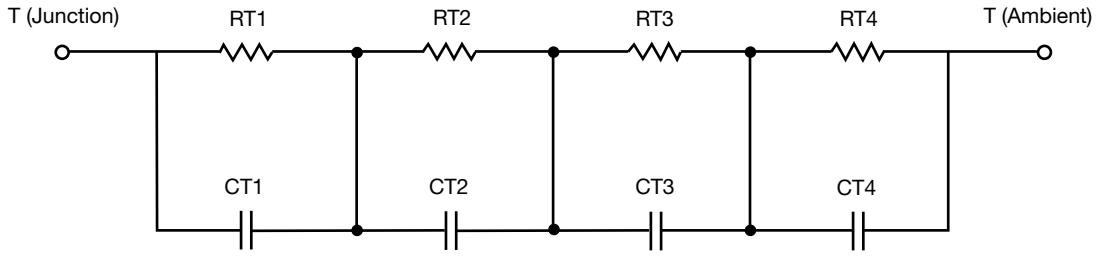
R-C Thermal Model Parameters

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

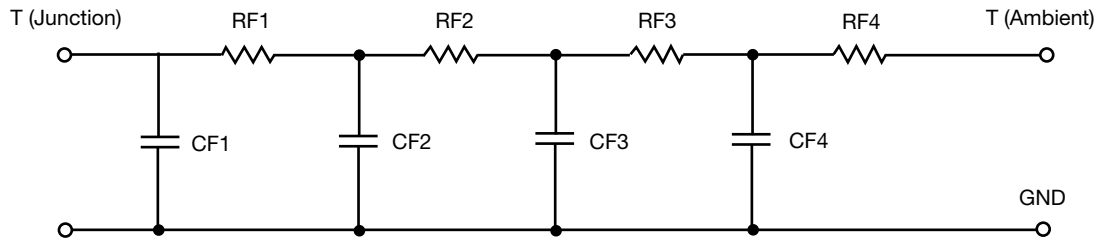


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.7277	189.5234m	N/A
RT2	24.8646	172.8567m	N/A
RT3	628.8086m	461.3152m	N/A
RT4	2.6399	274.8146m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	8.2542	382.5367m	N/A
CT2	3.6566	2.0514m	N/A
CT3	40.3749m	38.3203m	N/A
CT4	558.5953m	6.1595m	N/A

Note
N/A indicates not applicable

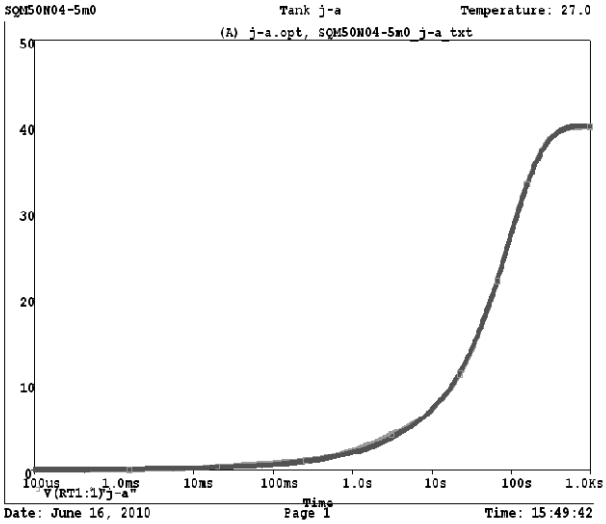
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

