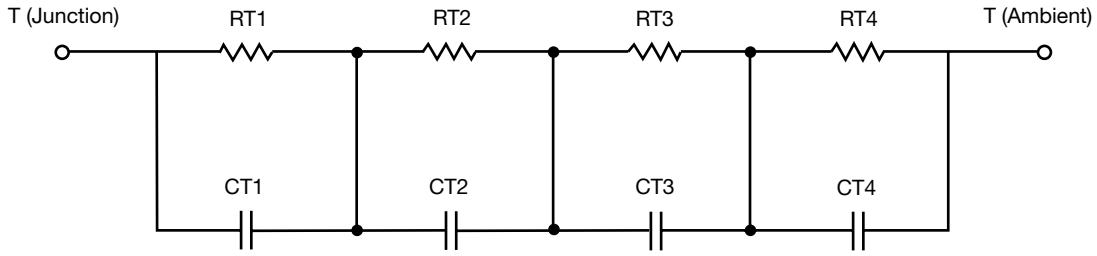
R-C Thermal Model Parameters

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

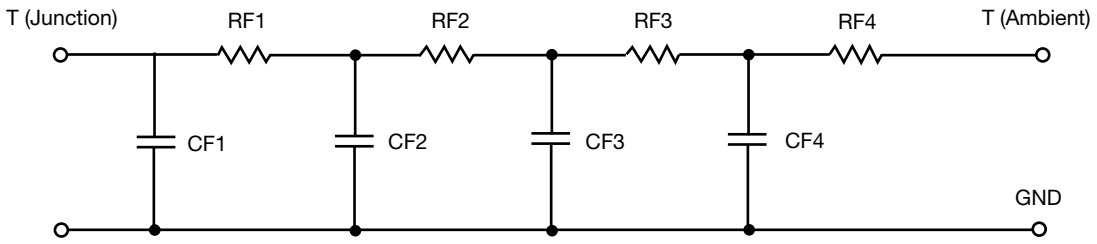


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.6085	338.8468m	N/A
RT2	51.8734	1.9740	N/A
RT3	14.3470	1.0814	N/A
RT4	9.6905	1.1239	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	87.5545m	68.1912m	N/A
CT2	1.1638	5.1302m	N/A
CT3	94.9032m	18.9624m	N/A
CT4	5.9366m	569.7264u	N/A

Note
N/A indicates not applicable

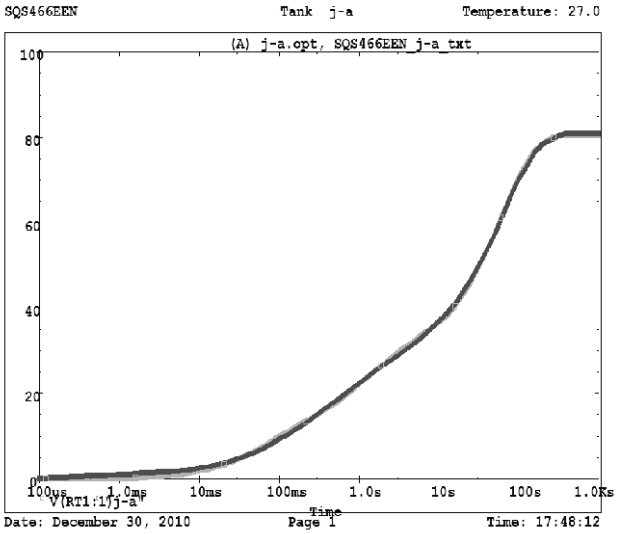
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

