

## 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                             | 5.6032     | N/A  | 1.0133     |
| RT2                             | 14.2956    | N/A  | 6.2540     |
| RT3                             | 14.6313    | N/A  | 8.7585     |
| RT4                             | 50.4699    | N/A  | 4.9742     |
| Thermal Capacitance (Joules/°C) |            |      |            |
| Junction to                     | Ambient    | Case | Foot       |
| CT1                             | 6.2096 m   | N/A  | 1.8776 m   |
| CT2                             | 59.4254 m  | N/A  | 58.6354 m  |
| CT3                             | 201.0155 m | N/A  | 202.4261 m |
| CT4                             | 1.6656     | N/A  | 13.7951 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                                                | 7.0803    | N/A  | 1.6962     |
| RF2                                                | 25.2038   | N/A  | 7.5576     |
| RF3                                                | 27.9267   | N/A  | 6.2751     |
| RF4                                                | 24.7892   | N/A  | 5.4711     |
| Thermal Capacitance (Joules/ $^{\circ}\text{C}$ )  |           |      |            |
| Junction to                                        | Ambient   | Case | Foot       |
| CF1                                                | 6.9366 m  | N/A  | 2.3287 m   |
| CF2                                                | 38.0633 m | N/A  | 8.7570 m   |
| CF3                                                | 1.0345    | N/A  | 56.5630 m  |
| CF4                                                | 1.9185    | N/A  | 178.0723 m |

**Note**

NA indicates not applicable

