

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-SPIICE, refer to [Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPIICE Platform](#).

R-C THERMAL MODEL FOR TANK CONFIGURATION



| R-C VALUES FOR TANK CONFIGURATION | | | |
|--|------------|------|------------|
| Thermal Resistance (°C/W) | | | |
| Junction to | Ambient | Case | Foot |
| RT1 | 10.4526 | N/A | 1.8770 |
| RT2 | 19.7498 | N/A | 11.8244 |
| RT3 | 13.7958 | N/A | 182.8000 m |
| RT4 | 41.0018 | N/A | 5.1158 |
| Thermal Capacitance (Joules/°C) | | | |
| Junction to | Ambient | Case | Foot |
| CT1 | 1.0735 m | N/A | 1.5762 m |
| CT2 | 3.7703 m | N/A | 2.4035 m |
| CT3 | 409.7869 m | N/A | 12.3188 |
| CT4 | 2.0736 | N/A | 15.3613 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 ($^{\circ}\text{C}/\text{W}$) | | | |
|--|------------|------|------------|
| Junction to | Ambient | Case | Foot |
| RF1 | 12.6462 | N/A | 8.8130 |
| RF2 | 17.7656 | N/A | 9.1819 |
| RF3 | 18.1505 | N/A | 762.1622 m |
| RF4 | 36.4377 | N/A | 242.9378 m |
| Thermal Capacitance (Joules/ $^{\circ}\text{C}$) | | | |
| Junction to | Ambient | Case | Foot |
| CF1 | 730.9942 u | N/A | 1.0532 m |
| CF2 | 2.5602 m | N/A | 3.2146 m |
| CF3 | 317.2725 m | N/A | 45.1916 m |
| CF4 | 1.9260 | N/A | 3.0159 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

