

## 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                                      | N/A     | 170.8589 m | N/A  |
| RT2                                      | N/A     | 173.9218 m | N/A  |
| RT3                                      | N/A     | 387.1914 m | N/A  |
| RT4                                      | N/A     | 368.0279 m | N/A  |
| Thermal Capacitance (Joules/°C)          |         |            |      |
| Junction to                              | Ambient | Case       | Foot |
| CT1                                      | N/A     | 2.3474 m   | N/A  |
| CT2                                      | N/A     | 11.7100 m  | N/A  |
| CT3                                      | N/A     | 46.6962 m  | N/A  |
| CT4                                      | N/A     | 149.1069 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



| <b>R-C VALUES FOR FILTER CONFIGURATION</b> |         |            |      |
|--|---------|------------|------|
| Thermal Resistance (°C/W)                  |         |            |      |
| Junction to                                | Ambient | Case       | Foot |
| RF1  | N/A     | 258.6821 m | N/A  |
| RF2  | N/A     | 252.4542 m | N/A  |
| RF3  | N/A     | 496.3073 m | N/A  |
| RF4  | N/A     | 92.5564 m  | N/A  |
| Thermal Capacitance (Joules/°C)            |         |            |      |
| Junction to                                | Ambient | Case       | Foot |
| CF1  | N/A     | 1.7150 m   | N/A  |
| CF2  | N/A     | 10.7280 m  | N/A  |
| CF3  | N/A     | 38.4074 m  | N/A  |
| CF4  | N/A     | 329.3794 m | 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

