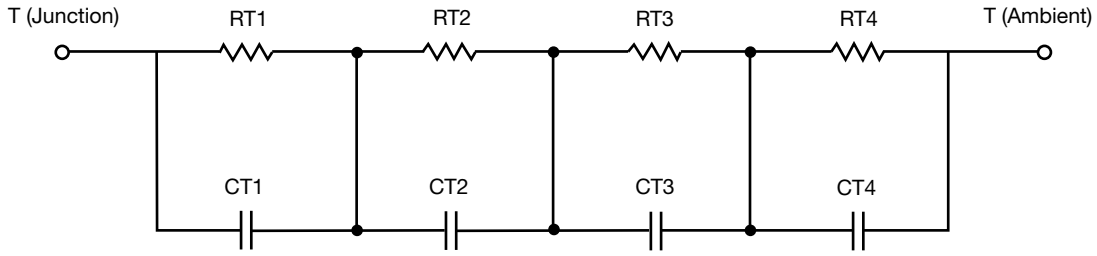
R-C Thermal Model Parameters

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

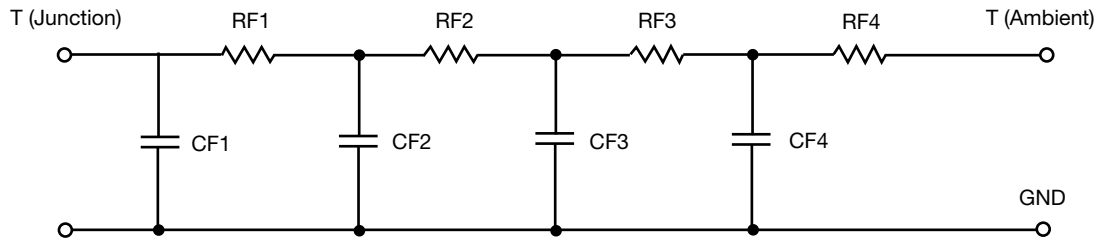


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.7277	240.2460m	N/A
RT2	24.8646	83.7415m	N/A
RT3	767.8000m	144.9113m	N/A
RT4	2.6399	131.1012m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	8.4352	63.3725m	N/A
CT2	3.6997	5.2297	N/A
CT3	198.4029m	5.2886m	N/A
CT4	688.3596m	24.0661m	N/A

Note
N/A indicates not applicable

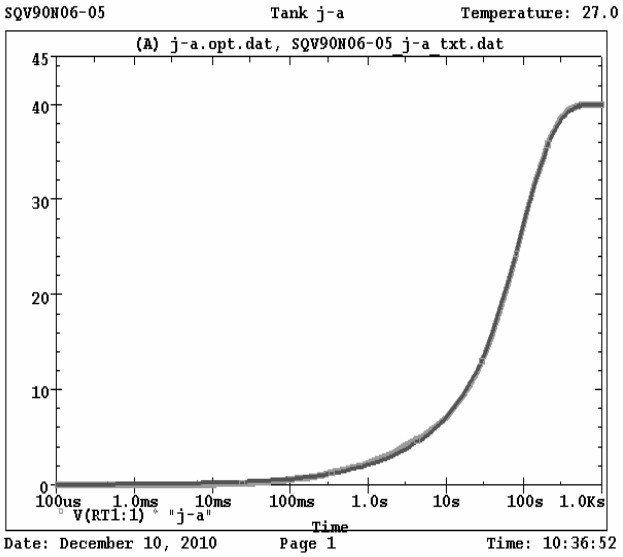
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

