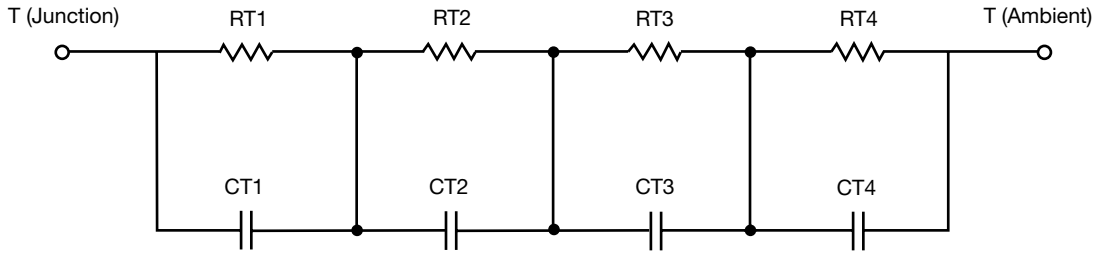
R-C Thermal Model Parameters

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



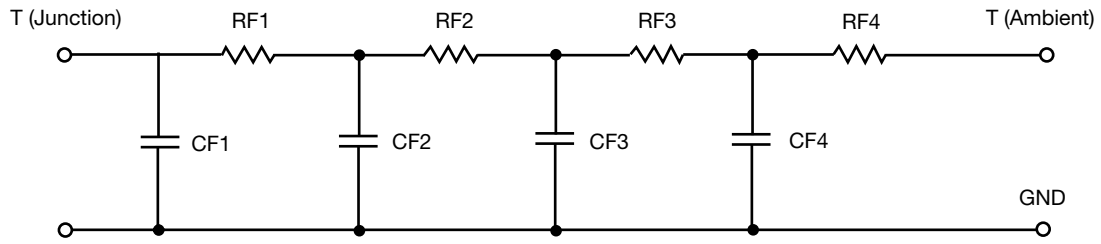
R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient Full Copper**	**Ambient Minimum Copper**	**Foot**
RT1	49.7725	80.0097	N/A
RT2	63.4555	50.5952	N/A
RT3	29.4154	81.9322	N/A
RT4	42.3566	117.4629	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient Full Copper**	**Ambient Minimum Copper**	**Foot**
CT1	1.4610	379.3117 m	N/A
CT2	725.7970 u	216.6336 u	N/A
CT3	41.5126 m	17.6959 m	N/A
CT4	140.2873 u	922.2590 u	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.

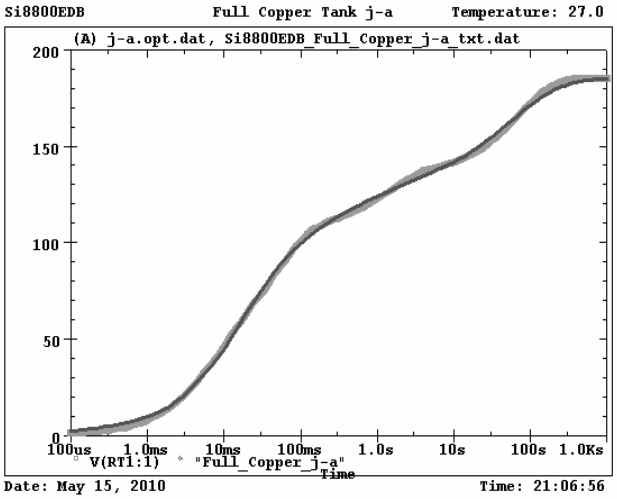
R-C THERMAL MODEL FOR FILTER CONFIGURATION

