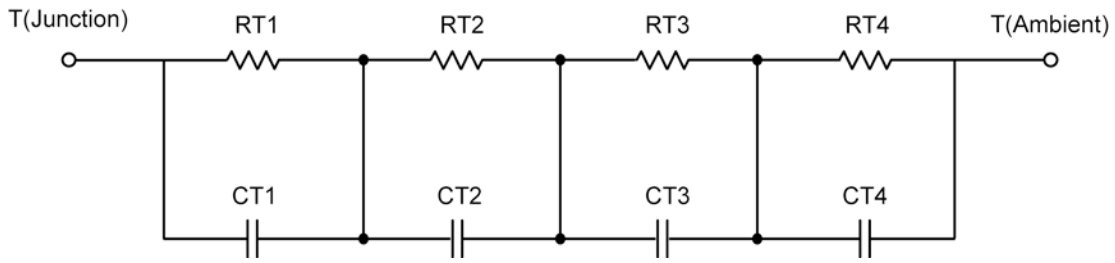
# R-C Thermal Model Parameters

## 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."

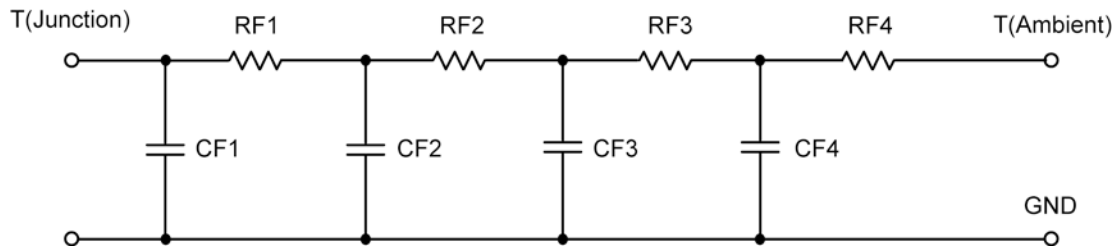
## R-C THERMAL MODEL FOR TANK CONFIGURATION




| R-C VALUES FOR TANK CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RT1 | 2.6479 | 530.6127 m | N/A |
| RT2 | 11.0629 | 373.8928 m | N/A |
| RT3 | 17.3458 | 258.2708 m | N/A |
| RT4 | 33.9434 | 337.2237 m | N/A |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CT1 | 19.8304 m | 30.3158 m | N/A |
| CT2 | 100.2958 m | 47.8572 m | N/A |
| CT3 | 1.5840 | 81.3467 m | N/A |
| CT4 | 2.5767 | 1.9413 m | N/A |

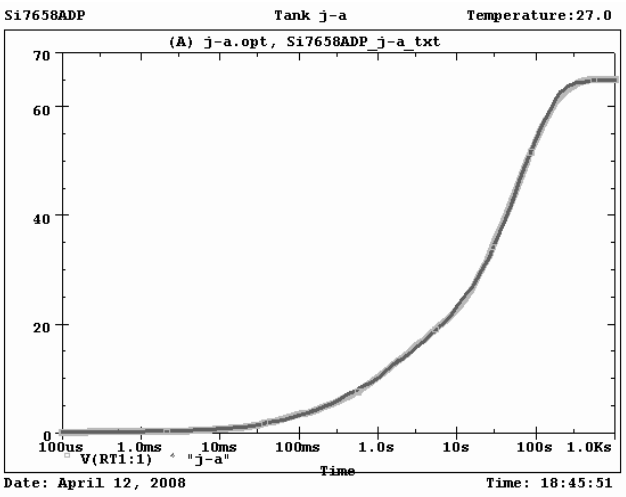
*This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.*

