

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-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
RT1	12.1637	5.7765	14.9494	6.5467
RT2	25.6565	3.7748	19.0021	4.3575
RT3	27.9663	2.3175	20.0917	2.8124
RT4	44.2135	4.1312	55.9568	4.7834
Thermal Capacitance (Joules/°C)				
Junction to	Ambient-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
CT1	90.4043 u	534.8325 u	44.0766 u	389.0875 u
CT2	1.8276 m	89.9295 u	1.4083 m	49.6774 u
CT3	26.2170 m	148.7090 u	32.6572 m	51.6465 u
CT4	1.0557	411.8908 u	1.4670	227.5644 u

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**

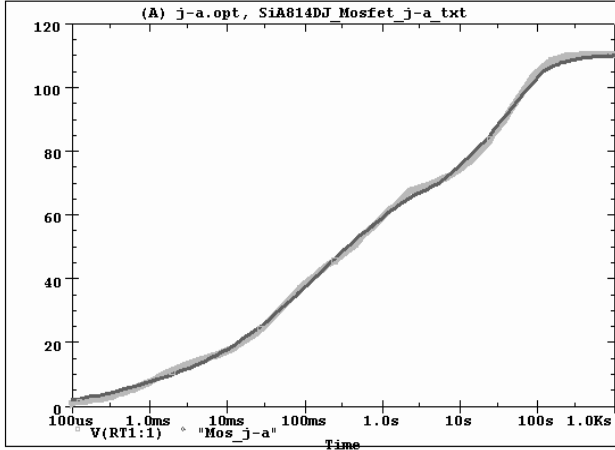
Thermal Resistance ($^{\circ}\text{C}/\text{W}$)				
Junction to	Ambient-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
RF1	16.6834	8.7745	15.8821	9.2052
RF2	31.9645	3.8432	21.5723	5.5541
RF3	21.7849	1.7466	16.8410	2.1892
RF4	39.5672	1.6357	55.7046	1.5515
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)				
Junction to	Ambient-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
CF1	112.9552 u	45.4623 u	42.3586 u	23.0729 u
CF2	2.6995 m	196.9465 u	1.4701 m	93.1985 u
CF3	63.9442 m	383.0379 u	41.2699 m	538.7457 u
CF4	1.2074	98.0442 u	1.3812	942.4790 u

Note

NA indicates not applicable



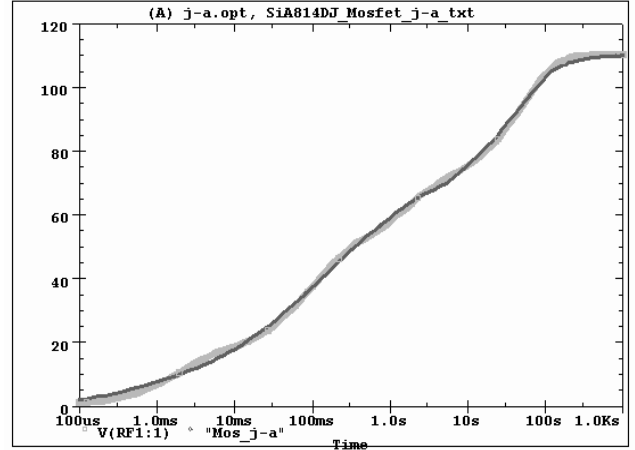
SiA814DJ Tank j-a MOSFET Temperature:27.0



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Time: 10:56:54

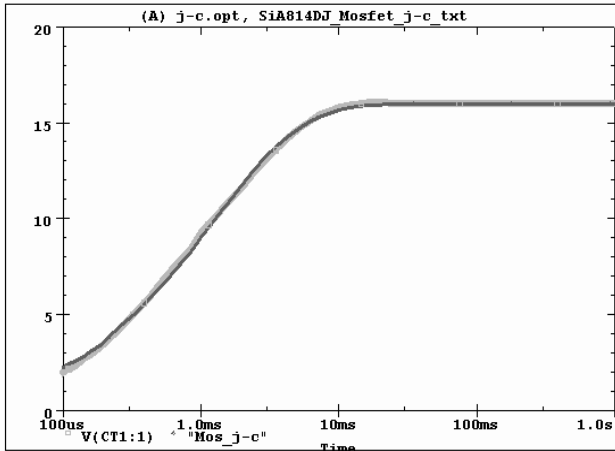
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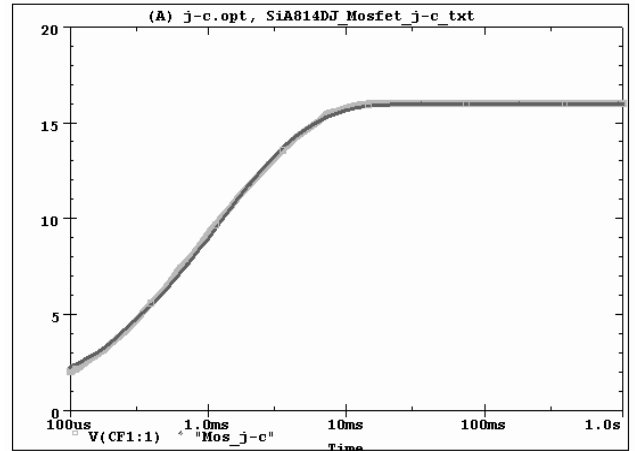
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Time: 11:11:00

