

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 ($^{\circ}\text{C}/\text{W}$)				
Junction to	Ambient-Mosfet	Foot-Mosfet	Ambient-Schtky	Foot-Schtky
RT1	20.4211	34.0075	12.1002	34.3101
RT2	55.2153	10.2599	49.0723	10.1542
RT3	31.3617	18.3438	48.6170	18.6741
RT4	43.0019	27.3888	45.2105	31.8616
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)				
Junction to	Ambient-Mosfet	Foot-Mosfet	Ambient-Schtky	Foot-Schtky
CT1	375.5247 u	1.2834 m	99.6544 u	947.9276 u
CT2	2.3727 m	192.6224 u	1.3744 m	86.5033 u
CT3	44.5994 m	69.8620 m	12.9623 m	37.3997 m
CT4	1.7315	5.3133 m	1.6491	5.2989 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

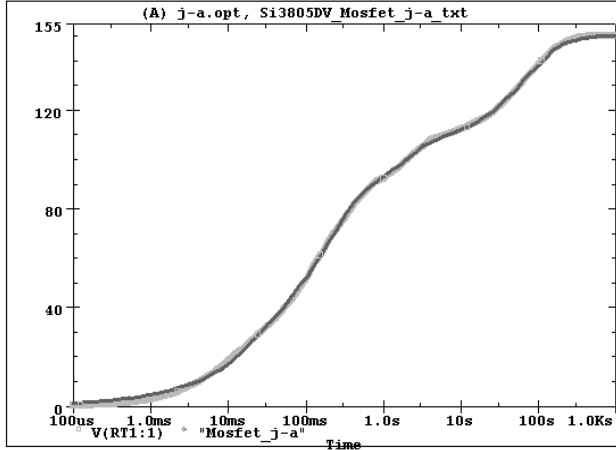
R-C VALUES FOR FILTER CONFIGURATION				
Thermal Resistance ($^{\circ}\text{C}/\text{W}$)				
Junction to	Ambient-Mosfet	Foot-Mosfet	Ambient-Schtky	Foot-Schtky
RF1	27.9639	13.9964	11.7193	13.4193
RF2	52.7373	39.5055	57.7203	40.0116
RF3	27.4664	19.3044	41.7096	24.4227
RF4	41.8324	17.1937	43.8508	17.1464
Thermal Capacitance (Joules/ $^{\circ}\text{C}$)				
Junction to	Ambient-Mosfet	Foot-Mosfet	Ambient-Schtky	Foot-Schtky
CF1	332.1633 u	165.3744 u	72.2742 u	87.9481 u
CF2	2.1397 m	856.4163 u	1.0519 m	735.2114 u
CF3	43.6041 m	2.6949 m	13.7893 m	3.0600 m
CF4	1.7199	59.2806 m	1.7348	24.9078 m

Note

NA indicates not applicable

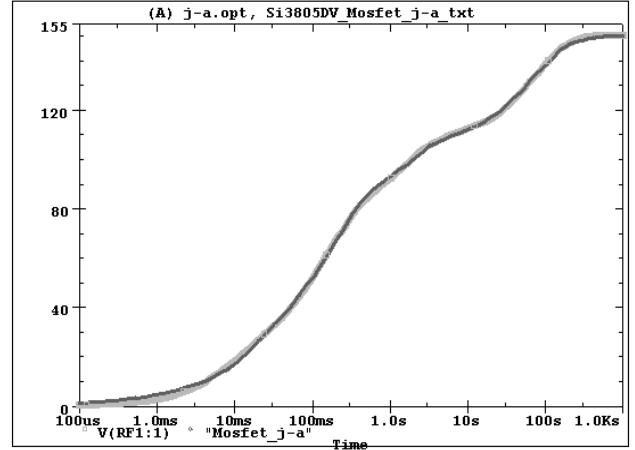


Si3805DV Tank j-a Mosfet Temperature:27.0



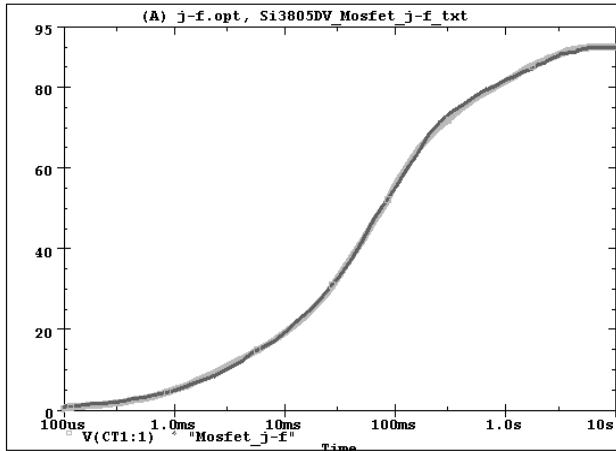
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Si3805DV Filter j-a Mosfet Temperature:27.0



