

## 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                       | Ambient   | Case      | Foot |
| RT1                               | 2.3861    | 136.4790m | n/a  |
| RT2                               | 9.1935    | 560.7199m | n/a  |
| RT3                               | 12.6868   | 129.7965m | n/a  |
| RT4                               | 56.2412   | 1.5858    | n/a  |
| THERMAL CAPACITANCE (Joules/°C)   |           |           |      |
| Junction to                       | Ambient   | Case      | Foot |
| CT1                               | 6.8821m   | 186.7574m | n/a  |
| CT2                               | 16.2428m  | 1.0062m   | n/a  |
| CT3                               | 113.2642m | 351.2760m | n/a  |
| CT4                               | 1.2047    | 7.1736m   | n/a  |

#### 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                         | Ambient   | Case      | Foot |
| RF1                                 | 8.9817    | 706.2705m | n/a  |
| RF2                                 | 12.9814   | 794.2491m | n/a  |
| RF3                                 | 11.3086   | 424.6185m | n/a  |
| RF4                                 | 47.3733   | 456.5133m | n/a  |
| THERMAL CAPACITANCE (Joules/°C)     |           |           |      |
| Junction to                         | Ambient   | Case      | Foot |
| CF1                                 | 6.2757m   | 766.8769u | n/a  |
| CF2                                 | 39.3163m  | 6.0387m   | n/a  |
| CF3                                 | 473.5689m | 1.4568m   | n/a  |
| CF4                                 | 897.0782m | 3.8565m   | n/a  |

Note

- n/a indicates not applicable

