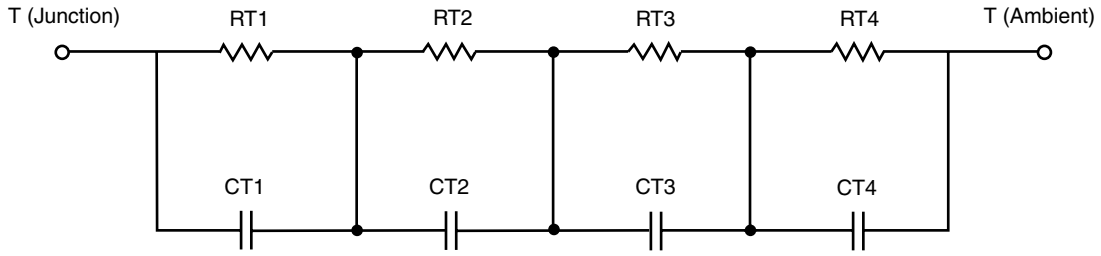
R-C Thermal Model Parameters

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

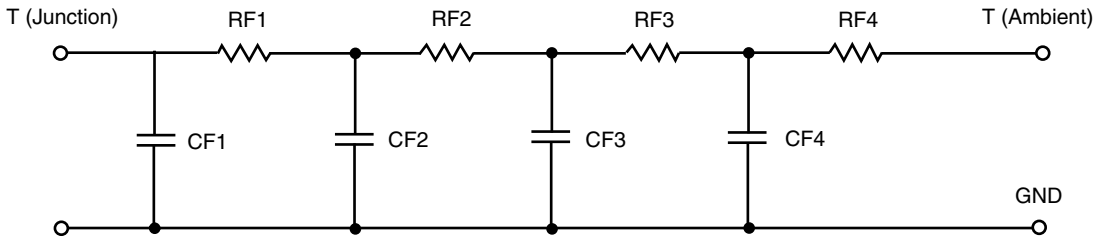


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	20.1102	3.0820	N/A
RT2	6.9813	957.4993 m	N/A
RT3	25.0253	2.8867	N/A
RT4	52.8832	5.0788	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.3624 m	427.6703 u	N/A
CT2	158.0577 u	320.2654 u	N/A
CT3	30.0402 m	6.4613 m	N/A
CT4	890.1387 m	4.3930 m	N/A

Note
N/A indicates not applicable

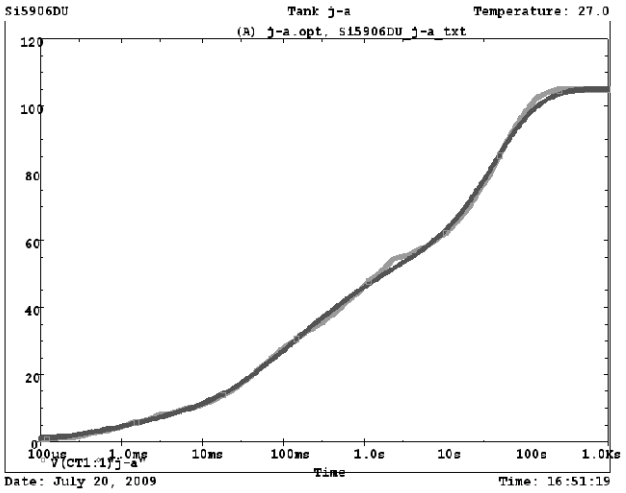
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

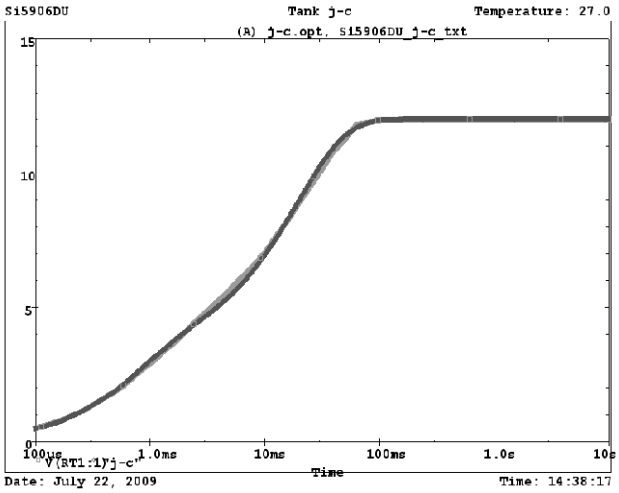
R-C THERMAL MODEL FOR FILTER CONFIGURATION

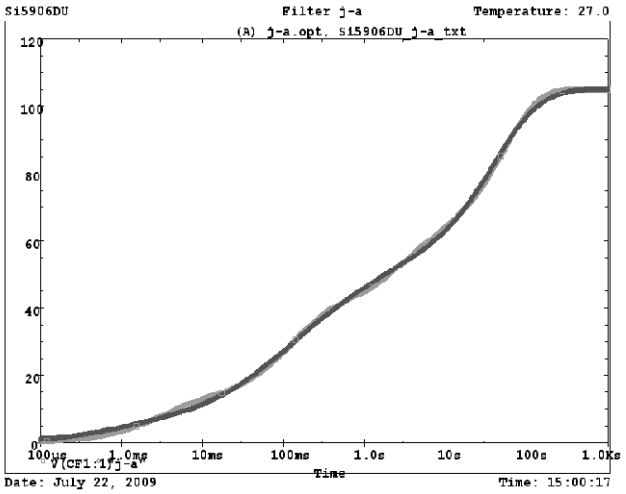


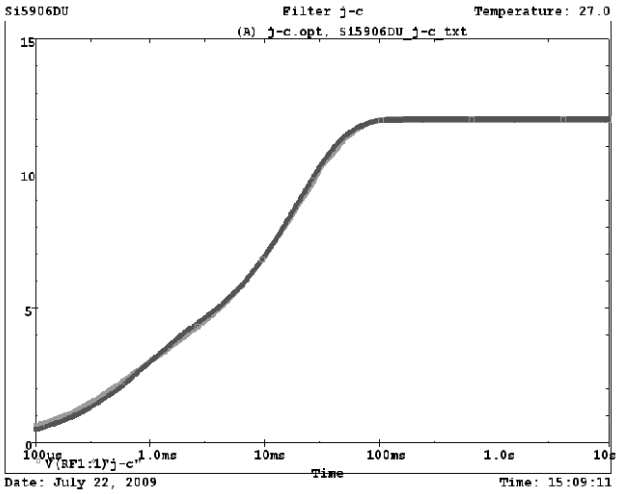
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.4168	1.7681	N/A
RF2	27.0676	1.9026	N/A
RF3	20.6182	3.8536	N/A
RF4	44.8974	4.4999	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	244.4683 u	129.8269 u	N/A
CF2	4.1966 m	127.9005 u	N/A
CF3	113.9156 m	1.3730 m	N/A
CF4	1.0391	2.1937 m	N/A

Note
N/A indicates not applicable


Si5906DU
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si5906DU_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CT1:1)j-a
Time
Date: July 20, 2009
Time: 16:51:19


Si5906DU
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si5906DU_j-c_txt
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RT1:1)j-c
Time
Date: July 22, 2009
Time: 14:38:17


Si5906DU
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si5906DU_j-a_txt
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(CF1:1)j-a
Time
Date: July 22, 2009
Time: 15:00:17


Si5906DU
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si5906DU_j-c_txt
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(RF1:1)j-c
Time
Date: July 22, 2009
Time: 15:09:11