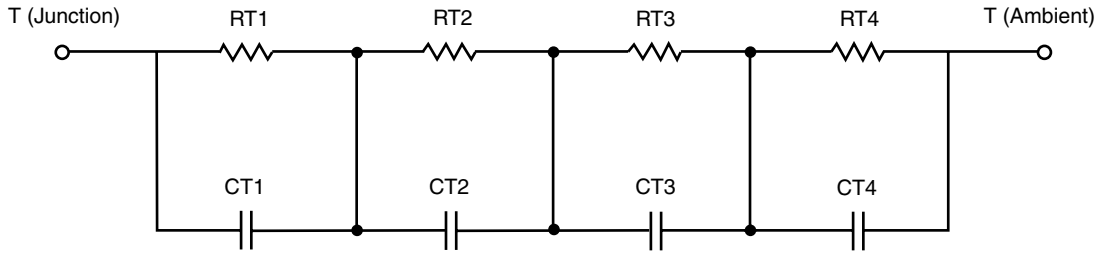
R-C Thermal Model Parameters

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

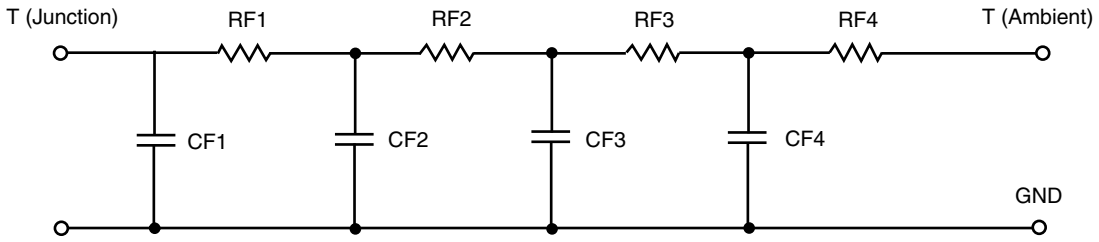


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	1.6613	1.3034 m	N/A
RT2	13.0652	763.6878 m	N/A
RT3	9.6356	1.5617	N/A
RT4	45.6379	1.1817	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.7028 m	5.8945 m	N/A
CT2	404.1676 m	817.8719 u	N/A
CT3	34.5603 m	13.5081 m	N/A
CT4	1.6050	11.1512 m	N/A

Note
N/A indicates not applicable

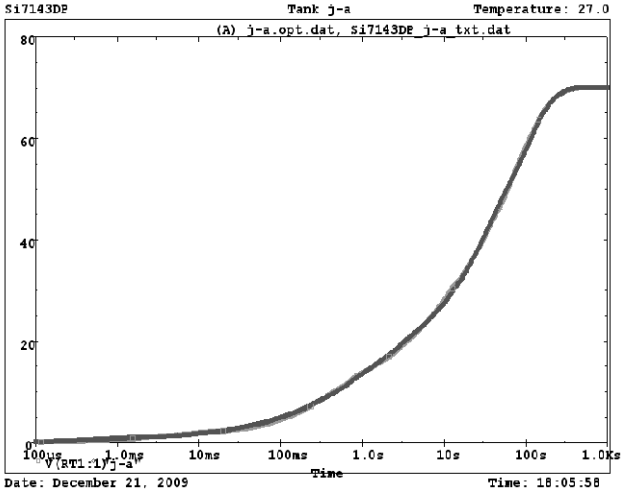
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

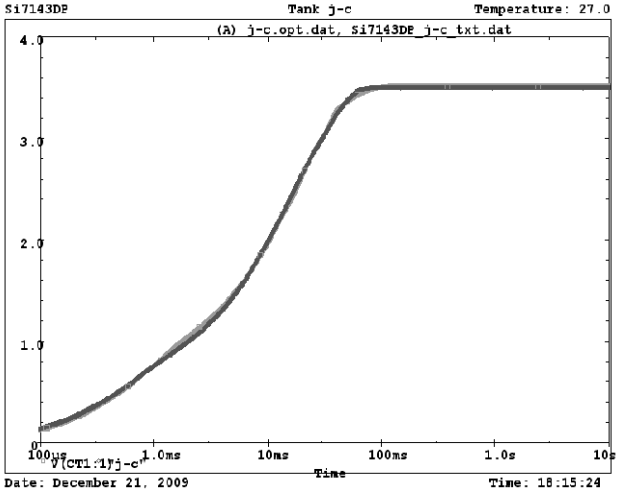
R-C THERMAL MODEL FOR FILTER CONFIGURATION

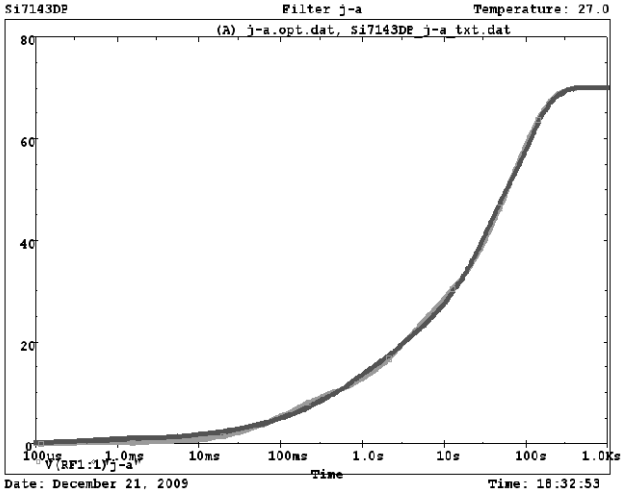


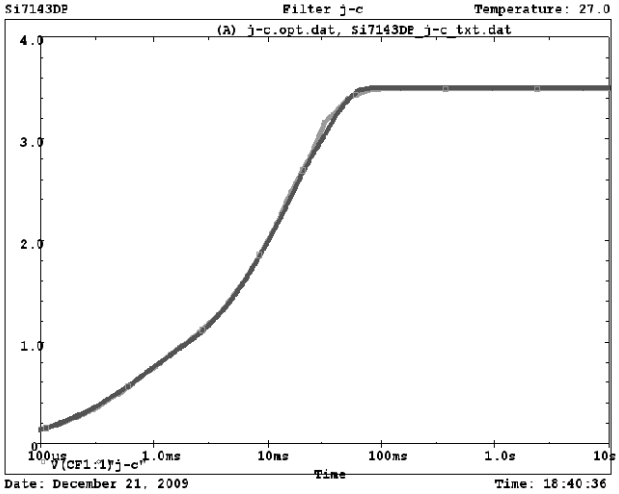
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	8.8695	1.8143 m	N/A
RF2	5.2485	880.7106 m	N/A
RF3	12.8089	1.6900	N/A
RF4	43.0731	916.3063 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	12.0517 m	172.7263 u	N/A
CF2	168.3078 m	503.1365 u	N/A
CF3	1.8403 m	5.1743 m	N/A
CF4	1.4269	367.1440 u	N/A

Note
N/A indicates not applicable


Si7143DP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7143DP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: December 21, 2009
Time: 18:05:58


Si7143DP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7143DP_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: December 21, 2009
Time: 18:15:24


Si7143DP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7143DP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: December 21, 2009
Time: 18:32:53


Si7143DP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7143DP_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: December 21, 2009
Time: 18:40:36