

## R-C Thermal Model Parameters

### DESCRIPTION

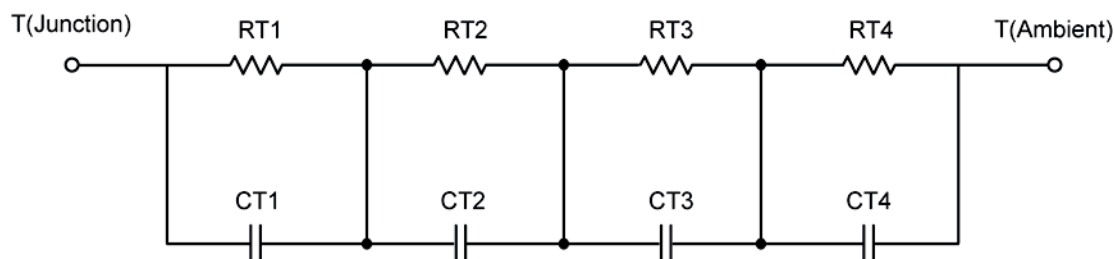
The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "[A Simple Method of Generating Thermal Models for a Power MOSFET](#)"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse 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	4.5197	277.4786 m	N/A
RT2	7.4284	449.4586 m	N/A
RT3	11.8825	965.3332 m	N/A
RT4	56.6379	709.2710 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	Ambient	Case	Foot
CT1	6.7430 m	17.9558 m	N/A
CT2	32.7582 m	827.6484 u	N/A
CT3	109.4727 m	18.7678 m	N/A
CT4	1.1804	13.0328 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****R-C VALUES FOR FILTER CONFIGURATION**

Thermal Resistance ( $^{\circ}\text{C}/\text{W}$ )			
Junction to	Ambient	Case	Foot
RF1	7.8647	1.8142 m	N/A
RF2	9.3907	670.9463 m	N/A
RF3	10.7274	1.0320	N/A
RF4	52.6417	691.0146 m	N/A
Thermal Capacitance (Joules/ $^{\circ}\text{C}$ )			
Junction to	Ambient	Case	Foot
CF1	6.1206 m	125.4667 u	N/A
CF2	24.0557 m	695.7232 u	N/A
CF3	148.5836 m	6.0783 m	N/A
CF4	1.1181	527.9622 u	N/A

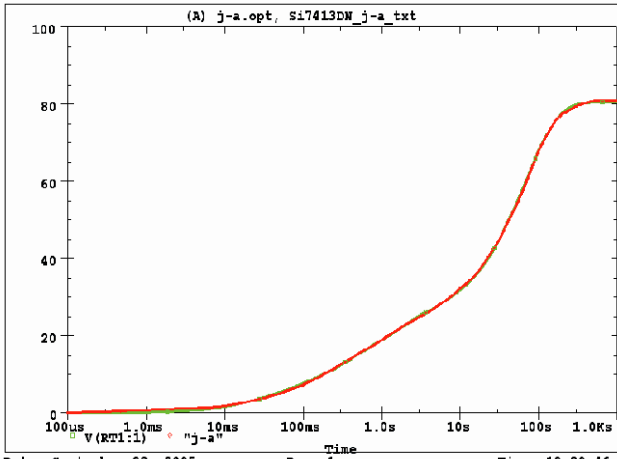
Note: NA indicates not applicable

Reference:

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

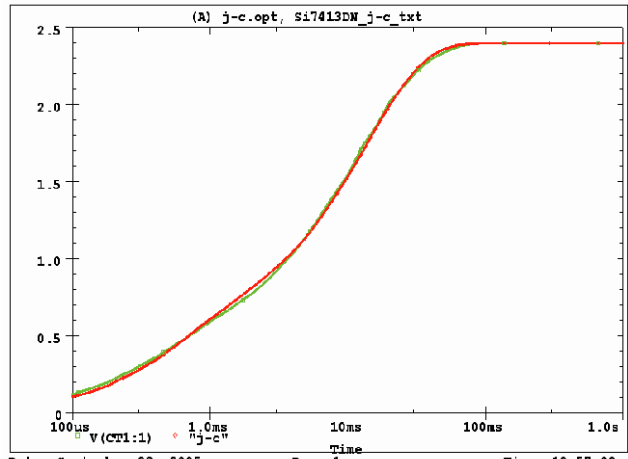


Si7413DN Tank j-a Temperature: 27.0



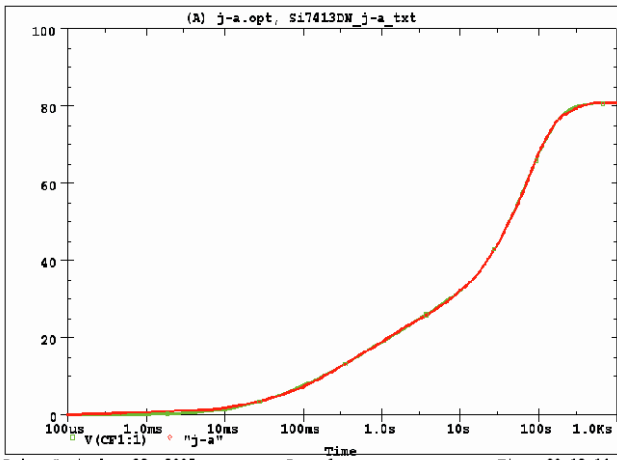
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Si7413DN Tank j-c Temperature: 27.0



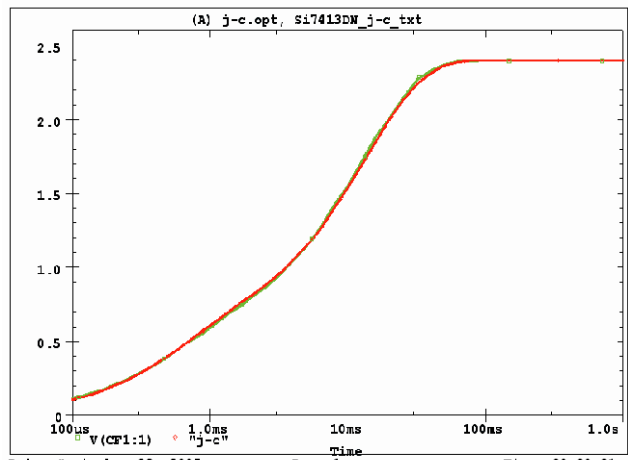
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Si7413DN Filter j-a Temperature: 27.0



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Si7413DN Filter j-c Temperature: 27.0



Date: September 23, 2005 Page 1 Time: 20:20:21