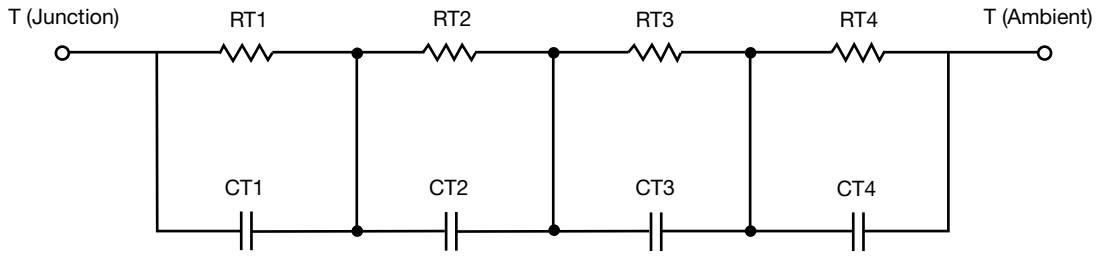
# R-C Thermal Model Parameters

## 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 PSpice, 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 PSpice 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 PSpice Platform”.

## R-C THERMAL MODEL FOR TANK CONFIGURATION



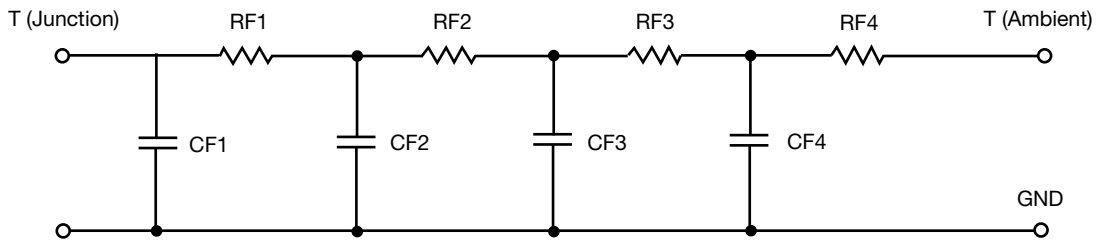

| R-C VALUES FOR TANK CONFIGURATION | | | | |
|---|---|---|---|---|
| THERMAL RESISTANCE (°C/W) | | | | |
| **Junction to** | **NCh-1 Ambient** | **NCh-2 Ambient** | **NCh-1 Case** | **NCh-2 Case** |
| RT1 | 1.8464 | 1.8464 | 1.4401 | 189.1927m |
| RT2 | 9.2164 | 9.2164 | 599.8824m | 447.3073m |
| RT3 | 16.8859 | 16.8859 | 2.5349 | 1.0096 |
| RT4 | 57.0513 | 57.0513 | 925.1176m | 1.4539 |
| THERMAL CAPACITANCE (Joules/°C) | | | | |
| **Junction to** | **NCh-1 Ambient** | **NCh-2 Ambient** | **NCh-1 Case** | **NCh-2 Case** |
| CT1 | 637.6036u | 383.2434u | 13.1521m | 143.3122m |
| CT2 | 4.9696m | 11.2749m | 910.9554u | 1.4212m |
| CT3 | 94.9131m | 114.2535m | 1.0314m | 8.3403m |
| CT4 | 1.2862 | 1.3163 | 328.2249m | 9.2651m |

**Note**

- n/a indicates not applicable

*This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet 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** | **NCh-1 Ambient** | **NCh-2 Ambient** | **NCh-1 Case** | **NCh-2 Case** |
| RF1 | 8.3333 | 7.6385 | 1.4470 | 738.7889m |
| RF2 | 16.8338 | 16.5339 | 1.9879 | 958.2386m |
| RF3 | 29.3127 | 31.3631 | 1.2262 | 1.2698 |
| RF4 | 30.5202 | 29.4645 | 838.8999m | 133.1722m |
| THERMAL CAPACITANCE (Joules/°C) | | | | |
| **Junction to** | **NCh-1 Ambient** | **NCh-2 Ambient** | **NCh-1 Case** | **NCh-2 Case** |
| CF1 | 1.4934m | 3.8569m | 406.7999u | 1.0999m |
| CF2 | 39.8799m | 37.0540m | 711.8035u | 2.7201m |
| CF3 | 740.3234m | 714.6697m | 12.1527m | 2.7776m |
| CF4 | 1.4956 | 1.7792 | 345.9767m | 80.1192m |

**Note**

- n/a indicates not applicable