

## 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:*

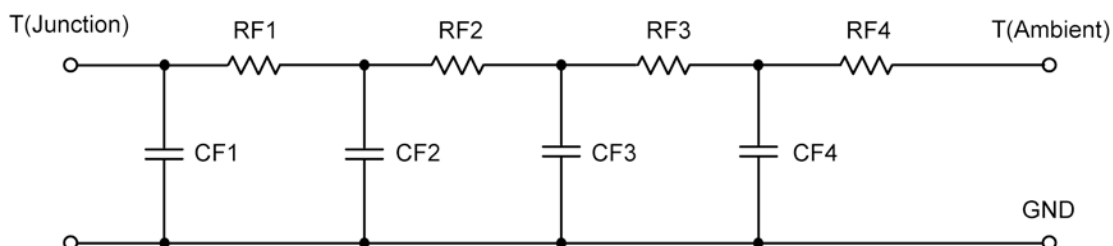
*For a detailed explanation of implementing these values in P-SPICE, refer to [Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform](#).*

### R-C THERMAL MODEL FOR TANK CONFIGURATION



| <b>R-C VALUES FOR TANK CONFIGURATION</b> |            |            |      |
|--|------------|------------|------|
| Thermal Resistance (°C/W)                |            |            |      |
| Junction to                              | Ambient    | Case       | Foot |
| RT1                                      | 4.0820     | 343.1000 m | N/A  |
| RT2                                      | 12.6407    | 1.3305     | N/A  |
| RT3                                      | 10.0717    | 2.1666     | N/A  |
| RT4                                      | 49.2056    | 2.1598     | N/A  |
| Thermal Capacitance (Joules/°C)          |            |            |      |
| Junction to                              | Ambient    | Case       | Foot |
| CT1                                      | 428.6982 u | 51.6965 m  | N/A  |
| CT2                                      | 127.3002 m | 441.2460 u | N/A  |
| CT3                                      | 9.9367 m   | 7.6265 m   | N/A  |
| CT4                                      | 1.6547     | 7.8038 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                             | 4.8887     | 1.6136     | N/A  |
| RF2                             | 11.8166    | 2.3565     | N/A  |
| RF3                             | 12.6042    | 1.7781     | N/A  |
| RF4                             | 46.6905    | 251.8000 m | N/A  |
| Thermal Capacitance (Joules/°C) |            |            |      |
| Junction to                     | Ambient    | Case       | Foot |
| CF1                             | 395.9376 u | 380.4735 u | N/A  |
| CF2                             | 10.5146 m  | 3.2480 m   | N/A  |
| CF3                             | 141.4110 m | 431.6524 u | N/A  |
| CF4                             | 1.5981     | 354.6075 u | N/A  |

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

