# R-C Thermal Model Parameters

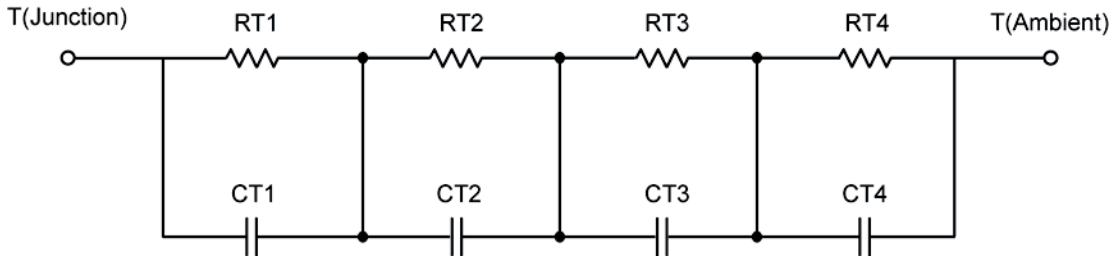
## DESCRIPTION

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.*

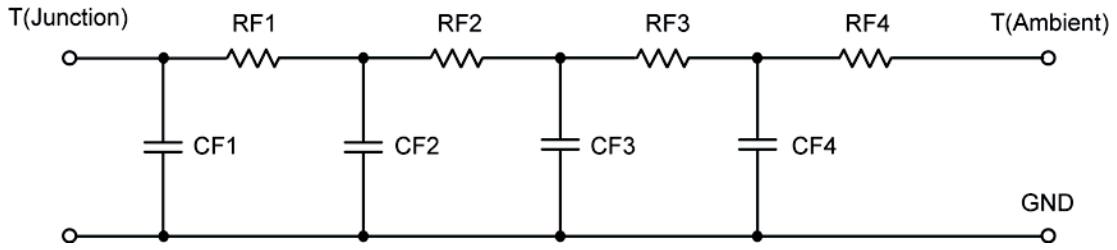
## R-C THERMAL MODEL FOR TANK CONFIGURATION




| R-C VALUES FOR TANK CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RT1 | 22.0425 | N/A | 23.5742 |
| RT2 | 33.2402 | N/A | 33.2557 |
| RT3 | 11.6883 | N/A | 10.4624 |
| RT4 | 53.0290 | N/A | 2.7077 |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CT1 | 54.9657 m | N/A | 58.2147 m |
| CT2 | 23.3037 m | N/A | 11.8325 m |
| CT3 | 1.6847 m | N/A | 3.0211 m |
| CT4 | 1.4307 | N/A | 289.3372 u |

