

## 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



<b>R-C VALUES FOR TANK CONFIGURATION</b>				
<b>Thermal Resistance (°C/W)</b>				
<b>Junction to</b>	<b>Ambient Nch</b>	<b>Ambient Pch</b>	<b>Foot Nch</b>	<b>Foot Pch</b>
RT1	24.2418	24.4906	14.4765	13.4634
RT2	29.7072	30.7076	13.6241	13.1115
RT3	6.2348	4.8949	3.9713	3.6512
RT4	59.8162	59.9069	9.9281	9.7739
<b>Thermal Capacitance (Joules/°C)</b>				
<b>Junction to</b>	<b>Ambient Nch</b>	<b>Ambient Pch</b>	<b>Foot Nch</b>	<b>Foot Pch</b>
CT1	7.2263 m	6.0845 m	83.3507 m	92.6928 m
CT2	66.7875 m	62.6693 m	8.8058 m	9.5455 m
CT3	885.7137 u	635.4234 u	424.7285 u	462.0172 u
CT4	1.2362	1.2313	5.2309 m	5.1944 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**

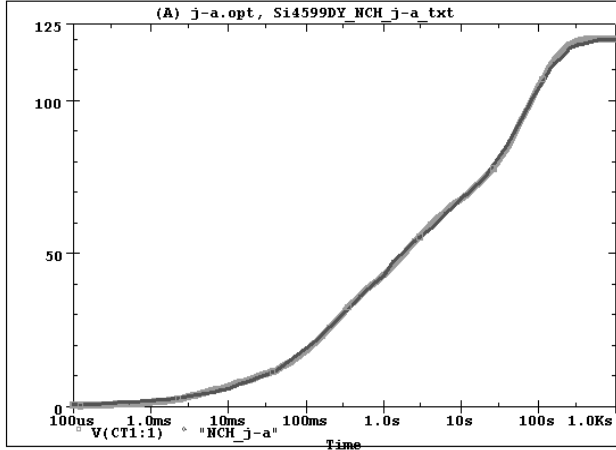
Thermal Resistance (°C/W)				
Junction to	Ambient Nch	Ambient Pch	Foot Nch	Foot Pch
RF1	7.5214	10.0244	2.6847	3.5069
RF2	30.4223	29.7139	13.7271	13.0838
RF3	27.1179	24.6132	15.6961	13.4928
RF4	54.9384	55.6485	9.7651	9.9165
Thermal Capacitance (Joules/°C)				
Junction to	Ambient Nch	Ambient Pch	Foot Nch	Foot Pch
CF1	738.9909 u	904.1379 u	212.8136 u	320.8251 u
CF2	6.0956 m	7.6080 m	1.6771 u	2.1123 m
CF3	84.2703 m	88.4875 m	7.1034 m	6.1867 m
CF4	1.2900	1.2359	129.0459 m	128.3563 m

**Note**

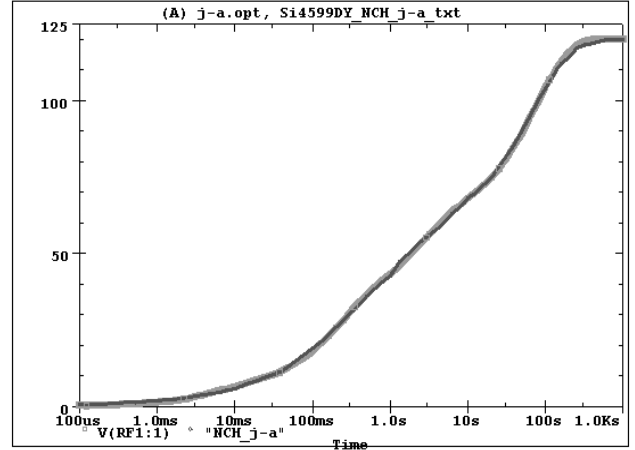
NA indicates not applicable



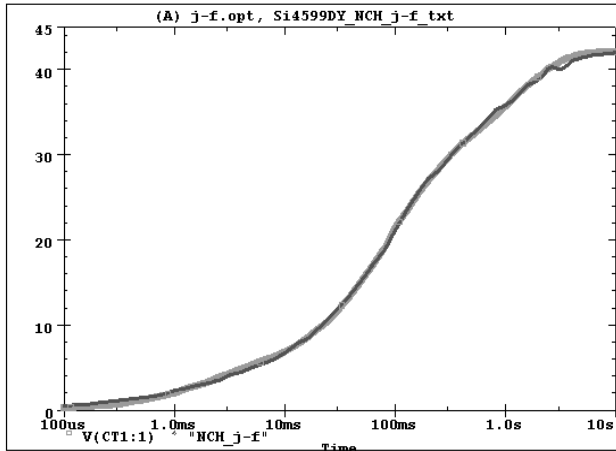
Si4599DY Tank j-a NCH CH1 Temperature:27.0



