

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	12.8811	6.8642	16.1939	6.4424
RT2	28.4971	3.8414	22.6355	3.6842
RT3	25.4273	2.8829	15.8877	3.1807
RT4	43.1945	5.4115	55.2829	5.1927
Thermal Capacitance (Joules/°C)				
Junction to	Ambient-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
CT1	89.9544 u	575.8047 u	47.0008 u	545.2226 u
CT2	2.1033 m	213.7521 u	1.9617 m	150.6342 u
CT3	38.4859 m	48.1103 u	77.6808 m	27.7754 u
CT4	1.1252	166.1143 u	1.5179	98.6902u

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**

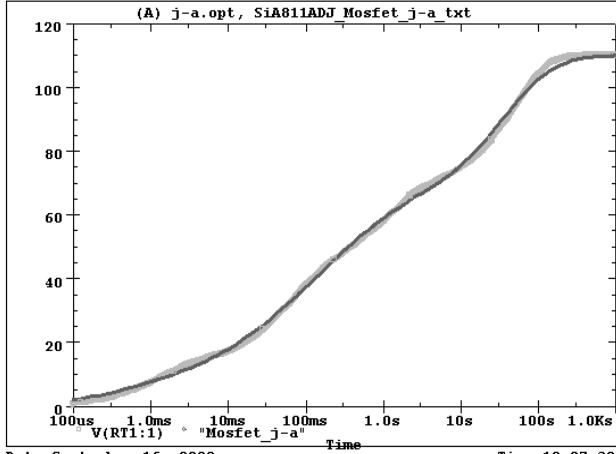
Thermal Resistance ($^{\circ}\text{C}/\text{W}$)				
Junction to	Ambient-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
RF1	16.6834	8.6709	15.8821	8.0052
RF2	31.9645	7.2095	21.5723	4.9541
RF3	21.7849	1.5089	16.8410	2.6892
RF4	39.5672	1.6107	55.7046	2.8515
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)				
Junction to	Ambient-Mosfet	Case-Mosfet	Ambient-Schtky	Case-Schtky
CF1	113.0927 u	33.8495 u	42.3509 u	19.9114 u
CF2	2.6852 m	120.1442 u	1.4711 m	61.1911 u
CF3	63.9126 m	772.3910 u	42.0397 m	234.1034 u
CF4	1.2030	449.1532 u	1.3816	593.2528 u

Note

NA indicates not applicable

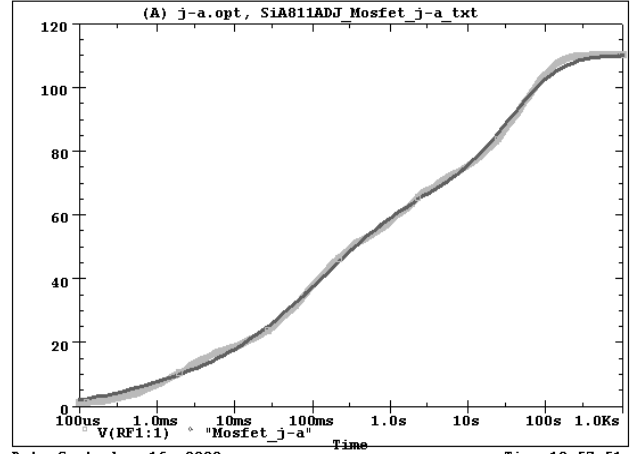


SiA811ADJ Tank j-a Mosfet Temperature:27.0



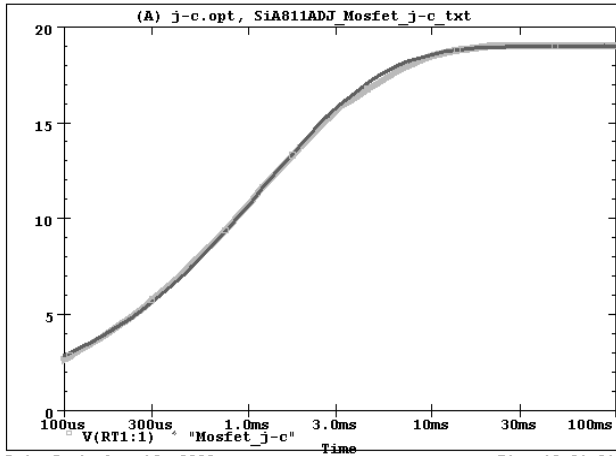
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SiA811ADJ Filter j-a Mosfet Temperature:27.0