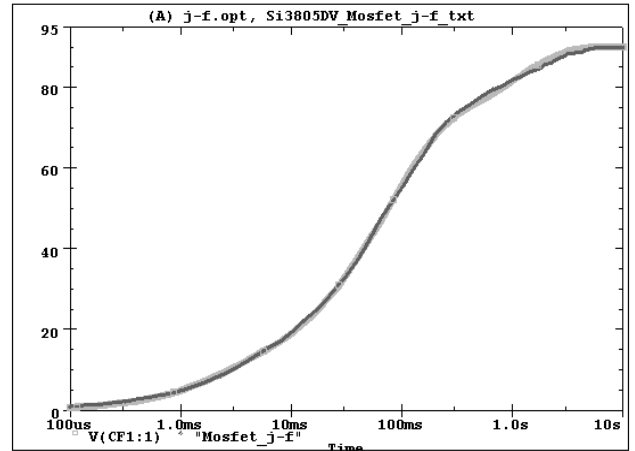
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Si3805DV Tank j-f Mosfet Temperature:27.0



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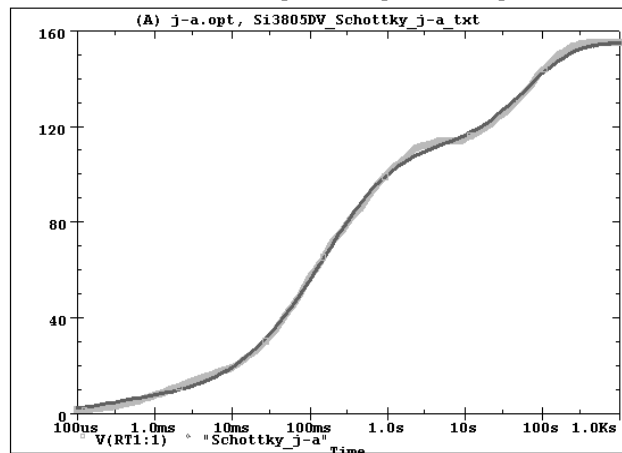
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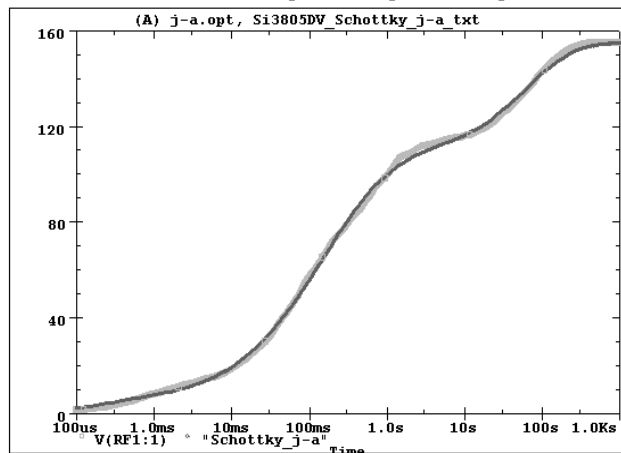


Si3805DV Tank j-a Schottky Temperature:27.0



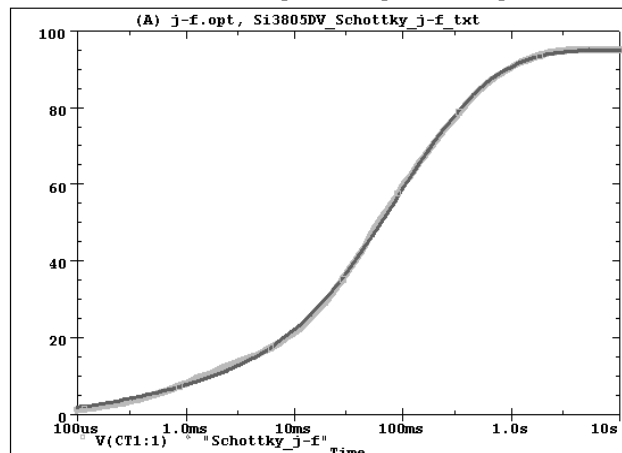
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Si3805DV Filter j-a Schottky Temperature:27.0



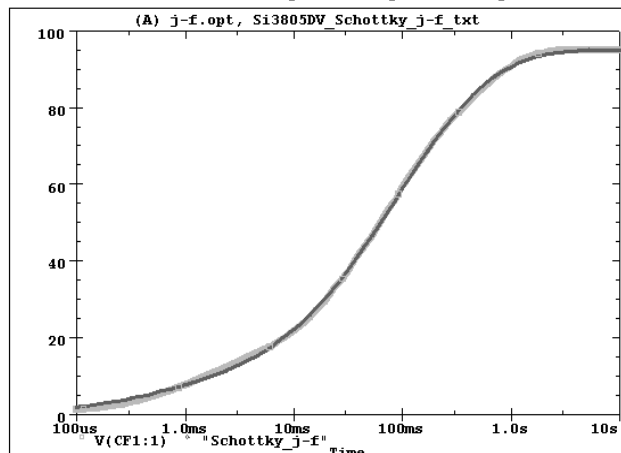
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Si3805DV Tank j-f Schottky Temperature:27.0



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Si3805DV Filter j-f Schottky Temperature:27.0



Date:August 29, 2008 Time:10:07:09