SiA814DJ Filter j-c MOSFET Temperature:27.0

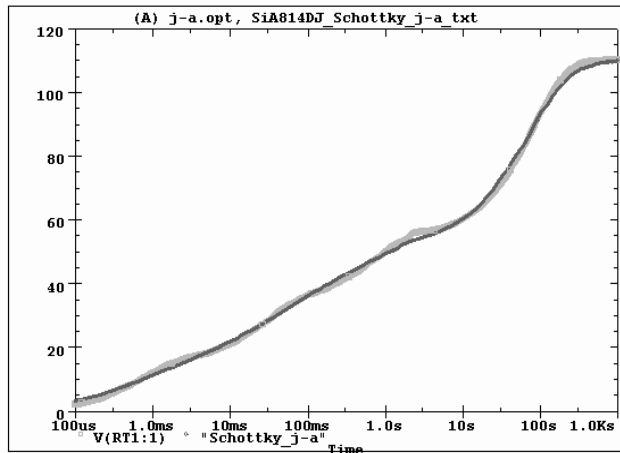


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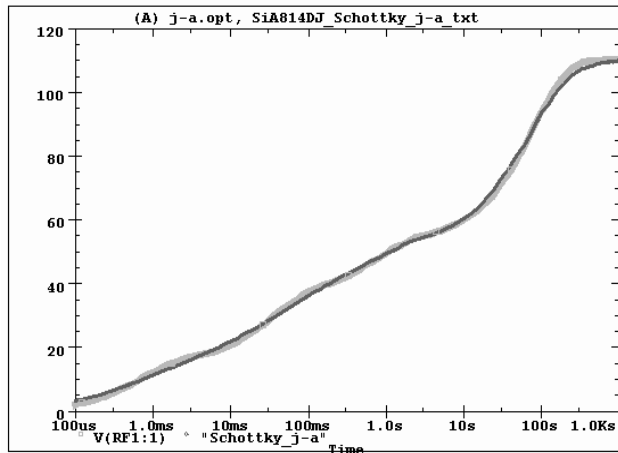


SiA814DJ Tank j-a Schottky Temperature:27.0



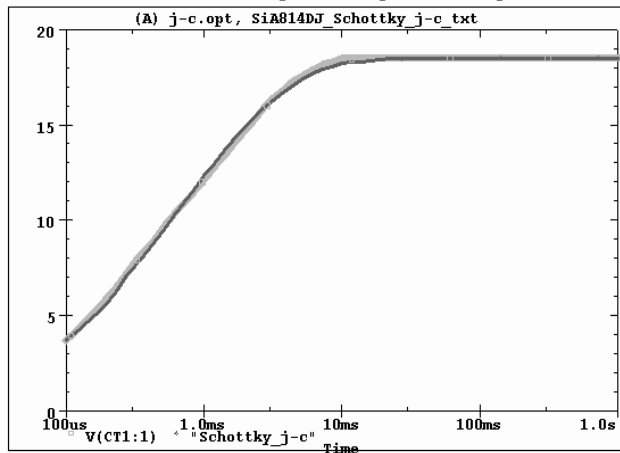
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SiA814DJ Filter j-a Schottky Temperature:27.0



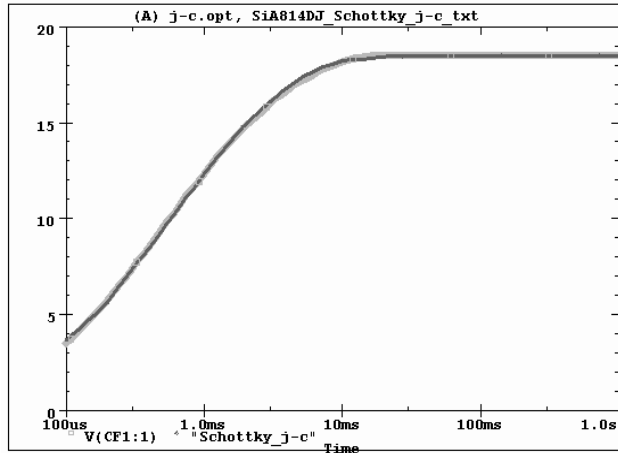
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SiA814DJ Tank j-c Schottky Temperature:27.0



Date: April 24, 2008 Time: 11:15:42

SiA814DJ Filter j-c Schottky Temperature:27.0



Date: April 24, 2008 Time: 12:10:37