# R-C Thermal Model Parameters

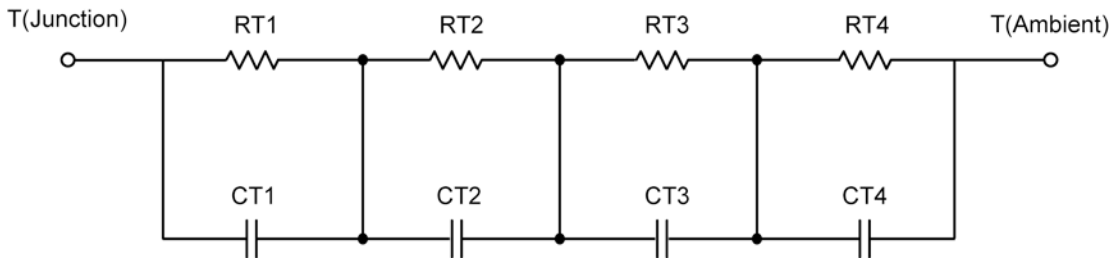
## DESCRIPTION

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.*

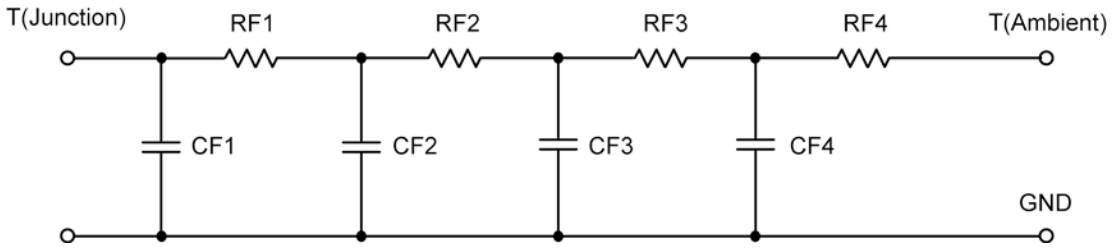
## R-C THERMAL MODEL FOR TANK CONFIGURATION




| R-C VALUES FOR TANK CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RT1 | 5.6033 | N/A | 1.0089 |
| RT2 | 14.2956 | N/A | 6.2588 |
| RT3 | 14.6312 | N/A | 8.7633 |
| RT4 | 50.4699 | N/A | 4.9690 |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CT1 | 6.2085 m | N/A | 1.9159 m |
| CT2 | 59.4383 m | N/A | 58.4572 m |
| CT3 | 200.9402 m | N/A | 202.2141 m |
| CT4 | 1.6659 | N/A | 13.7388 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