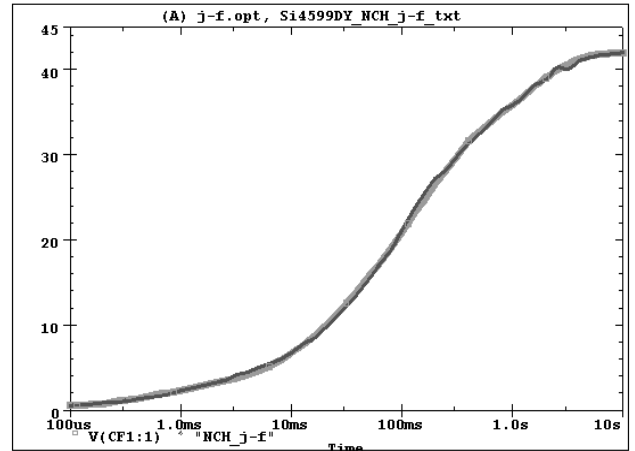
Si4599DY Filter j-a NCH CH1 Temperature:27.0



Si4599DY Tank j-f NCH CH1 Temperature:27.0

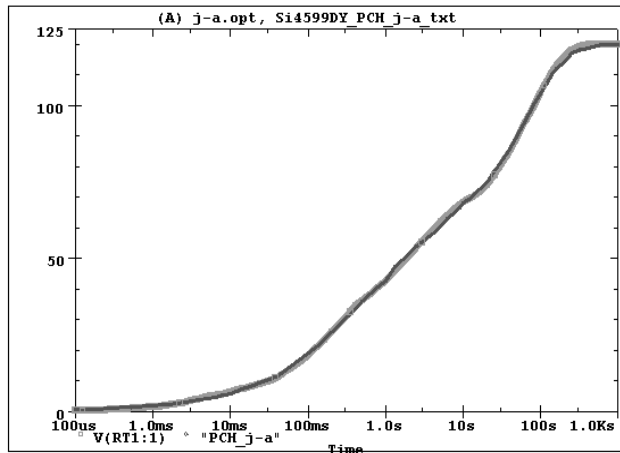


Si4599DY Filter j-f NCH CH1 Temperature:27.0



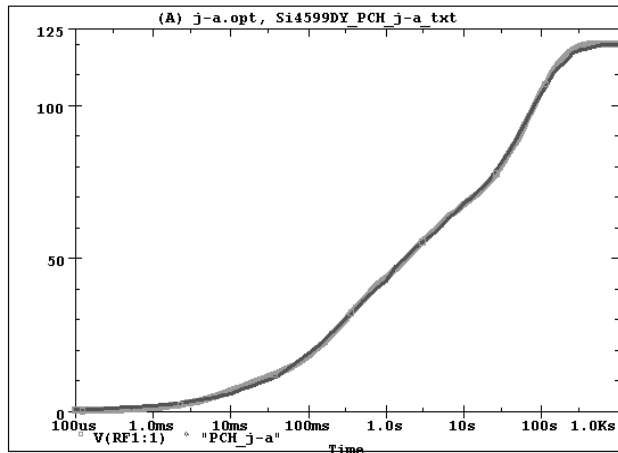


Si4599DY Tank j-a PCH CH2 Temperature:27.0



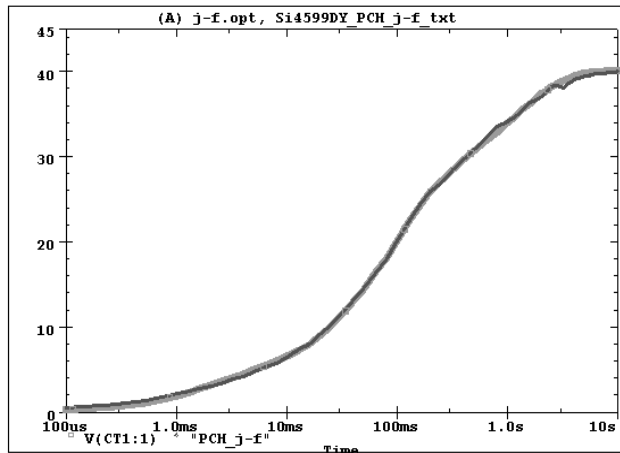
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Si4599DY Filter j-a PCH CH2 Temperature:27.0



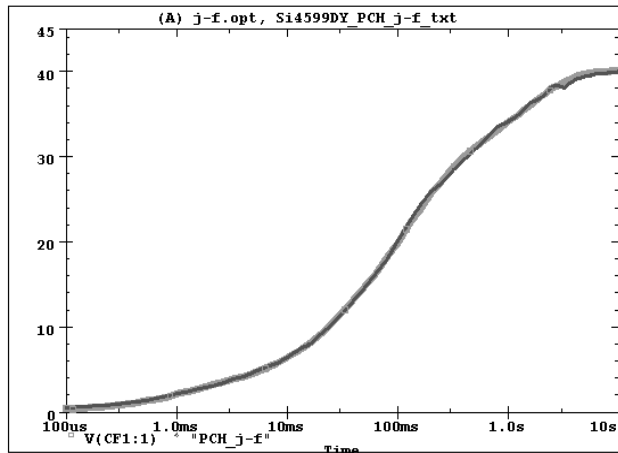
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Si4599DY Tank j-f PCH CH2 Temperature:27.0



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Si4599DY Filter j-f PCH CH2 Temperature:27.0



Date:September 24, 2008 Time:21:12:03