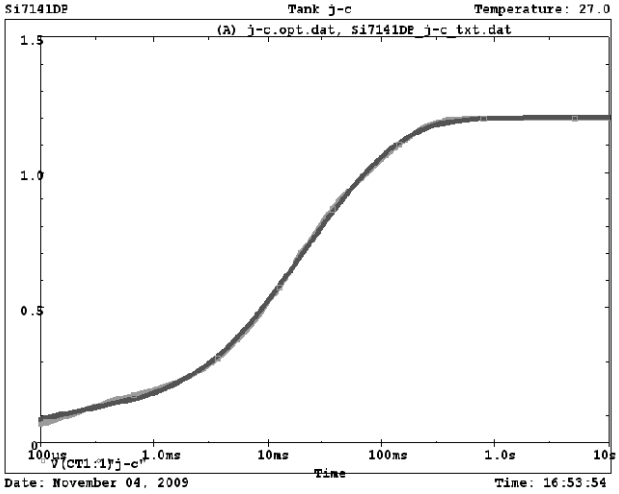
R-C THERMAL MODEL FOR FILTER CONFIGURATION

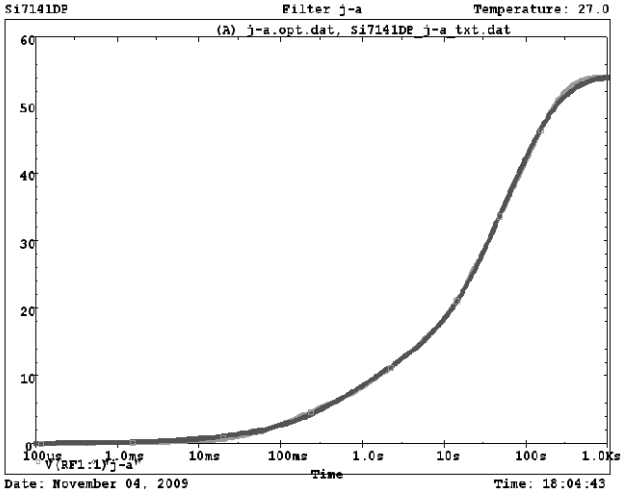


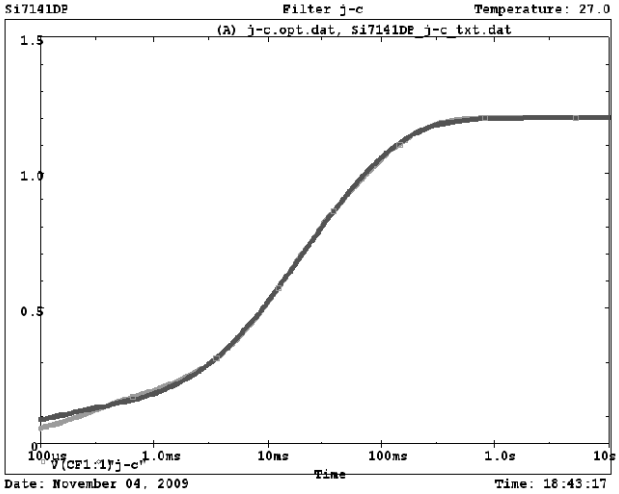
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.2830	172.9307 m	N/A
RF2	7.8721	619.8561 m	N/A
RF3	22.0853	302.1613 m	N/A
RF4	18.7596	105.5382 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	25.2305 m	1.4148 m	N/A
CF2	165.9454 m	17.3566 m	N/A
CF3	916.6229 m	131.5241 m	N/A
CF4	4.7147	840.3169 m	N/A

Note
N/A indicates not applicable


Si7141DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7141DP_j-a_txt.dat
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: November 04, 2009
Time: 16:44:45


Si7141DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7141DP_j-c_txt.dat
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: November 04, 2009
Time: 16:53:54


Si7141DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7141DP_j-a_txt.dat
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: November 04, 2009
Time: 18:04:43


Si7141DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7141DP_j-c_txt.dat
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: November 04, 2009
Time: 18:43:17