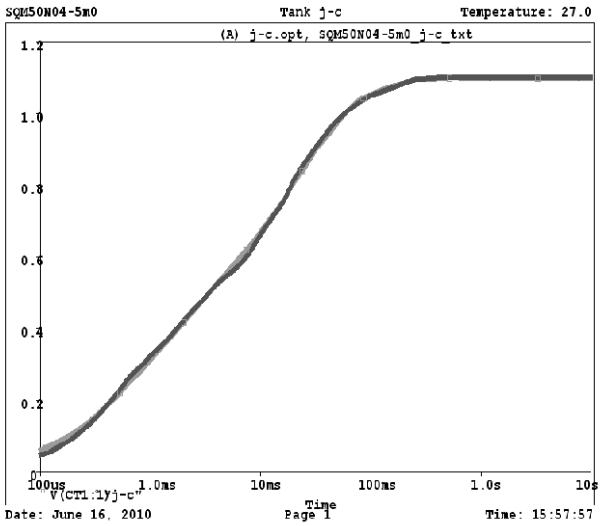
R-C THERMAL MODEL FOR FILTER CONFIGURATION

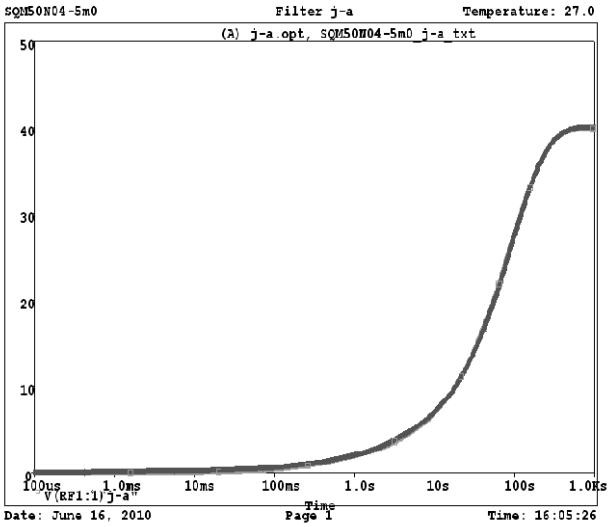


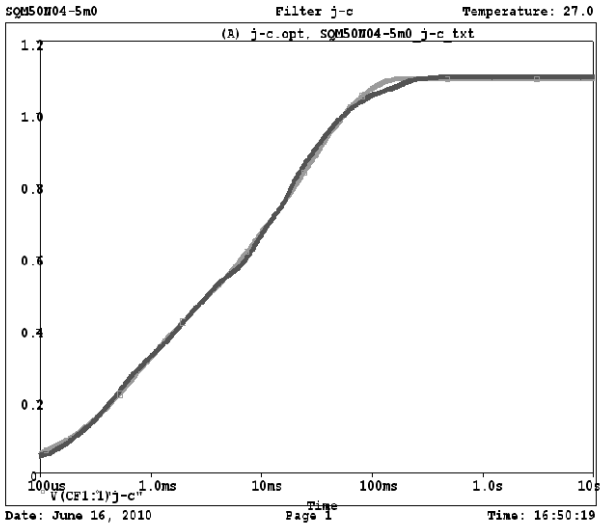
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	1.8523	400.1805m	N/A
RF2	5.8331	124.8512m	N/A
RF3	26.8915	188.3071m	N/A
RF4	5.2698	382.2255m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	216.4139m	1.6474m	N/A
CF2	939.5240m	16.0195m	N/A
CF3	1.4374	46.0815u	N/A
CF4	7.7268	63.2030m	N/A

Note
N/A indicates not applicable


SQM50N04-5m0
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQM50N04-5m0_j-a_txt
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 16, 2010
Page 1
Time: 15:49:42


SQM50N04-5m0
Tank j-c
Temperature: 27.0
(A) j-c.opt, SQM50N04-5m0_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-c
Time
Date: June 16, 2010
Page 1
Time: 15:57:57


SQM50N04-5m0
Filter j-a
Temperature: 27.0
(A) j-a.opt, SQM50N04-5m0_j-a_txt
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 16, 2010
Page 1
Time: 16:05:26


SQM50N04-5m0
Filter j-c
Temperature: 27.0
(A) j-c.opt, SQM50N04-5m0_j-c_txt
1.2
1.0
0.8
0.6
0.4
0.2
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-c
Time
Date: June 16, 2010
Page 1
Time: 16:50:19