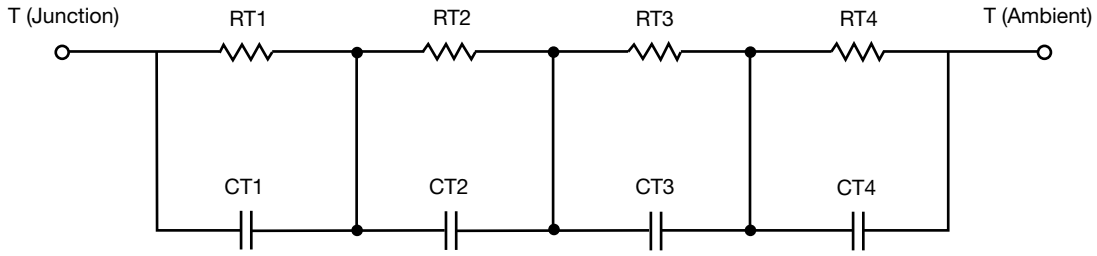
R-C Thermal Model Parameters

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

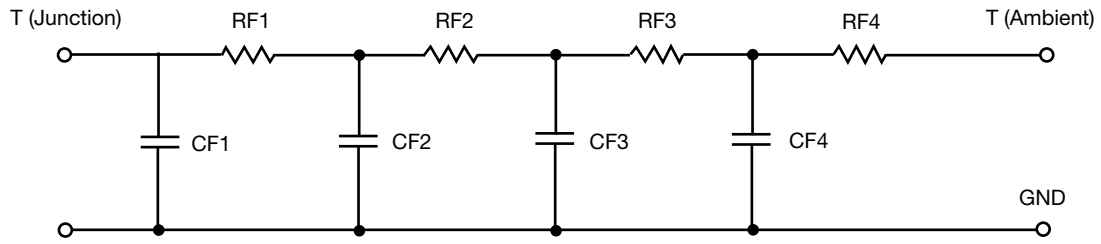


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	6.8143	220.4235m	N/A
RT2	2.2836	631.1366m	N/A
RT3	5.3067	190.3314m	N/A
RT4	35.2398	63.5771m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	468.4353m	138.7619m	N/A
CT2	4.6953m	96.8385m	N/A
CT3	63.0740m	3.6933m	N/A
CT4	1.1007	211.5246m	N/A

Note
N/A indicates not applicable

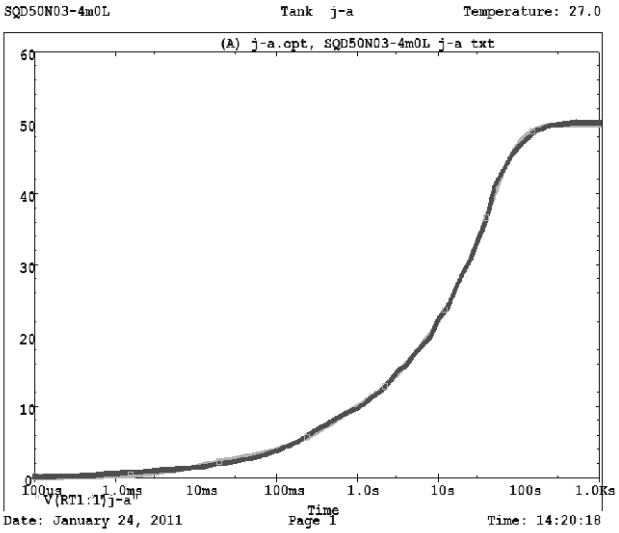
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

