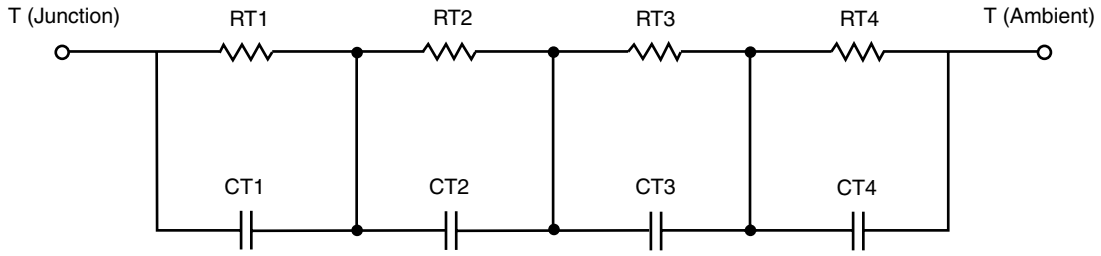
R-C Thermal Model Parameters

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

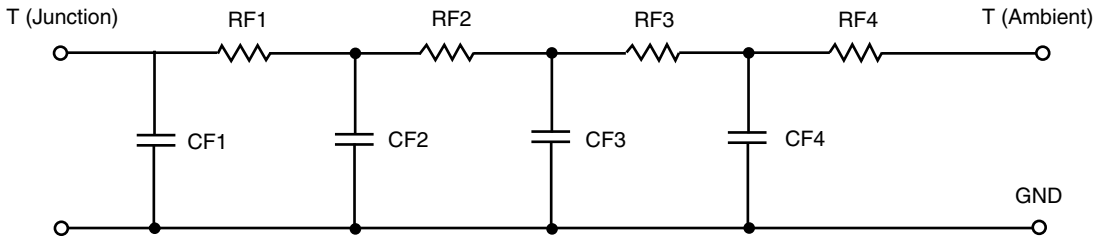


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient Full Copper (FC)**	**Ambient Minimum Copper (MC)**	**Foot**
RT1	10.3218	43.8718	N/A
RT2	20.7341	45.4365	N/A
RT3	7.8228	33.6909	N/A
RT4	46.0441	52.0008	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient Full Copper (FC)**	**Ambient Minimum Copper (MC)**	**Foot**
CT1	905.1290 u	8.2027 m	N/A
CT2	3.6547 m	110.6096 m	N/A
CT3	260.3356 m	1.0573 m	N/A
CT4	1.2752	1.0060	N/A

Note
N/A indicates not applicable

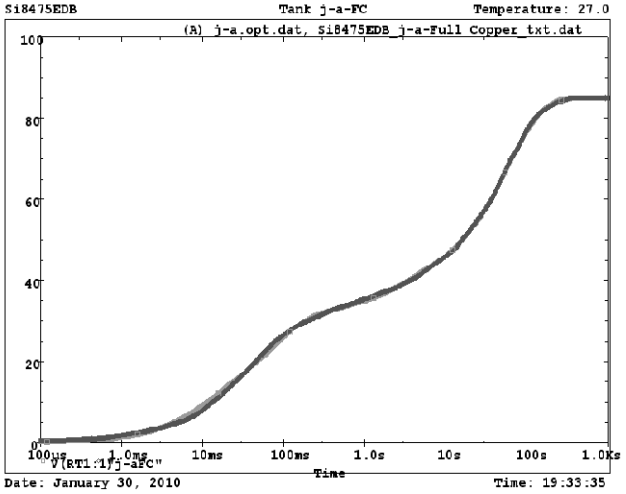
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

