R-C Thermal Model Parameters

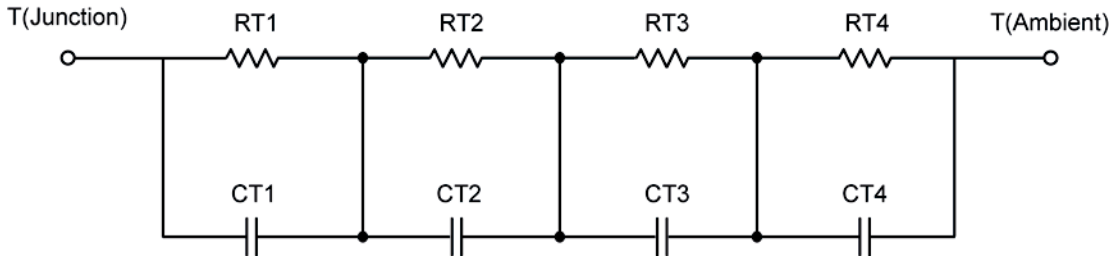
DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "A Simple Method of Generating Thermal Models for a Power MOSFET"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse Transient Thermal Impedance curves for the MOSFET.

R-C values for the electrical circuit in the Foster/Tank and Cauer/Filter configurations are included.

Note:
For a detailed explanation of implementing these values in P-SPICE, refer to Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform.

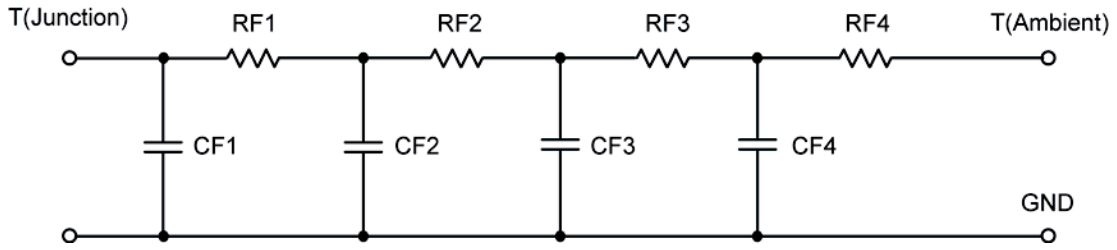
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	214.2990	N/A	79.6144
RT2	24.5623	N/A	15.9707
RT3	98.8378	N/A	116.5748
RT4	90.8922	N/A	124.3247
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	5.4751 m	N/A	853.1305 u
CT2	230.4432 u	N/A	121.8111 u
CT3	547.9173 m	N/A	10.5289 m
CT4	1.1544 m	N/A	3.6906 m