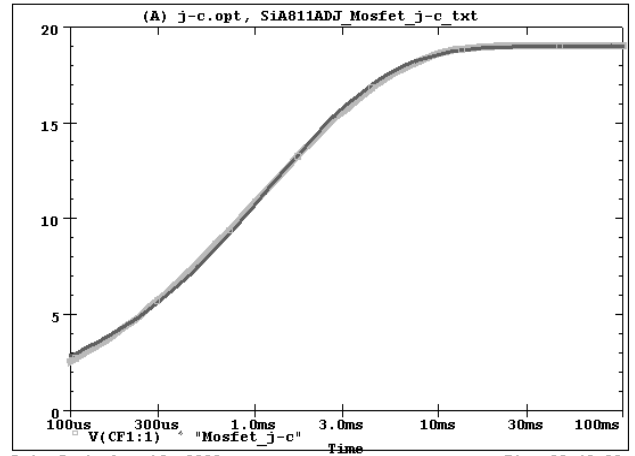
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SiA811ADJ Tank j-c Mosfet Temperature:27.0



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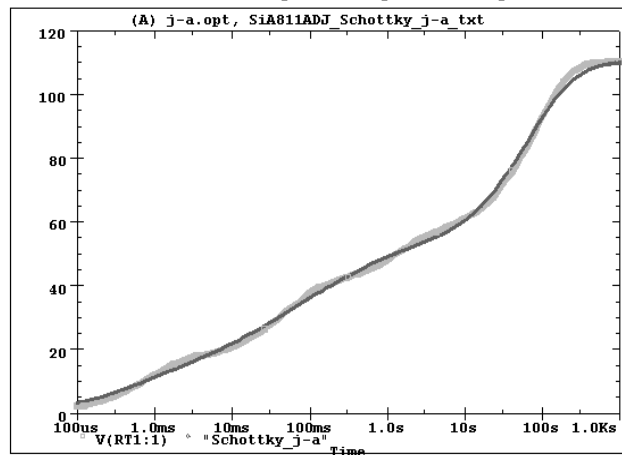
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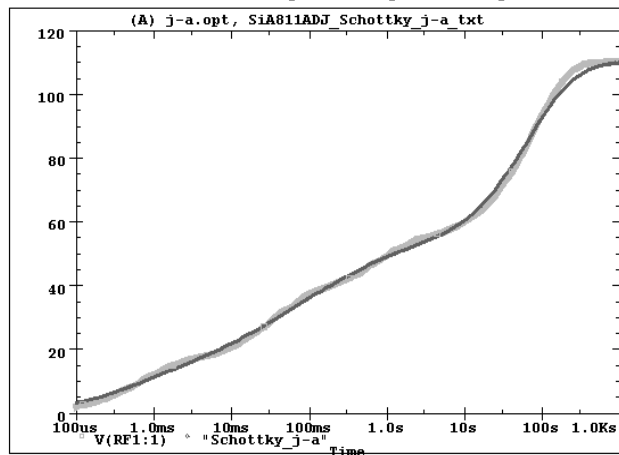


SiA811ADJ Tank j-a Schottky Temperature:27.0



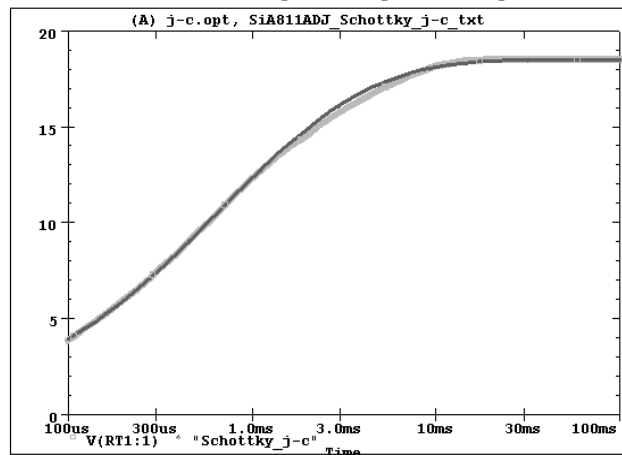
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SiA811ADJ Filter j-a Schottky Temperature:27.0



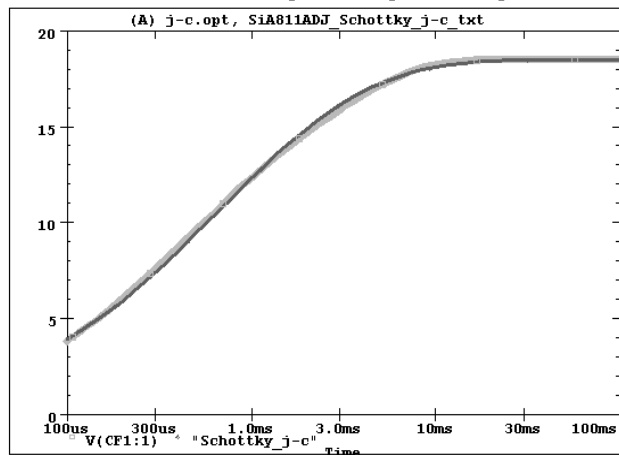
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SiA811ADJ Tank j-c Schottky Temperature:27.0



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SiA811ADJ Filter j-c Schottky Temperature:27.0



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