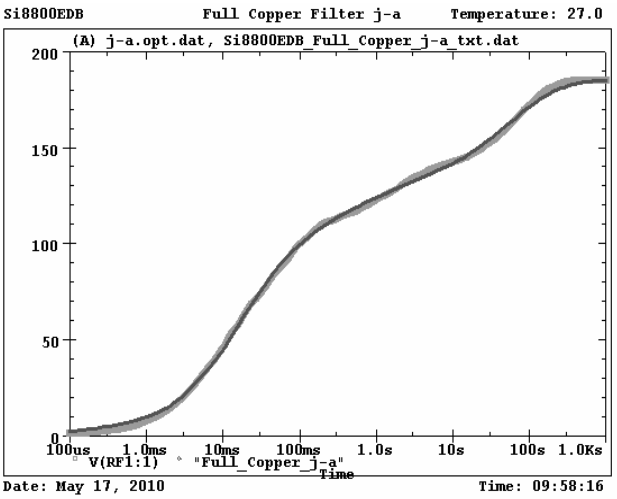


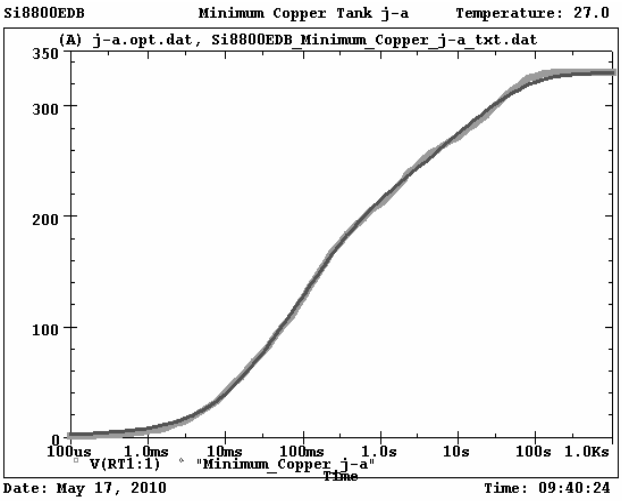
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient Full Copper**	**Ambient Minimum Copper**	**Foot**
RF1	64.5758	60.3541	N/A
RF2	45.5712	112.0105	N/A
RF3	26.8463	84.3181	N/A
RF4	48.0067	73.3173	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient Full Copper**	**Ambient Minimum Copper**	**Foot**
CF1	123.7825 u	151.8091 u	N/A
CF2	1.0848 m	602.7665 u	N/A
CF3	50.1886 m	14.7990 m	N/A
CF4	1.4492	394.0934 m	N/A

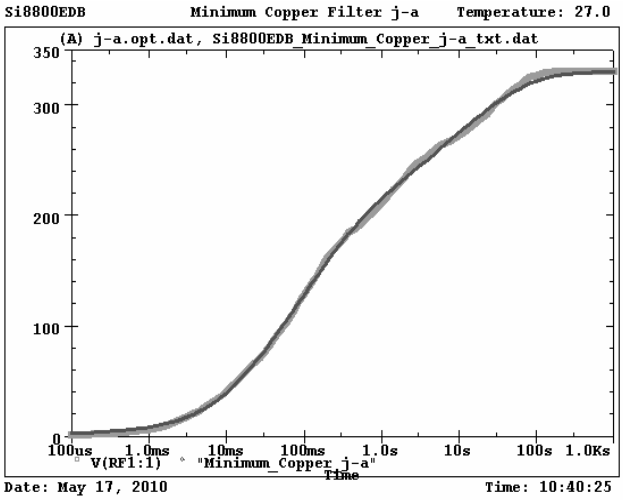
Note

- N/A indicates not applicable


Si8800EDB Full Copper Tank j-a Temperature: 27.0
(A) j-a.opt.dat, Si8800EDB_Full_Copper_j-a_txt.dat
200
150
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "Full_Copper_j-a"
Time
Date: May 15, 2010
Time: 21:06:56


Si8800EDB Full Copper Filter j-a Temperature: 27.0
(A) j-a.opt.dat, Si8800EDB_Full_Copper_j-a_txt.dat
200
150
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "Full_Copper_j-a"
Time
Date: May 17, 2010
Time: 09:58:16


Si8800EDB Minimum Copper Tank j-a Temperature: 27.0
(A) j-a.opt.dat, Si8800EDB_Minimum_Copper_j-a_txt.dat
350
300
200
100
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "Minimum_Copper_j-a"
Time
Date: May 17, 2010
Time: 09:40:24


Si8800EDB Minimum Copper Filter j-a Temperature: 27.0
(A) j-a.opt.dat, Si8800EDB_Minimum_Copper_j-a_txt.dat
350
300
200
100
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "Minimum_Copper_j-a"
Time
Date: May 17, 2010
Time: 10:40:25