

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

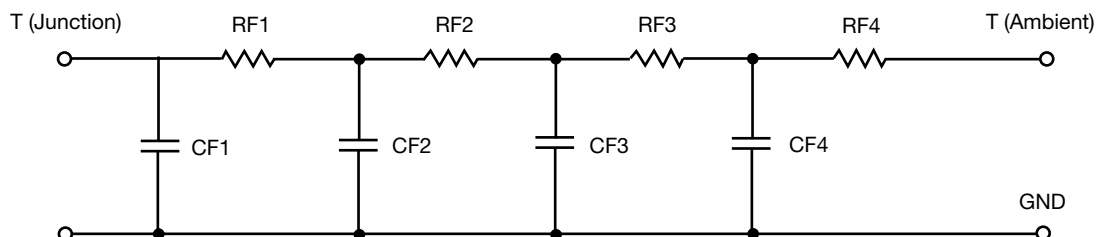


| R-C VALUES FOR TANK CONFIGURATION | | | | |
|-----------------------------------|-------------------|-------------------|----------------|----------------|
| THERMAL RESISTANCE (°C/W) | | | | |
| Junction to | Ambient Channel 1 | Ambient Channel 2 | Foot Channel 1 | Foot Channel 2 |
| RT1 | 8.8119 | 5.8332 | 13.7750 | 11.0076 |
| RT2 | 25.4469 | 25.7315 | 12.4374 | 14.0113 |
| RT3 | 22.8160 | 23.6280 | 3.5700 | 2.2027 |
| RT4 | 62.9252 | 54.8073 | 10.2176 | 10.7784 |
| THERMAL CAPACITANCE (Joules/°C) | | | | |
| Junction to | Ambient Channel 1 | Ambient Channel 2 | Foot Channel 1 | Foot Channel 2 |
| CT1 | 946.2768 u | 3.2768 m | 104.8122 m | 186.2093 m |
| CT2 | 20.2070 m | 9.4656 m | 20.7745 m | 15.8855 m |
| CT3 | 62.8463 m | 84.7284 m | 357.6399 u | 917.1032 u |
| CT4 | 1.1064 | 1.2331 | 4.8035 m | 5.6942 m |

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

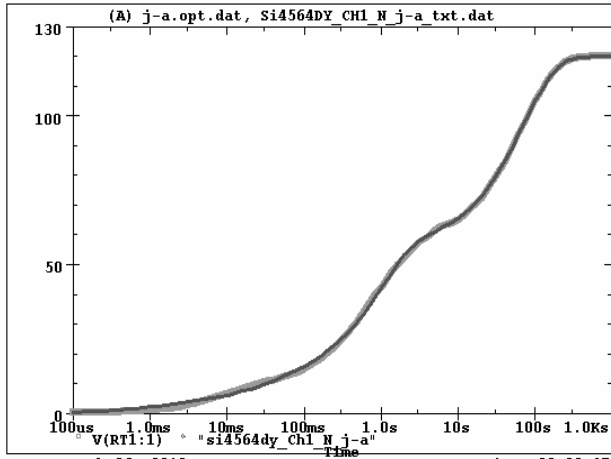
| R-C VALUES FOR FILTER CONFIGURATION | | | | |
|--|--------------------------|--------------------------|-----------------------|-----------------------|
| THERMAL RESISTANCE (°C/W) | | | | |
| Junction to | Ambient Channel 1 | Ambient Channel 2 | Foot Channel 1 | Foot Channel 2 |
| RF1 | 7.4554 | 6.9305 | 4.1451 | 3.9916 |
| RF2 | 21.7741 | 26.6656 | 15.3082 | 18.9931 |
| RF3 | 31.1664 | 25.8544 | 15.0155 | 10.4816 |
| RF4 | 59.6041 | 50.5495 | 5.5312 | 4.5337 |
| THERMAL CAPACITANCE (Joules/°C) | | | | |
| Junction to | Ambient Channel 1 | Ambient Channel 2 | Foot Channel 1 | Foot Channel 2 |
| CF1 | 730.6810 u | 1.3377 m | 340.2531 u | 1.0522 m |
| CF2 | 7.7933 m | 6.1285 m | 3.2045 m | 3.4581 m |
| CF3 | 30.2777 m | 62.6347 m | 27.3149 m | 46.7552 m |
| CF4 | 1.1427 | 1.3009 | 208.4042 m | 609.9337 m |

