# R-C Thermal Model Parameters

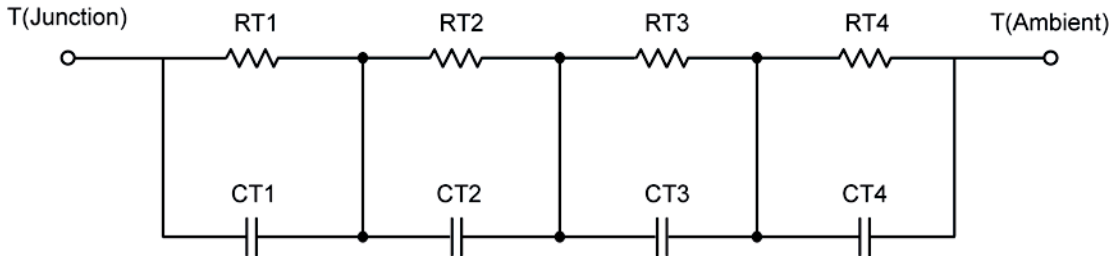
## DESCRIPTION

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.*

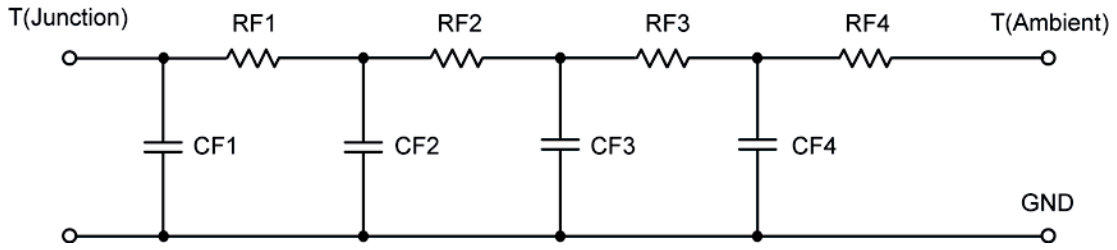
## R-C THERMAL MODEL FOR TANK CONFIGURATION




| R-C VALUES FOR TANK CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RT1 | 10.0058 | N/A | 9.1823 |
| RT2 | 29.9386 | N/A | 17.3143 |
| RT3 | 29.3707 | N/A | 20.3863 |
| RT4 | 50.6849 | N/A | 5.1171 |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CT1 | 6.2534 m | N/A | 78.7575 m |
| CT2 | 86.6508 m | N/A | 21.7497 m |
| CT3 | 24.0784 m | N/A | 76.2079 m |
| CT4 | 2.0302 | N/A | 3.7797 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

