

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

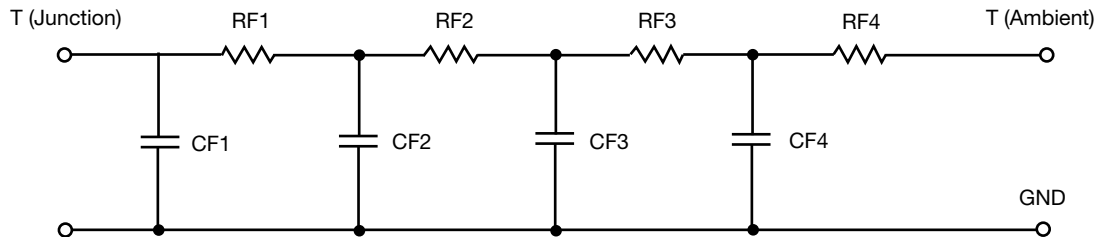


| R-C VALUES FOR TANK CONFIGURATION | | | |
|-----------------------------------|-----------|------|-----------|
| THERMAL RESISTANCE (°C/W) | | | |
| Junction to | Ambient | Case | Foot |
| RT1 | 20.5030 | N/A | 6.8854 |
| RT2 | 13.8494 | N/A | 6.7440 |
| RT3 | 33.1218 | N/A | 12.2675 |
| RT4 | 56.8319 | N/A | 18.8008 |
| THERMAL CAPACITANCE (Joules/°C) | | | |
| Junction to | Ambient | Case | Foot |
| CT1 | 3.6992m | N/A | 101.8657m |
| CT2 | 405.3140u | N/A | 177.5242u |
| CT3 | 17.1050m | N/A | 5.1068m |
| CT4 | 1.1787 | N/A | 1.6286m |

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

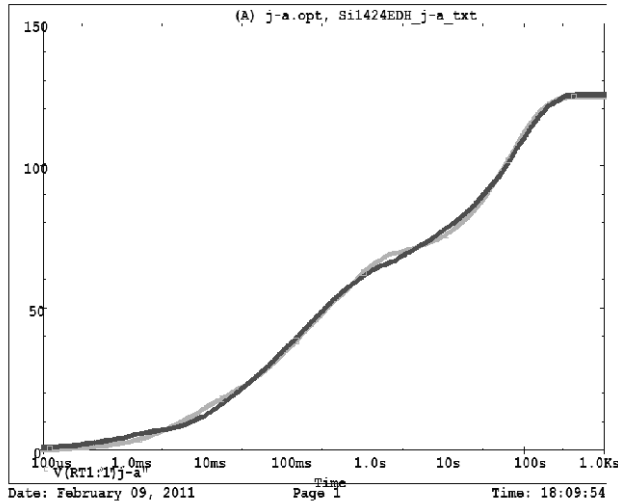
| R-C VALUES FOR FILTER CONFIGURATION | | | |
|--|----------------|-------------|-------------|
| THERMAL RESISTANCE (°C/W) | | | |
| Junction to | Ambient | Case | Foot |
| RF1 | 17.9927 | N/A | 9.3062 |
| RF2 | 33.4660 | N/A | 23.7862 |
| RF3 | 20.5779 | N/A | 5.2208 |
| RF4 | 52.6284 | N/A | 6.4141 |
| THERMAL CAPACITANCE (Joules/°C) | | | |
| Junction to | Ambient | Case | Foot |
| CF1 | 419.3512u | N/A | 167.1636u |
| CF2 | 3.1736m | N/A | 1.2141m |
| CF3 | 61.9349m | N/A | 359.9215u |
| CF4 | 1.3280 | N/A | 107.1951m |

Note

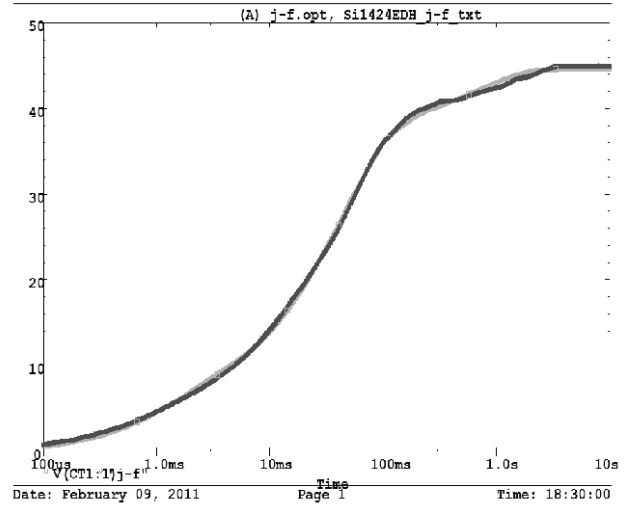
N/A indicates not applicable



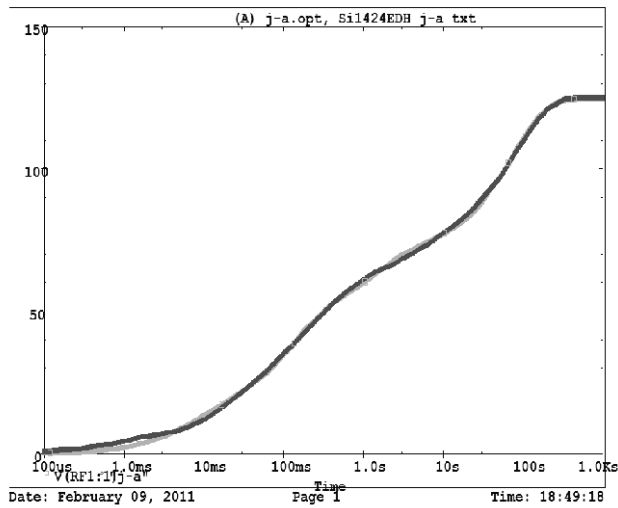
Si1424EDH Tank j-a Temperature: 27.0



Si1424EDH Tank j-f Temperature: 27.0



Si1424EDH Filter j-a Temperature: 27.0



Si1424EDH Filter j-f Temperature: 27.0