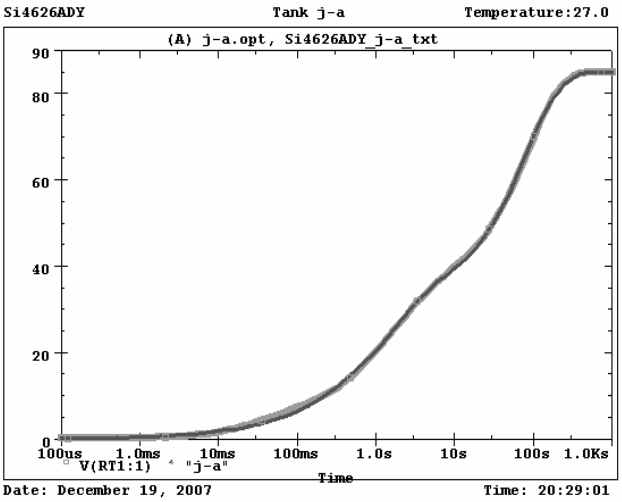


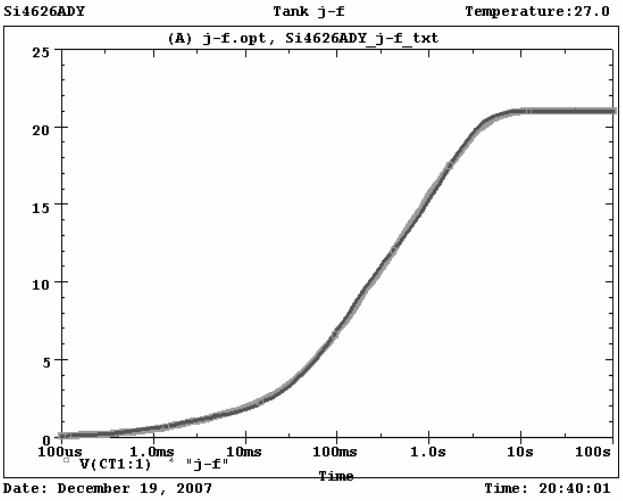

| R-C VALUES FOR FILTER CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RF1 | 7.1116 | N/A | 1.6856 |
| RF2 | 25.2038 | N/A | 7.5612 |
| RF3 | 27.9267 | N/A | 6.2786 |
| RF4 | 24.7579 | N/A | 5.4746 |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CF1 | 7.0458 m | N/A | 2.3251 m |
| CF2 | 38.2466 m | N/A | 8.7568 m |
| CF3 | 1.0365 | N/A | 56.5823 m |
| CF4 | 1.9145 | N/A | 178.8429 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*


Si4626ADY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4626ADY_j-a_txt
90
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: December 19, 2007
Time: 20:29:01


Si4626ADY
Tank j-f
Temperature:27.0
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25
20
15
10
5
0
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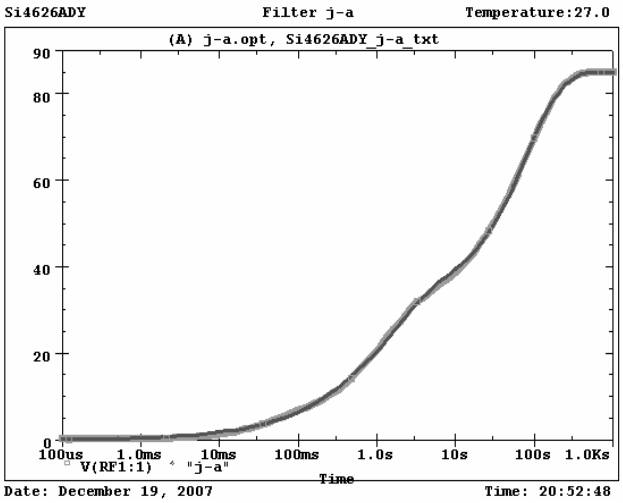
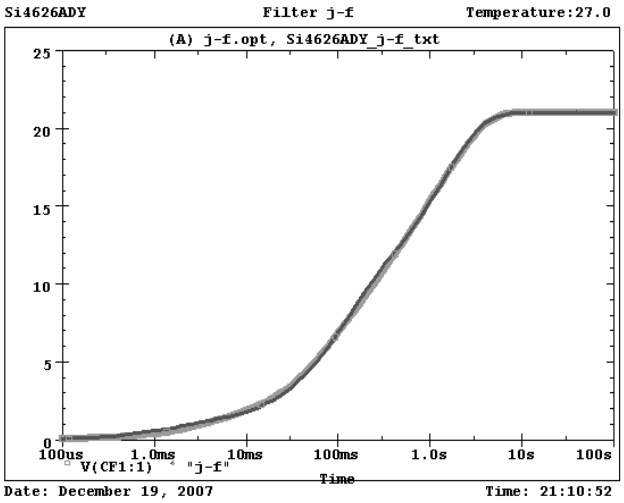
V(CT1:1) "j-f"
Time
Date: December 19, 2007
Time: 20:40:01


Si4626ADY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4626ADY_j-a_txt
90
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a"
Time
Date: December 19, 2007
Time: 20:52:48


Si4626ADY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4626ADY_j-f_txt
25
20
15
10
5
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CF1:1) "j-f"
Time
Date: December 19, 2007
Time: 21:10:52