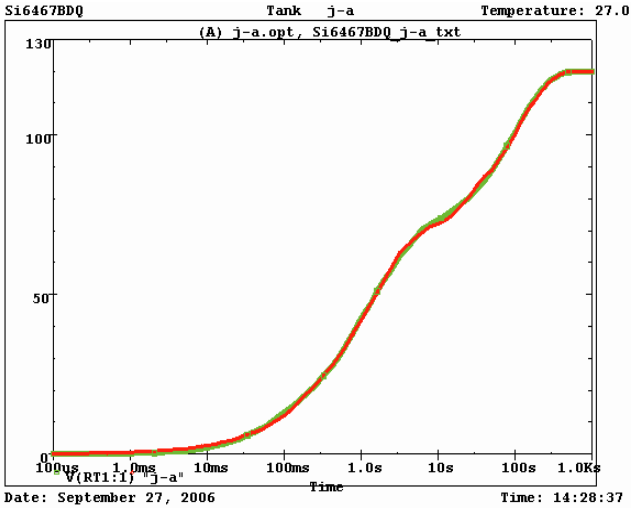


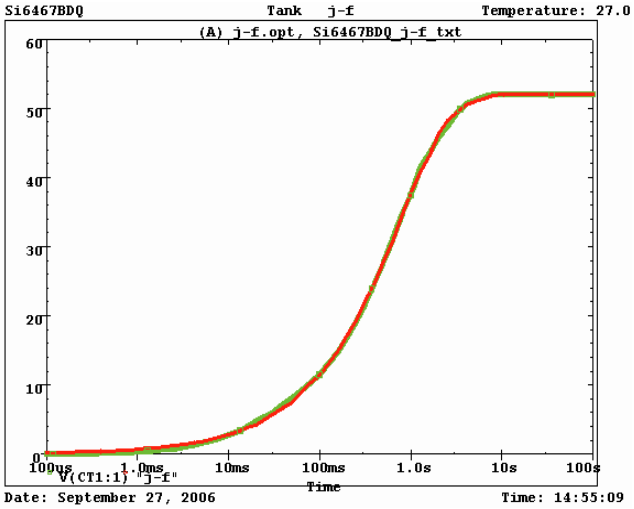

| R-C VALUES FOR FILTER CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RF1 | 10.1677 | N/A | 3.8515 |
| RF2 | 30.2728 | N/A | 15.1766 |
| RF3 | 29.4062 | N/A | 21.8768 |
| RF4 | 50.1533 | N/A | 11.0951 |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CF1 | 3.9019 m | N/A | 2.0225 m |
| CF2 | 9.8584 m | N/A | 6.2808 m |
| CF3 | 34.7824 m | N/A | 11.8978 m |
| CF4 | 1.8999 | N/A | 104.2293 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*


Si6467BDQ
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si6467BDQ_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: September 27, 2006
Time: 14:28:37


Si6467BDQ
Tank j-f
Temperature: 27.0
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50
40
30
20
10
0
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Time
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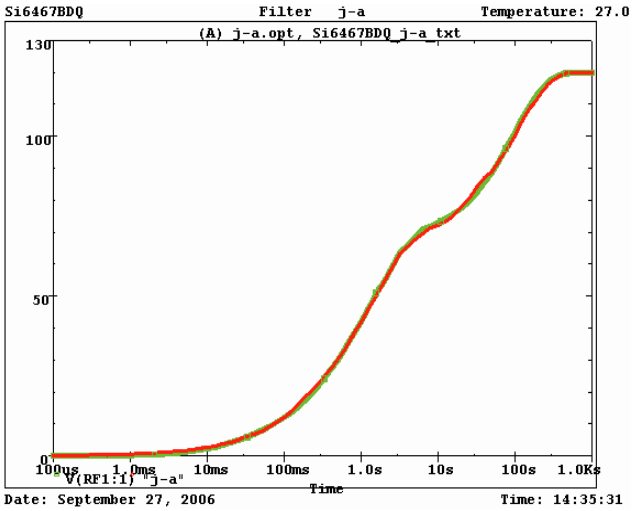
Time: 14:55:09


Si6467BDQ
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si6467BDQ_j-a_txt
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
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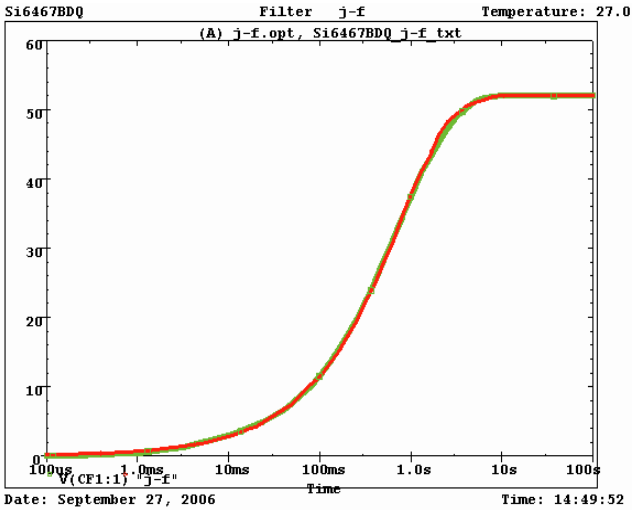
Time
Date: September 27, 2006
Time: 14:35:31


Si6467BDQ
Filter j-f
Temperature: 27.0
(A) j-f.opt, Si6467BDQ_j-f_txt
60
50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s
V(CF1:1) "j-f"
Time
Date: September 27, 2006
Time: 14:49:52