*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

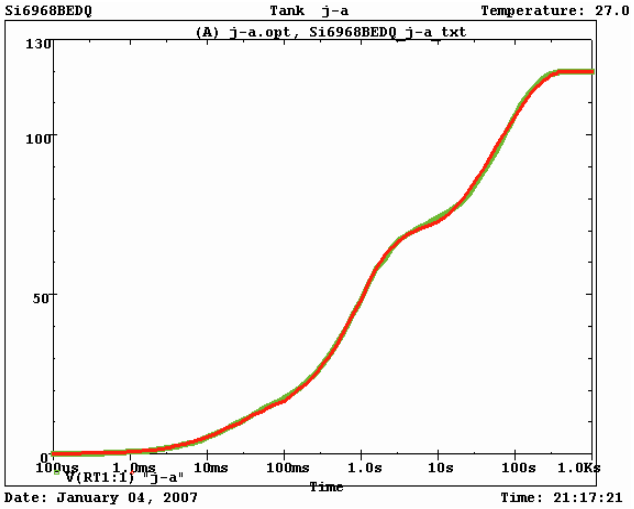


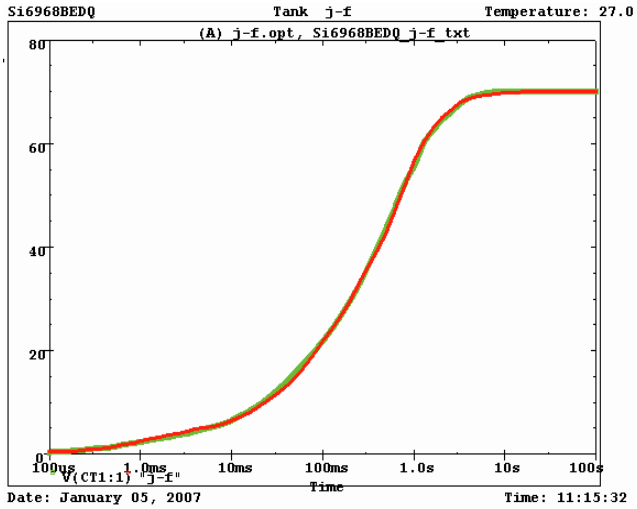

| R-C VALUES FOR FILTER CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RF1 | 12.0591 | N/A | 4.6749 |
| RF2 | 26.1631 | N/A | 13.9626 |
| RF3 | 31.2811 | N/A | 19.6217 |
| RF4 | 50.4967 | N/A | 31.7408 |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CF1 | 1.3325 m | N/A | 311.5387 u |
| CF2 | 11.2274 m | N/A | 2.8693 m |
| CF3 | 15.0487 m | N/A | 3.6756 m |
| CF4 | 1.4432 | N/A | 18.0470 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*


Si6968BEDQ
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si6968BEDQ_j-a_txt
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date: January 04, 2007
Time: 21:17:21


Si6968BEDQ
Tank j-f
Temperature: 27.0
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80
60
40
20
0
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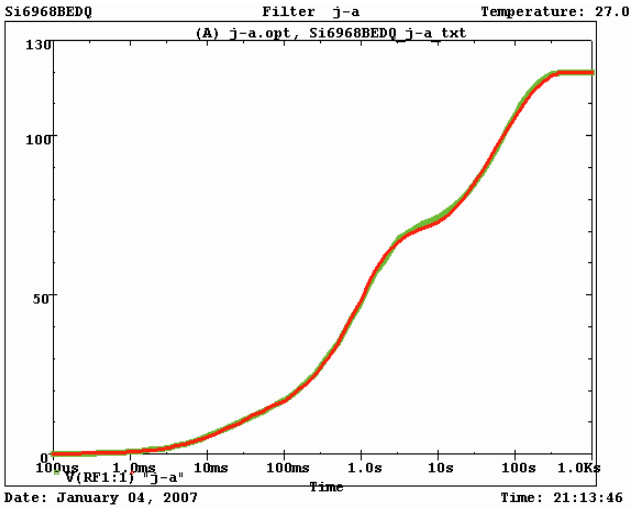
Time
Date: January 05, 2007
Time: 11:15:32


Si6968BEDQ
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si6968BEDQ_j-a_txt
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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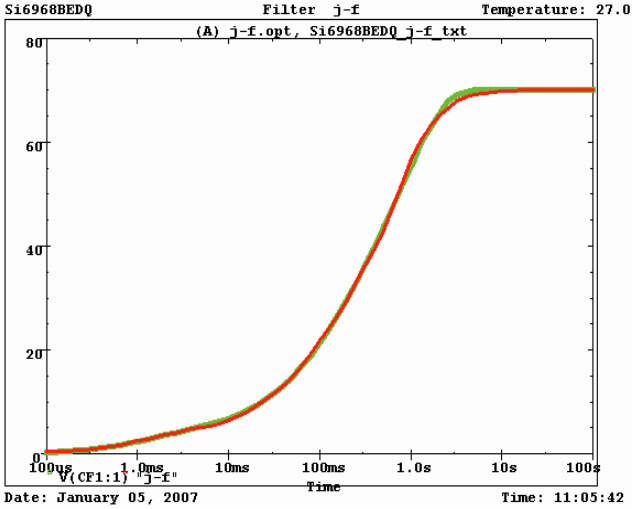
Time
Date: January 04, 2007
Time: 21:13:46


Si6968BEDQ
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si6968BEDQ_j-f_txt
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CF1:1) "j-f"
Time
Date: January 05, 2007
Time: 11:05:42