

R-C Thermal Model Parameters

DESCRIPTION

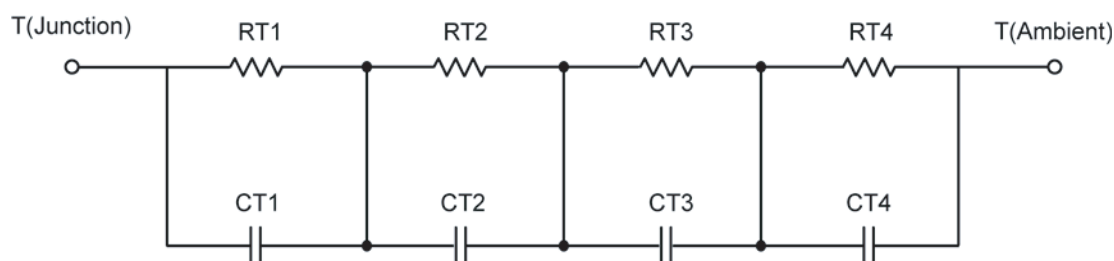
The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "[A Simple Method of Generating Thermal Models for a Power MOSFET](#)"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse 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



| R-C VALUES FOR TANK CONFIGURATION | | | |
|--|------------|------|------------|
| Thermal Resistance (°C/W) | | | |
| Junction to | Ambient | Case | Foot |
| RT1 | 10.7224 | N/A | 10.1748 |
| RT2 | 24.3862 | N/A | 4.9487 |
| RT3 | 21.1365 | N/A | 4.2670 |
| RT4 | 52.8961 | N/A | 16.1489 |
| Thermal Capacitance (Joules/°C) | | | |
| Junction to | Ambient | Case | Foot |
| CT1 | 528.0795 u | N/A | 3.9143 m |
| CT2 | 5.4966 m | N/A | 404.9790 u |
| CT3 | 52.9518 m | N/A | 175.3498 m |
| CT4 | 1.4413 | N/A | 7.4697 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 | 12.5029 | N/A | 6.1817 |
| RF2 | 29.3753 | N/A | 14.0421 |
| RF3 | 16.7420 | N/A | 11.2894 |
| RF4 | 50.5959 | N/A | 4.0621 |
| Thermal Capacitance (Joules/ $^{\circ}\text{C}$) | | | |
| Junction to | Ambient | Case | Foot |
| CF1 | 447.4337 μ | N/A | 352.8564 μ |
| CF2 | 4.8345 m | N/A | 1.8886 m |
| CF3 | 76.3317 m | N/A | 4.7917 m |
| CF4 | 1.4431 | N/A | 139.3288 m |

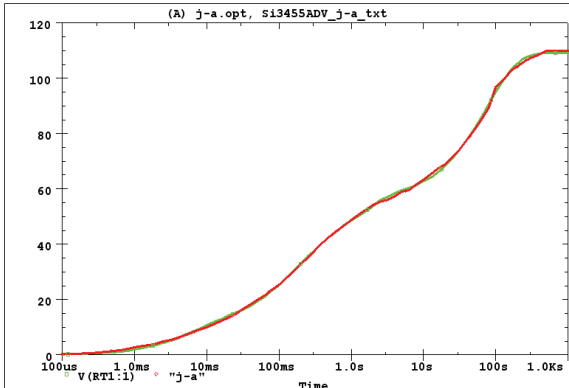
Note: NA indicates not applicable

Reference:

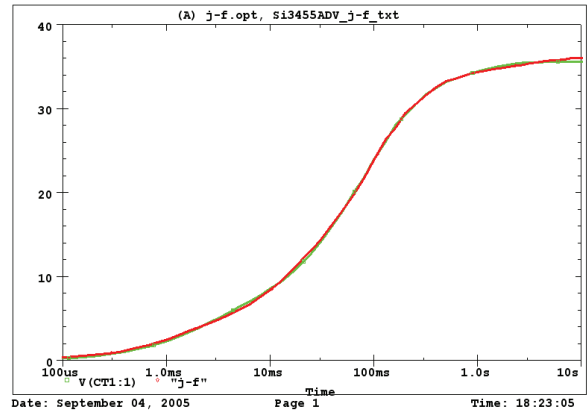
[1] "A Simple Method of Generating Thermal Models for a Power MOSFET" by Wharton McDaniel and Kandarp Pandya. IEEE / SEMITHERM 2002



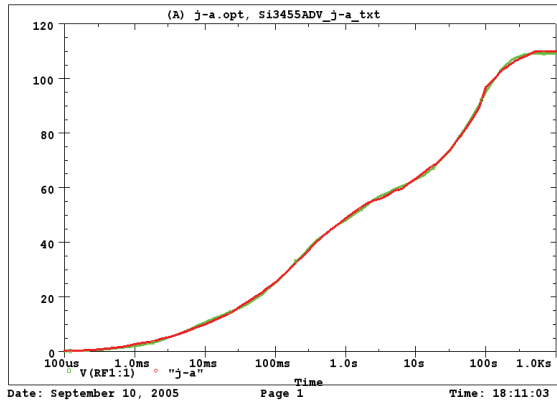
Si3455ADV Tank j-a Temperature: 27.0



Si3455ADV Tank j-f Temperature: 27.0



Si3455ADV Filter j-a Temperature: 27.0



Si3455ADV Filter j-f Temperature: 27.0