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

R-C THERMAL MODEL FOR FILTER CONFIGURATION

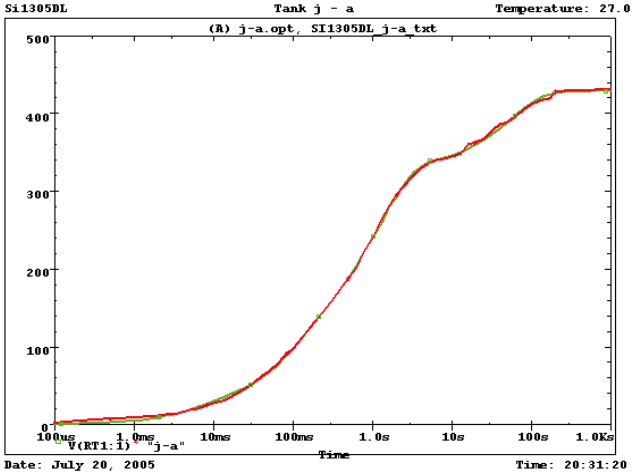


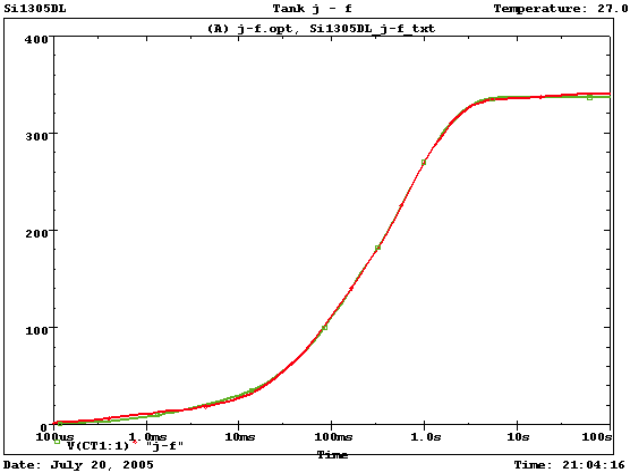
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	33.8048	N/A	21.3981
RF2	107.4276	N/A	135.9713
RF3	190.3794	N/A	84.0886
RF4	96.8608	N/A	95.2982
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	185.7535 u	N/A	95.6622 u
CF2	704.7275 u	N/A	596.9559 u
CF3	4.5727 m	N/A	2.8977 m
CF4	506.5133 m	N/A	3.9614 m

Note: NA indicates not applicable

Reference:

[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya, IEEE / SEMITHERM 2002


Si1305DL
Tank j - a
Temperature: 27.0
(A) j-a.opt, SI1305DL_j-a_txt
500
400
300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1) "j-a"
Time
Date: July 20, 2005
Time: 20:31:20


Si1305DL
Tank j - f
Temperature: 27.0
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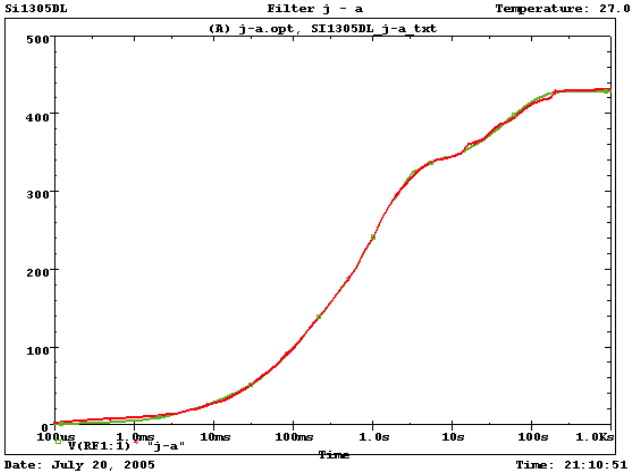
300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1) "j-f"
Time
Date: July 20, 2005
Time: 21:04:16


Si1305DL
Filter j - a
Temperature: 27.0
(A) j-a.opt, SI1305DL_j-a_txt
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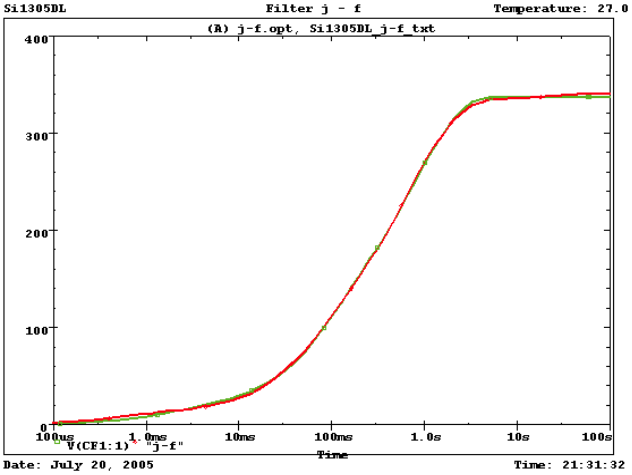
400
300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1) "j-a"
Time
Date: July 20, 2005
Time: 21:10:51


Si1305DL
Filter j - f
Temperature: 27.0
(A) j-f.opt, Si1305DL_j-f_txt
400
300
200
100
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1) "j-f"
Time
Date: July 20, 2005
Time: 21:31:32