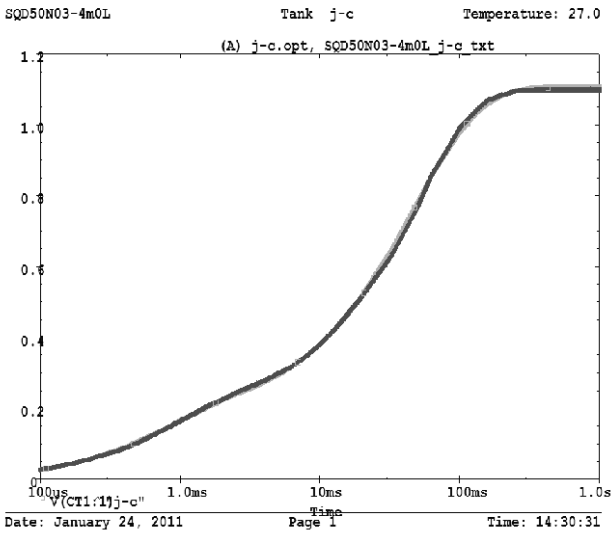
R-C THERMAL MODEL FOR FILTER CONFIGURATION

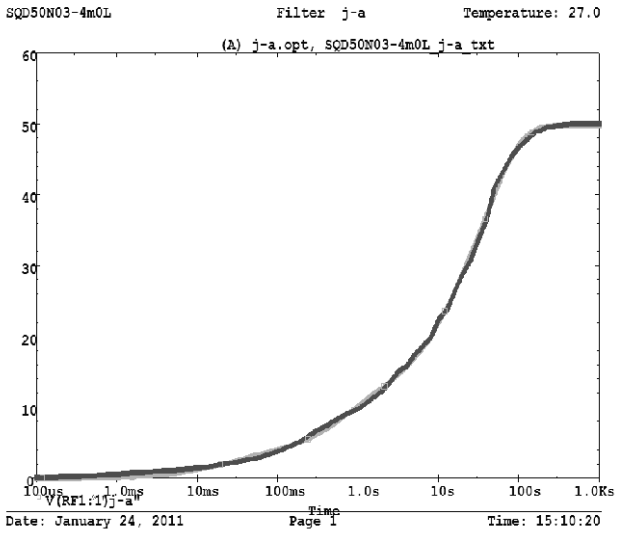


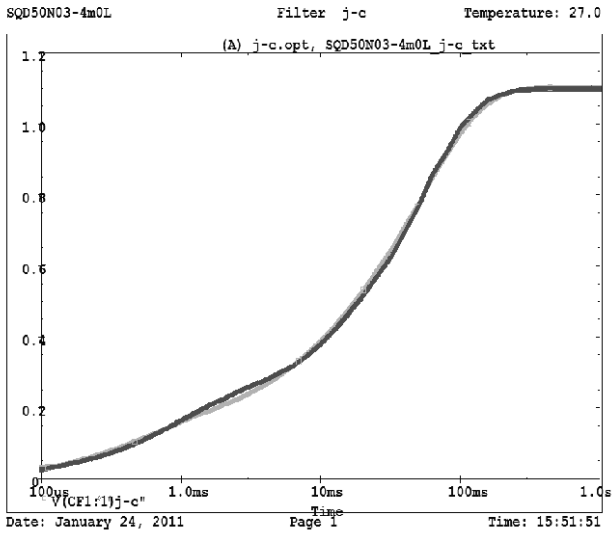
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.2972	181.8340m	N/A
RF2	8.6790	390.6887m	N/A
RF3	20.5716	21.0338m	N/A
RF4	17.2201	508.0285m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	6.7504m	3.0059m	N/A
CF2	67.6126m	28.7922m	N/A
CF3	588.1782m	26.7807m	N/A
CF4	1.3775	38.3938m	N/A

Note
N/A indicates not applicable


SQD50N03-4m0L
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQD50N03-4m0L_j-a_txt
60
50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a"
Time
Date: January 24, 2011
Page 1
Time: 14:20:18


SQD50N03-4m0L
Tank j-c
Temperature: 27.0
(A) j-c.opt, SQD50N03-4m0L_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c"
Time
Date: January 24, 2011
Page 1
Time: 14:30:31


SQD50N03-4m0L
Filter j-a
Temperature: 27.0
(A) j-a.opt, SQD50N03-4m0L_j-a_txt
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: January 24, 2011
Page 1
Time: 15:10:20


SQD50N03-4m0L
Filter j-c
Temperature: 27.0
(A) j-c.opt, SQD50N03-4m0L_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c"
Time
Date: January 24, 2011
Page 1
Time: 15:51:51