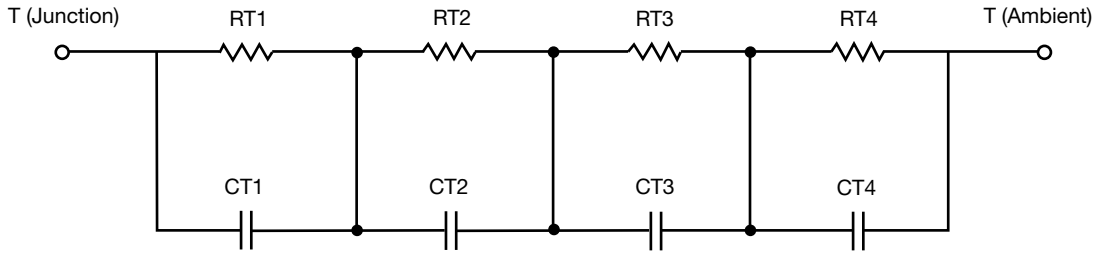
R-C Thermal Model Parameters

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

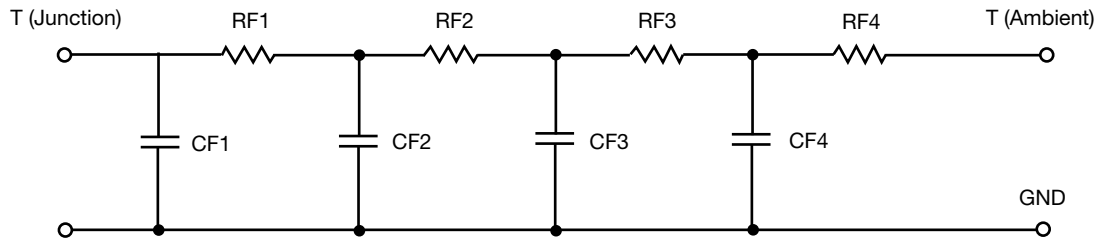


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	12.5863	384.2348m	N/A
RT2	27.6708	449.3765m	N/A
RT3	7.5485	350.3041m	N/A
RT4	2.2466	638.3870m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**		**Foot**
CT1	1.8680	89.6880m	N/A
CT2	4.2841	1.0834m	N/A
CT3	336.7591m	843.8527m	N/A
CT4	16.4235m	24.3456m	N/A

Note
N/A indicates not applicable

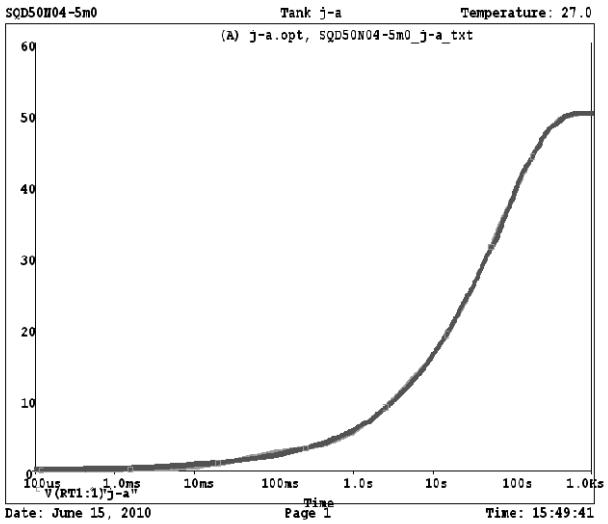
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

