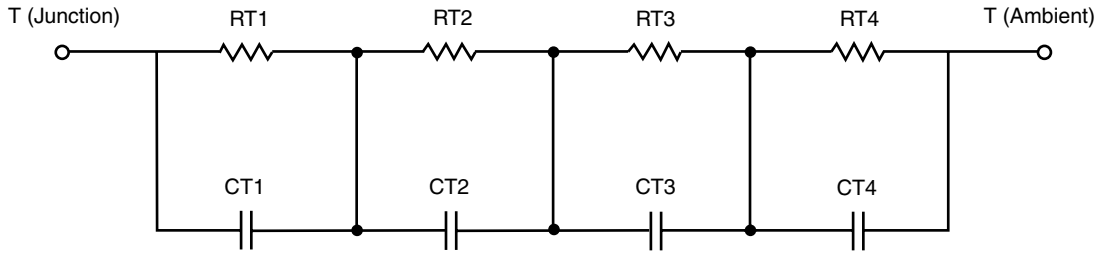
R-C Thermal Model Parameters

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

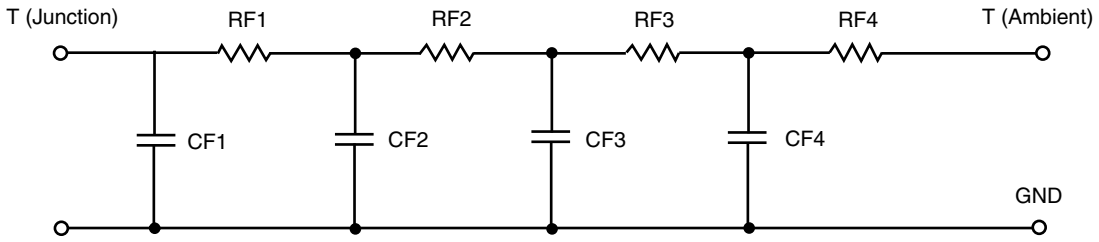


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient-Full Copper(FC)**	**Ambient-Minimum Copper(MC)**	**Foot**
RT1	41.7716	52.8539	N/A
RT2	9.6630	38.0723	N/A
RT3	23.9352	58.5941	N/A
RT4	24.4879	40.8002	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient-Full Copper(FC)**	**Ambient-Minimum Copper(MC)**	**Foot**
CT1	267.8702 u	829.7687 u	N/A
CT2	565.9177 m	57.9980 m	N/A
CT3	4.6510 m	4.8205 m	N/A
CT4	1.6538	583.1416 m	N/A

Note
N/A indicates not applicable

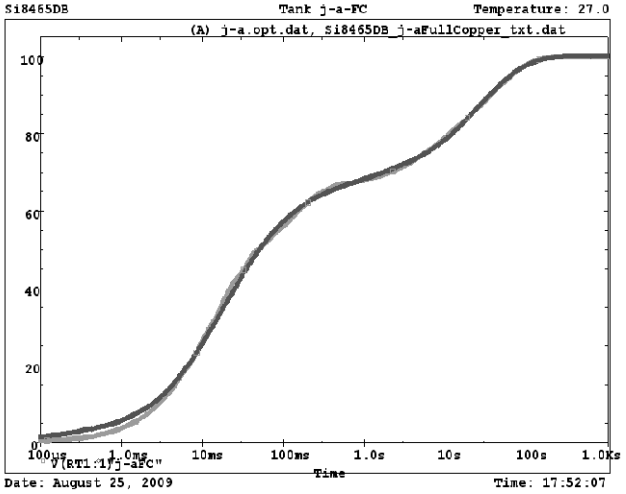
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

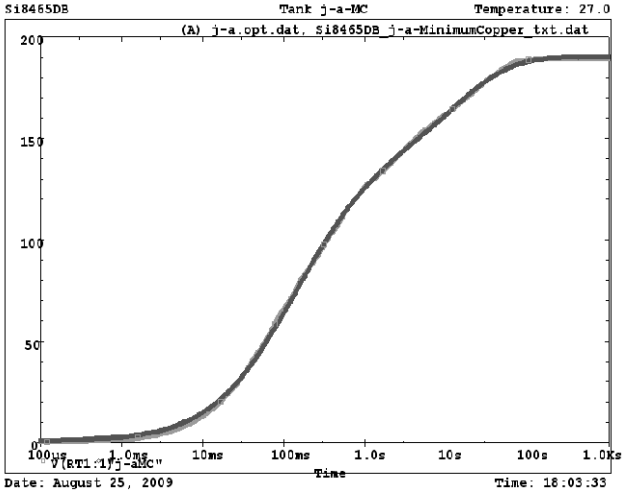
R-C THERMAL MODEL FOR FILTER CONFIGURATION

