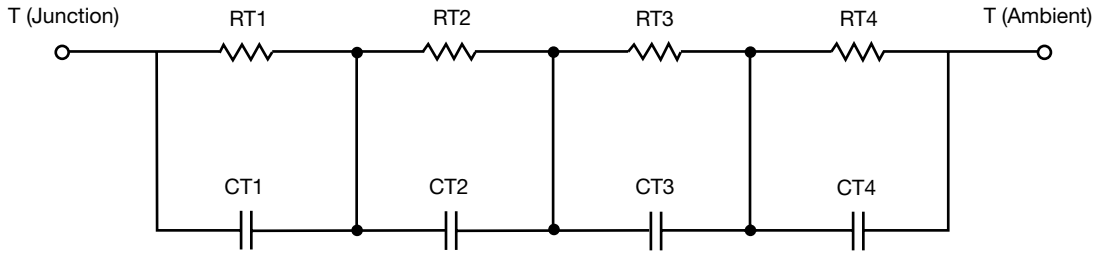
R-C Thermal Model Parameters

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

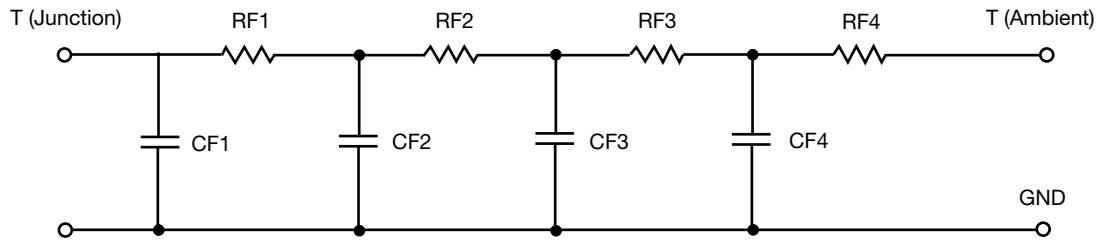


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	24.9998	828.7780 m	N/A
RT2	28.9808	773.3808 m	N/A
RT3	11.6530	300.5467 m	N/A
RT4	4.1921	1.4008	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.5636	21.9176 m	N/A
CT2	4.5631	865.4559 u	N/A
CT3	99.9148 m	71.9584 m	N/A
CT4	8.5036 m	12.4943 m	N/A

Note
N/A indicates not applicable

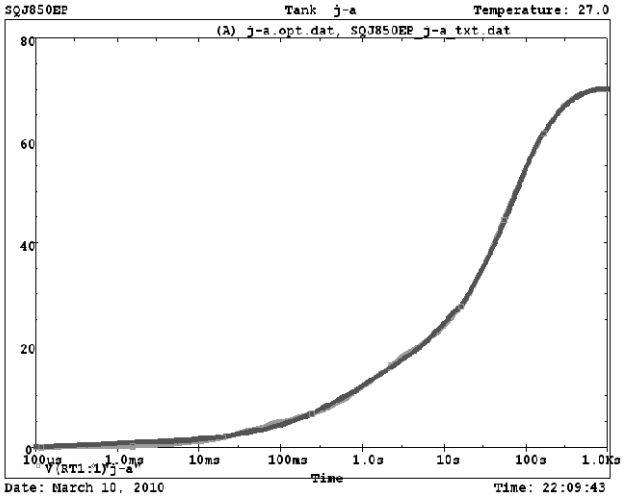
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

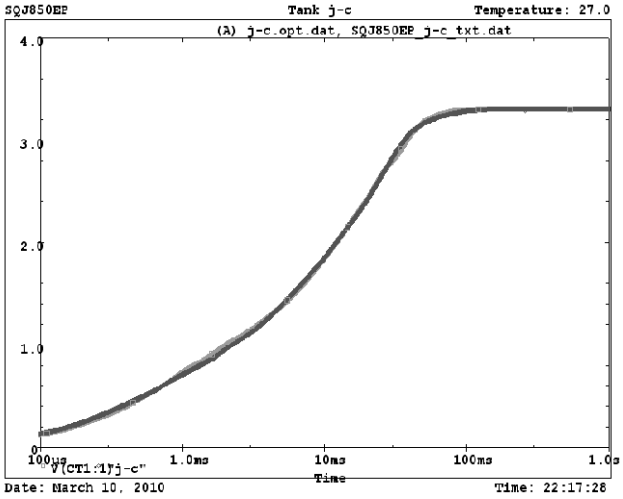
R-C THERMAL MODEL FOR FILTER CONFIGURATION

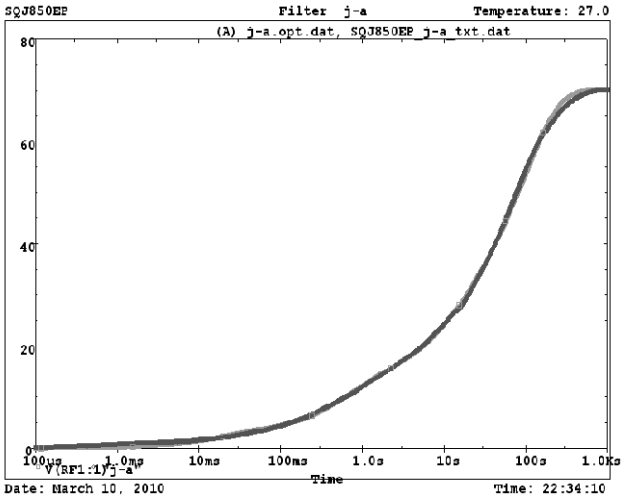


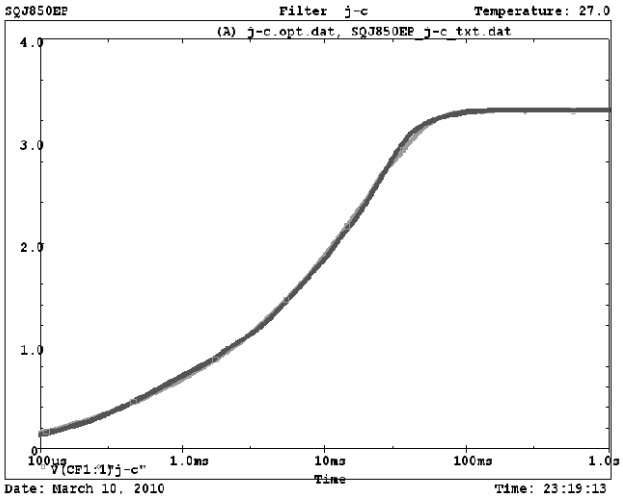
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.4789	557.1881 m	N/A
RF2	11.0804	866.9523 m	N/A
RF3	19.4867	807.5158 m	N/A
RF4	35.9540	1.0685	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	5.1652 m	570.4000 u	N/A
CF2	53.9763 m	2.3094 m	N/A
CF3	612.4319 m	4.7749 m	N/A
CF4	1.8616	5.5774 m	N/A

Note
N/A indicates not applicable


SQJ850EP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SQJ850EP_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: March 10, 2010
Time: 22:09:43


SQJ850EP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SQJ850EP_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)/j-c"
Time
Date: March 10, 2010
Time: 22:17:28


SQJ850EP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SQJ850EP_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: March 10, 2010
Time: 22:34:10


SQJ850EP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SQJ850EP_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)/j-c"
Time
Date: March 10, 2010
Time: 23:19:13