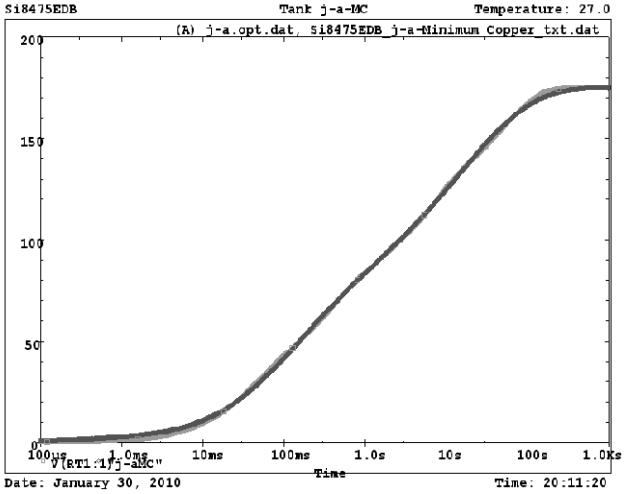
R-C THERMAL MODEL FOR FILTER CONFIGURATION

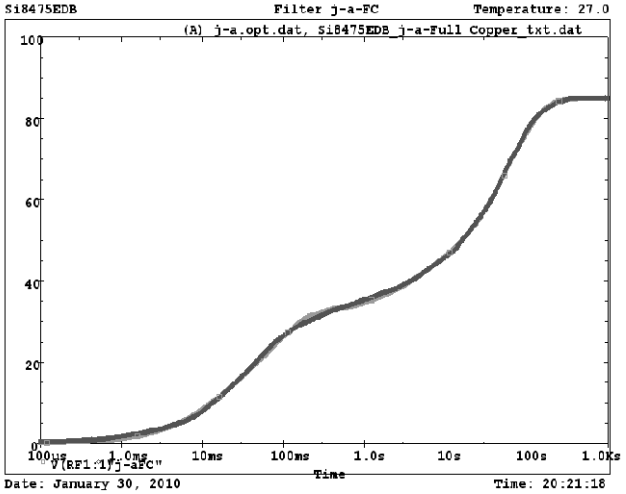


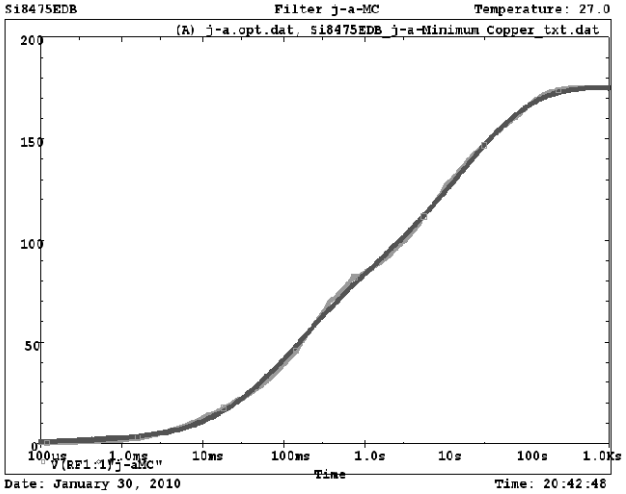
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient Full Copper (FC)**	**Ambient Minimum Copper (MC)**	**Foot**
RF1	15.2149	19.3755	N/A
RF2	16.9494	59.8527	N/A
RF3	12.0660	58.2056	N/A
RF4	40.6269	37.5662	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient Full Copper (FC)**	**Ambient Minimum Copper (MC)**	**Foot**
CF1	811.6089 u	517.5989 u	N/A
CF2	3.0499 m	2.8375 m	N/A
CF3	291.2151 m	98.8806 m	N/A
CF4	1.1522	1.5537	N/A

Note
N/A indicates not applicable


Si8475EDB
Tank j-a-FC
Temperature: 27.0
(A) j-a.opt.dat, Si8475EDB_j-a-Full Copper_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: January 30, 2010
Time: 19:33:35


Si8475EDB
Tank j-a-MC
Temperature: 27.0
(A) j-a.opt.dat, Si8475EDB_j-a-Minimum Copper_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: January 30, 2010
Time: 20:11:20


Si8475EDB
Filter j-a-FC
Temperature: 27.0
(A) j-a.opt.dat, Si8475EDB_j-a-Full Copper_txt.dat
100
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-aFC"
Time
Date: January 30, 2010
Time: 20:21:18


Si8475EDB
Filter j-a-MC
Temperature: 27.0
(A) j-a.opt.dat, Si8475EDB_j-a-Minimum Copper_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: January 30, 2010
Time: 20:42:48