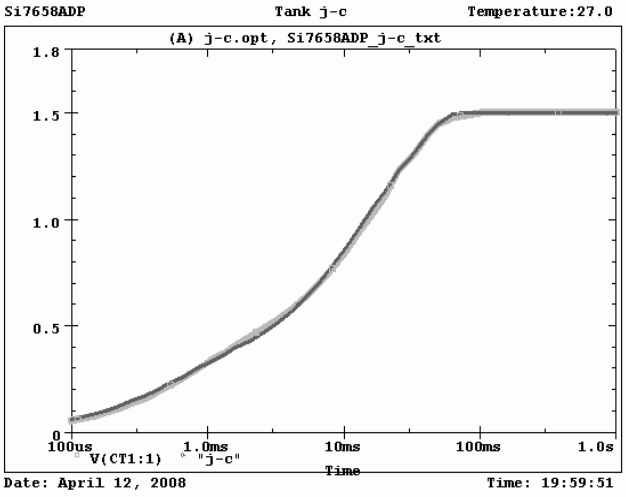
## R-C THERMAL MODEL FOR FILTER CONFIGURATION

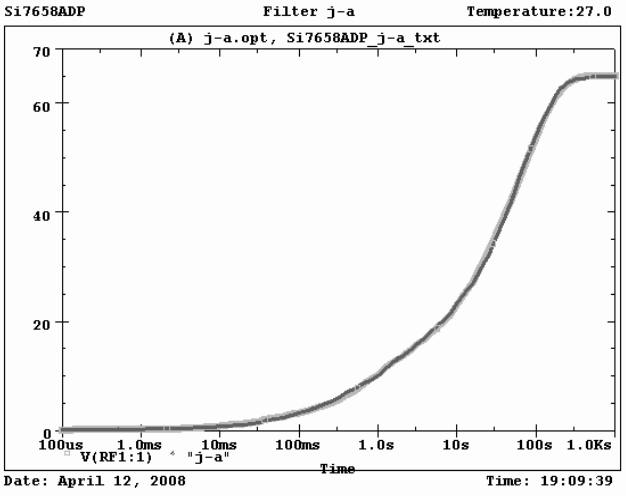


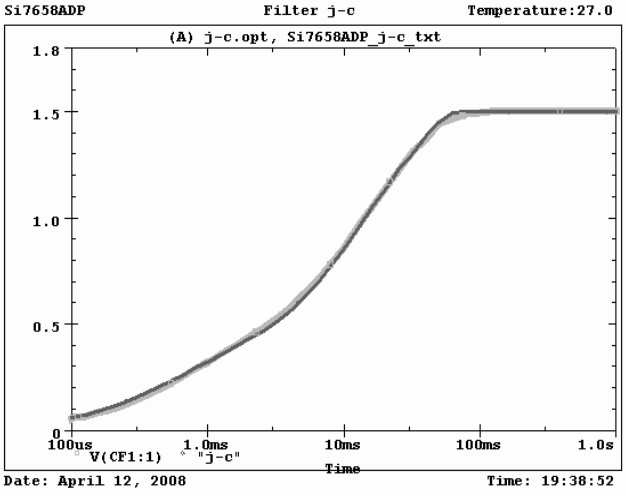

| R-C VALUES FOR FILTER CONFIGURATION | | | |
|---|---|---|---|
| **Thermal Resistance (°C/W)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| RF1 | 2.8491 | 397.0332 m | N/A |
| RF2 | 11.2810 | 652.9132 m | N/A |
| RF3 | 24.7425 | 237.2455 m | N/A |
| RF4 | 26.1274 | 212.8081 m | N/A |
| **Thermal Capacitance (Joules/°C)** | | | |
| **Junction to** | **Ambient** | **Case** | **Foot** |
| CF1 | 11.8771 m | 1.6962 m | N/A |
| CF2 | 64.6191 m | 10.9472 m | N/A |
| CF3 | 681.7151 m | 9.0048 m | N/A |
| CF4 | 1.9098 | 30.3204 m | N/A |

**Note**
NA indicates not applicable


Si7658ADP
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7658ADP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date: April 12, 2008
Time: 18:45:51


Si7658ADP
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7658ADP_j-c_txt
1.8
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date: April 12, 2008
Time: 19:59:51


Si7658ADP
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7658ADP_j-a_txt
70
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date: April 12, 2008
Time: 19:09:39


Si7658ADP
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7658ADP_j-c_txt
1.8
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date: April 12, 2008
Time: 19:38:52