Note

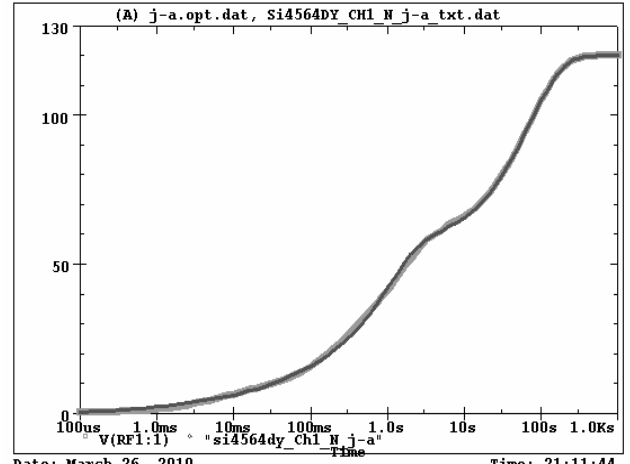
N/A indicates not applicable



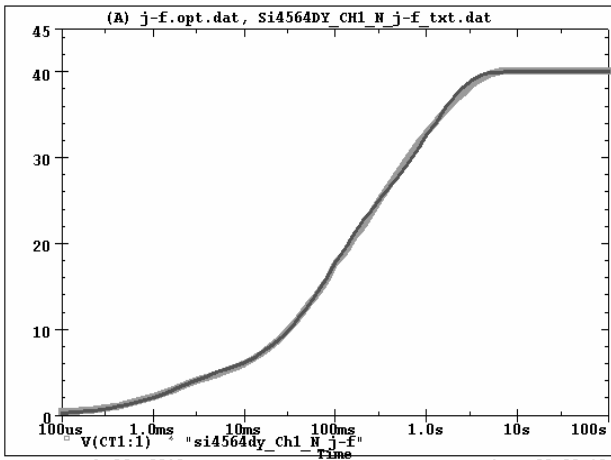
Si4564DY Tank j-a Ch1 Nch Temperature: 27.0



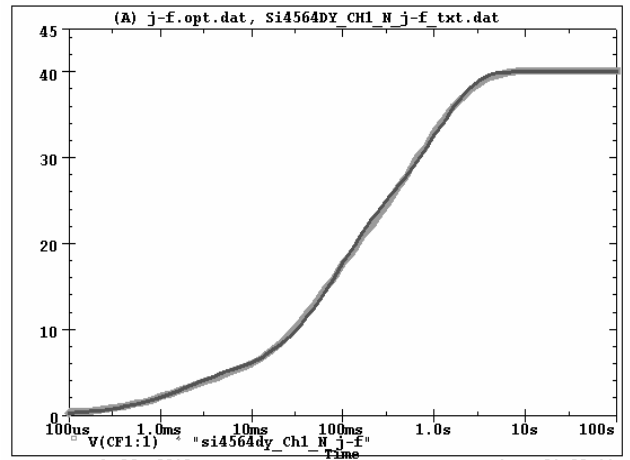
Si4564DY Filter j-a Ch1 Nch Temperature: 27.0



Si4564DY Tank j-f Ch1 Nch Temperature: 27.0

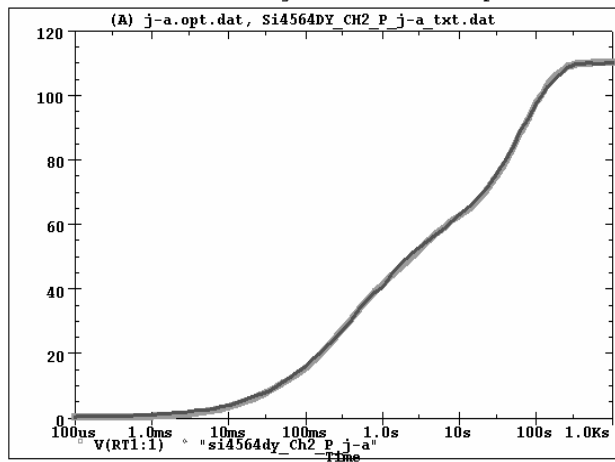


Si4564DY Filter j-f Ch1 Nch Temperature: 27.0

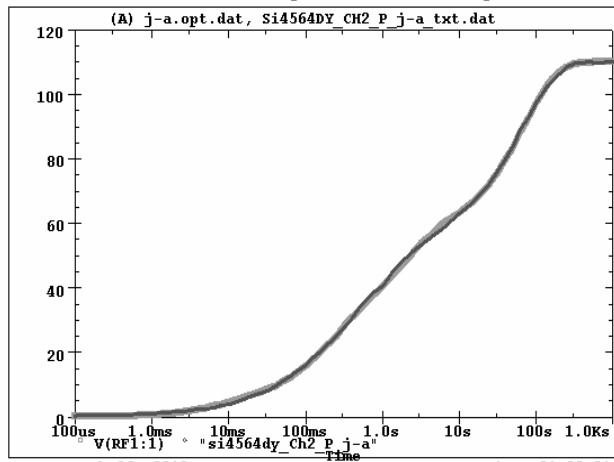




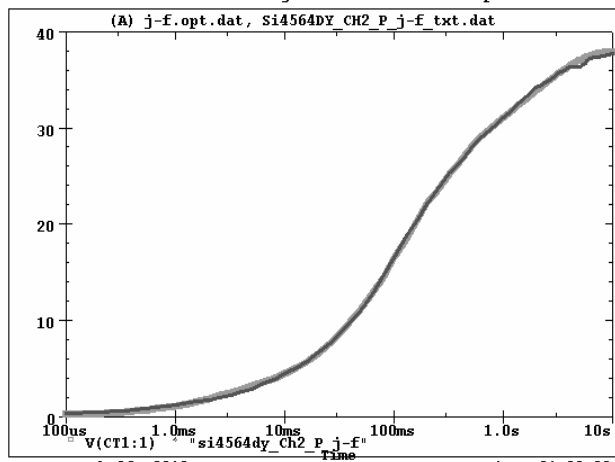
Si4564DY Tank j-a Ch2 Pch Temperature: 27.0



Si4564DY Filter j-a Ch2 Pch Temperature: 27.0



Si4564DY Tank j-f Ch2 Pch Temperature: 27.0



Si4564DY Filter j-f Ch2 Pch Temperature: 27.0