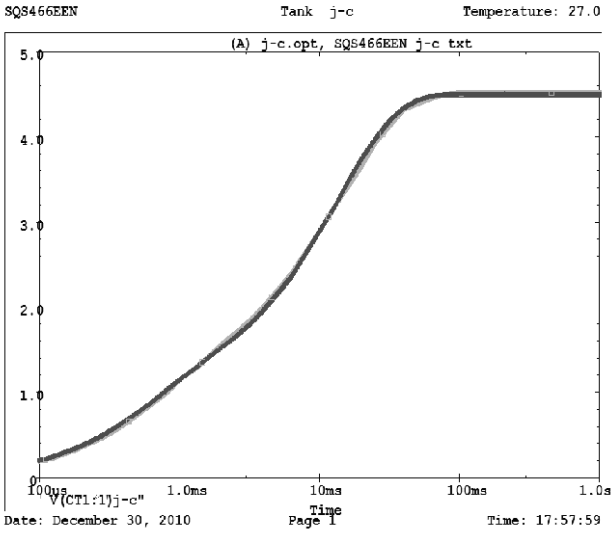
R-C THERMAL MODEL FOR FILTER CONFIGURATION

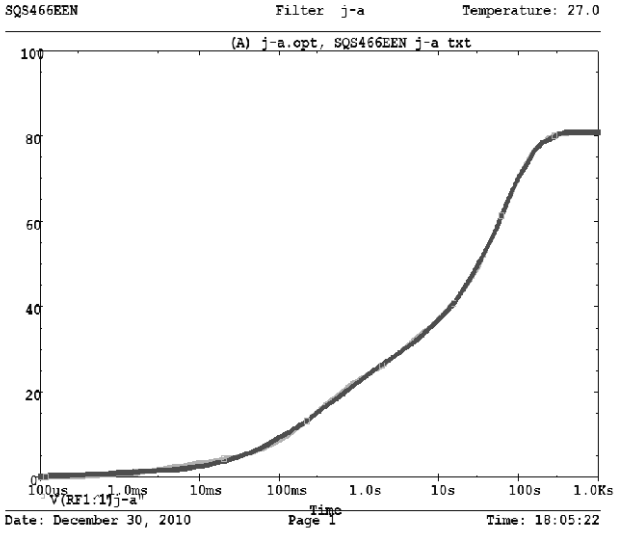


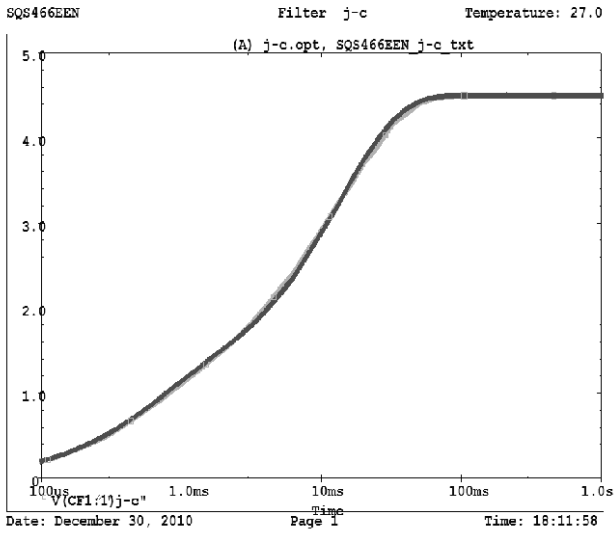
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.4507	1.2505	N/A
RF2	17.5051	1.7799	N/A
RF3	13.3209	1.3554	N/A
RF4	46.4256	110.8898m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.1898m	459.1243u	N/A
CF2	13.4756m	2.4749m	N/A
CF3	193.3877m	5.6137m	N/A
CF4	1.1551	10.4454m	N/A

Note
N/A indicates not applicable


SQS466EEN
Tank j-a
Temperature: 27.0
(A) j-a.opt, SQS466EEN_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a"
Time
Date: December 30, 2010
Page 1
Time: 17:48:12


SQS466EEN
Tank j-c
Temperature: 27.0
(A) j-c.opt, SQS466EEN_j-c_txt
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)j-c"
Time
Date: December 30, 2010
Page 1
Time: 17:57:59


SQS466EEN
Filter j-a
Temperature: 27.0
(A) j-a.opt, SQS466EEN_j-a_txt
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a"
Time
Date: December 30, 2010
Page 1
Time: 18:05:22


SQS466EEN
Filter j-c
Temperature: 27.0
(A) j-c.opt, SQS466EEN_j-c_txt
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)j-c"
Time
Date: December 30, 2010
Page 1
Time: 18:11:58