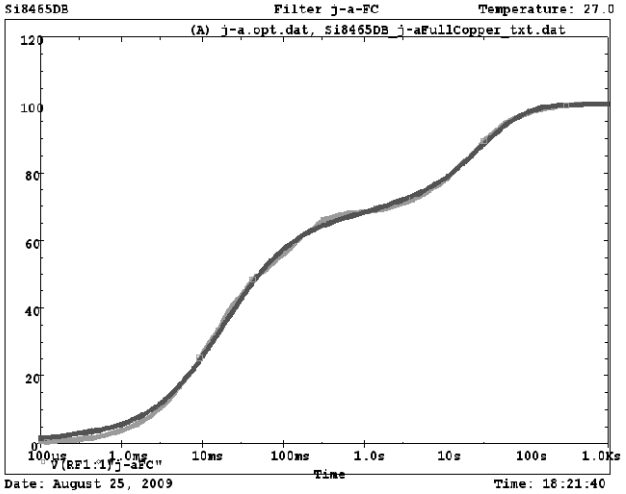


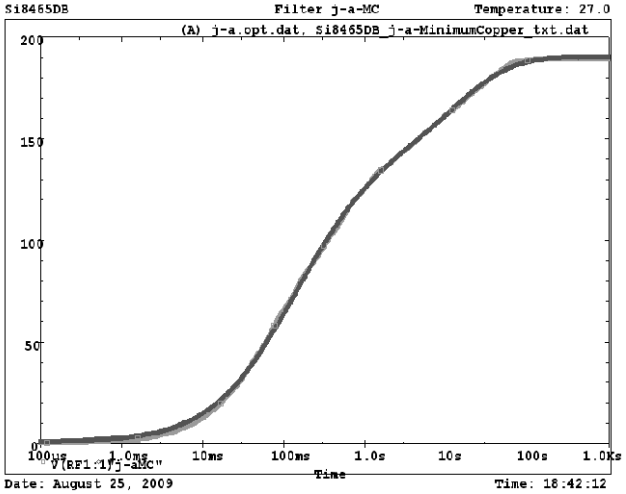
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient-Full Copper(FC)**	**Ambient-Minimum Copper(MC)**	**Foot**
RF1	45.5917	75.5098	N/A
RF2	21.8254	54.0982	N/A
RF3	28.1334	29.6710	N/A
RF4	4.5611	29.9583	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient-Full Copper(FC)**	**Ambient-Minimum Copper(MC)**	**Foot**
CF1	249.0576 u	721.3691 u	N/A
CF2	5.0482 m	6.4083 m	N/A
CF3	714.6096 m	102.6309 m	N/A
CF4	20.0003	657.3939 m	N/A

Note
N/A indicates not applicable


Si8465DB
Tank j-a-FC
Temperature: 27.0
(A) j-a.opt.dat, Si8465DB_j-aFullCopper_txt.dat
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)/j-aFC"
Time
Date: August 25, 2009
Time: 17:52:07


Si8465DB
Tank j-a-MC
Temperature: 27.0
(A) j-a.opt.dat, Si8465DB_j-a-MinimumCopper_txt.dat
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)/j-aMC"
Time
Date: August 25, 2009
Time: 18:03:33


Si8465DB
Filter j-a-FC
Temperature: 27.0
(A) j-a.opt.dat, Si8465DB_j-aFullCopper_txt.dat
120
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)/j-aFC"
Time
Date: August 25, 2009
Time: 18:21:40


Si8465DB
Filter j-a-MC
Temperature: 27.0
(A) j-a.opt.dat, Si8465DB_j-a-MinimumCopper_txt.dat
200
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)/j-aMC"
Time
Date: August 25, 2009
Time: 18:42:12