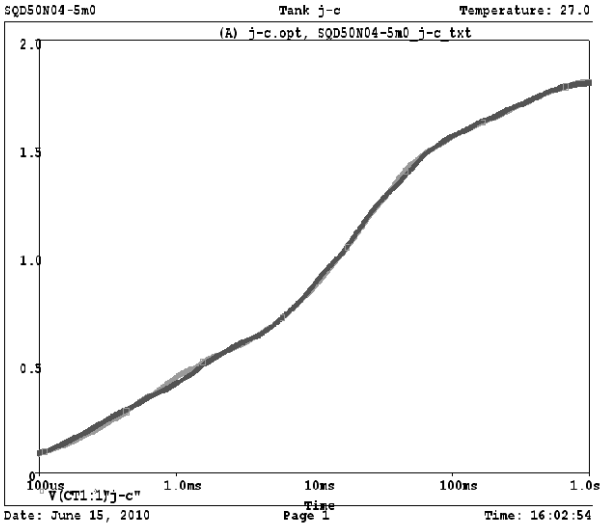
R-C THERMAL MODEL FOR FILTER CONFIGURATION

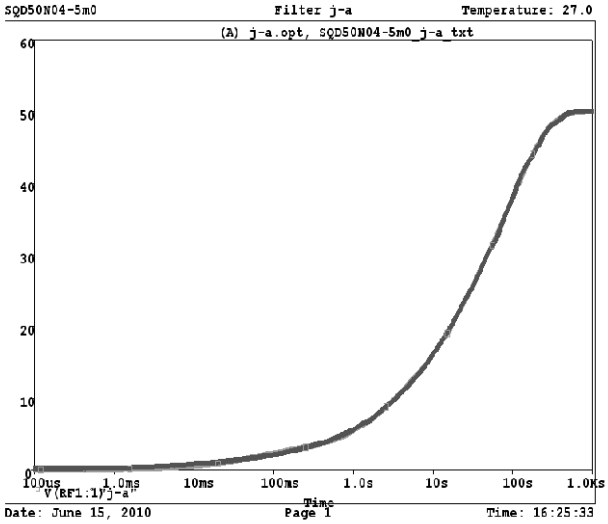


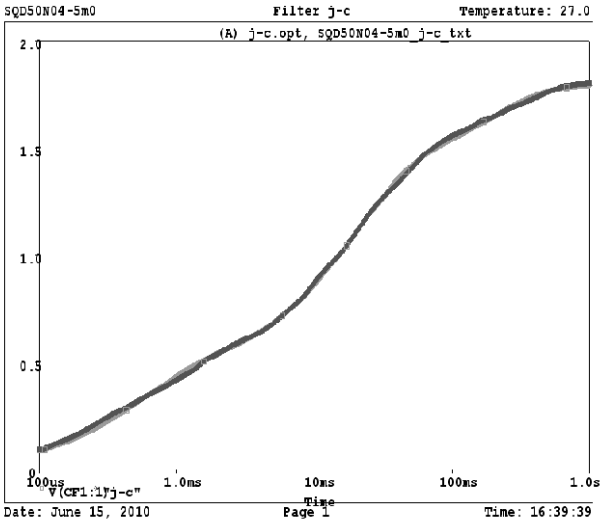
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.6315	502.6928m	N/A
RF2	10.2642	124.4285m	N/A
RF3	17.0413	817.5777m	N/A
RF4	20.0217	346.9437m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	17.6596m	1.0641m	N/A
CF2	255.0879m	17.7122m	N/A
CF3	944.9234m	973.2333u	N/A
CF4	3.9667	504.6823m	N/A

Note
N/A indicates not applicable


SQD50N04-5m0
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQD50N04-5m0_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: June 15, 2010
Page 1
Time: 15:49:41


SQD50N04-5m0
Tank j-c
Temperature: 27.0
(A) j-c.opt, SQD50N04-5m0_j-c_txt
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)"j-c"
Time
Date: June 15, 2010
Page 1
Time: 16:02:54


SQD50N04-5m0
Filter j-a
Temperature: 27.0
(A) j-a.opt, SQD50N04-5m0_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: June 15, 2010
Page 1
Time: 16:25:33


SQD50N04-5m0
Filter j-c
Temperature: 27.0
(A) j-c.opt, SQD50N04-5m0_j-c_txt
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)"j-c"
Time
Date: June 15, 2010
Page 1
Time: 16:39:39