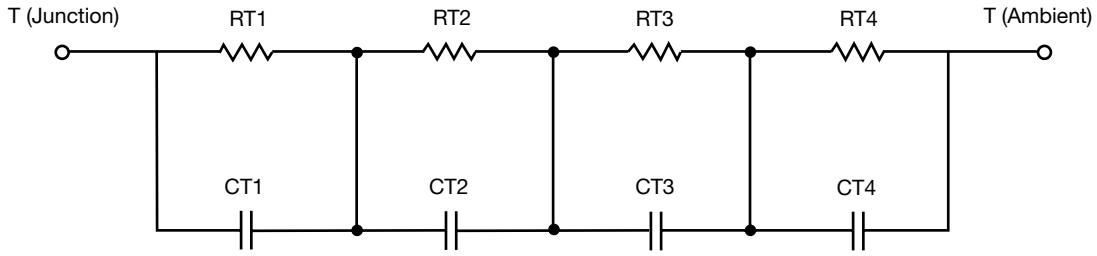
R-C Thermal Model Parameters

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



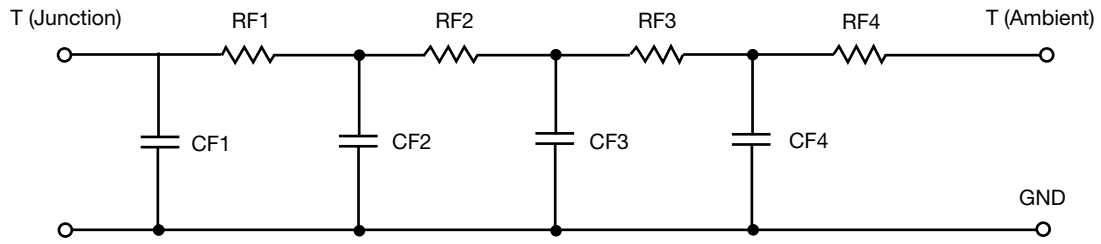
R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	3.1170	856.3058 m	N/A
RT2	9.1451	734.8937 m	N/A
RT3	6.4872	134.2005 m	N/A
RT4	51.2507	1.7746	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	11.4387 m	1.1727 m	N/A
CT2	293.3753 m	23.6191 m	N/A
CT3	89.9906 m	128.9962 m	N/A
CT4	1.2389	7.8207 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.

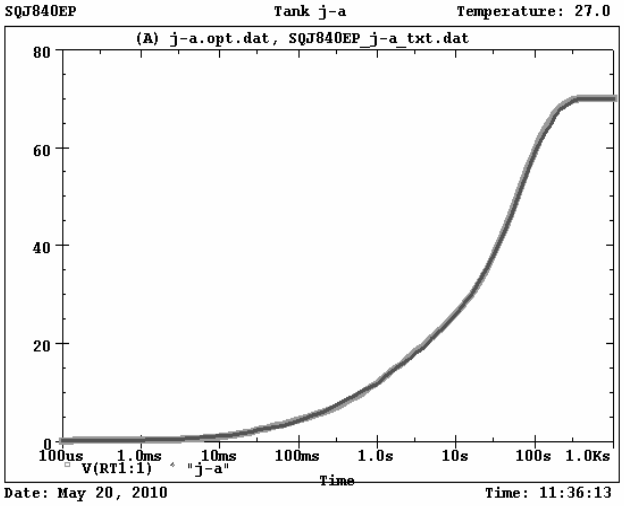
R-C THERMAL MODEL FOR FILTER CONFIGURATION

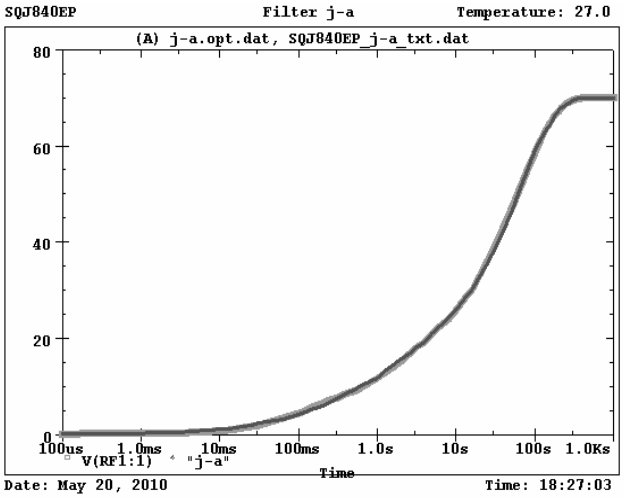


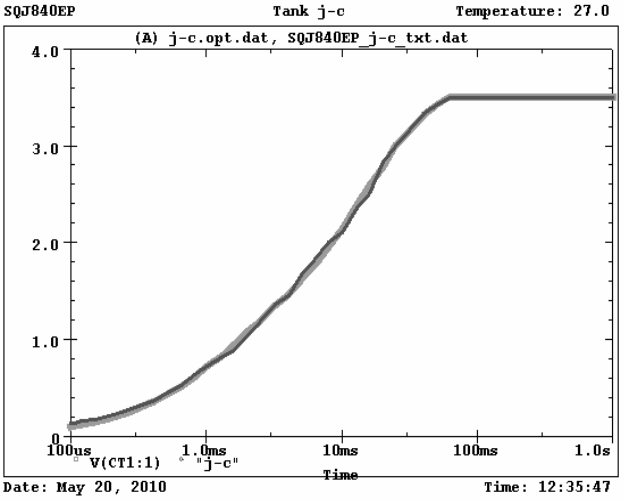
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.9992	1.3629	N/A
RF2	12.3507	2.0497	N/A
RF3	25.3575	68.3108 m	N/A
RF4	25.2926	19.0892 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	13.9180 m	1.0372 m	N/A
CF2	122.0332 m	5.9671 m	N/A
CF3	730.5815 m	82.6848 m	N/A
CF4	1.5305	1.3553 m	N/A

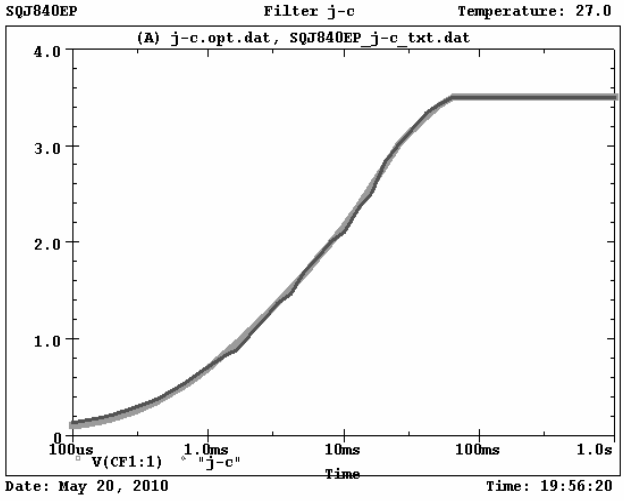
Note

- N/A indicates not applicable


SQJ840EP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SQJ840EP_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: May 20, 2010
Time: 11:36:13


SQJ840EP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SQJ840EP_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: May 20, 2010
Time: 18:27:03


SQJ840EP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SQJ840EP_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: May 20, 2010
Time: 12:35:47


SQJ840EP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SQJ840EP_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: May 20, 2010
Time: 19:56:20