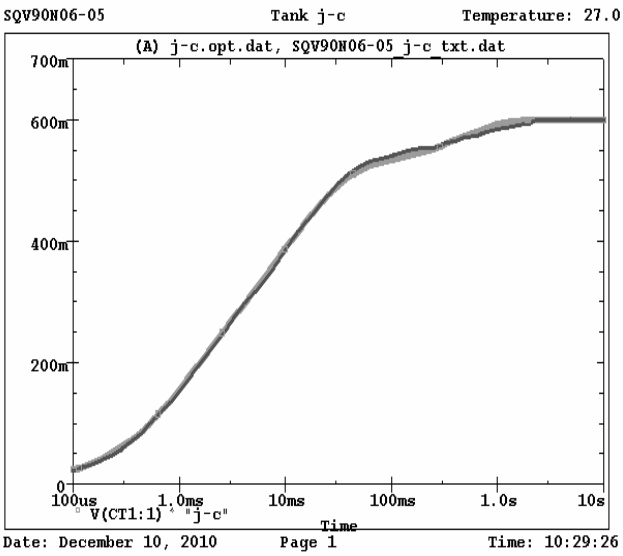
R-C THERMAL MODEL FOR FILTER CONFIGURATION

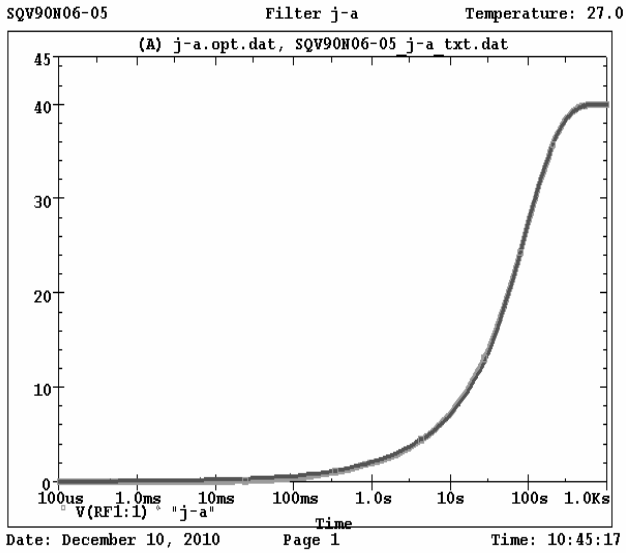


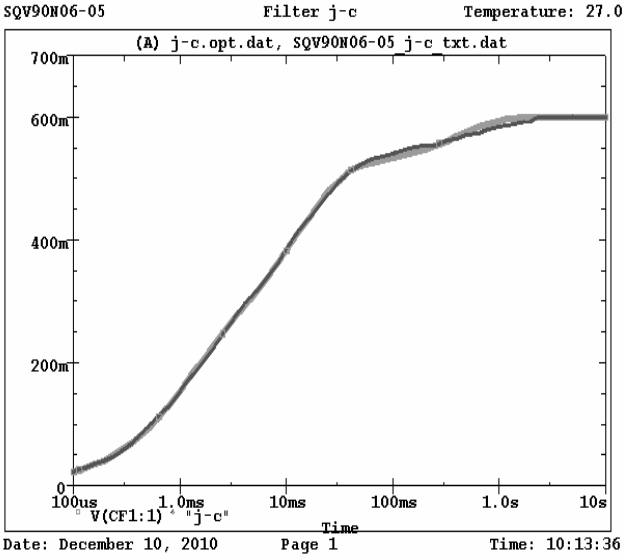
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.9086	261.1650m	N/A
RF2	7.1183	134.8792m	N/A
RF3	22.9377	122.9513m	N/A
RF4	8.0354	81.0045m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	231.9881m	4.3706m	N/A
CF2	885.9552m	40.5427m	N/A
CF3	1.7868	6.0027m	N/A
CF4	1.4745	4.7349	N/A

Note
N/A indicates not applicable


SQV90N06-05
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, SQV90N06-05_j-a_txt.dat
45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) - "j-a"
Time
Date: December 10, 2010
Page 1
Time: 10:36:52


SQV90N06-05
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SQV90N06-05_j-c_txt.dat
700m
600m
400m
200m
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1) - "j-c"
Time
Date: December 10, 2010
Page 1
Time: 10:29:26


SQV90N06-05
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, SQV90N06-05_j-a_txt.dat
45
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) - "j-a"
Time
Date: December 10, 2010
Page 1
Time: 10:45:17


SQV90N06-05
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SQV90N06-05_j-c_txt.dat
700m
600m
400m
200m
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1) - "j-c"
Time
Date: December 10, 2010
Page 1
Time: 10:13:36