

## R-C Thermal Model Parameters

### DESCRIPTION

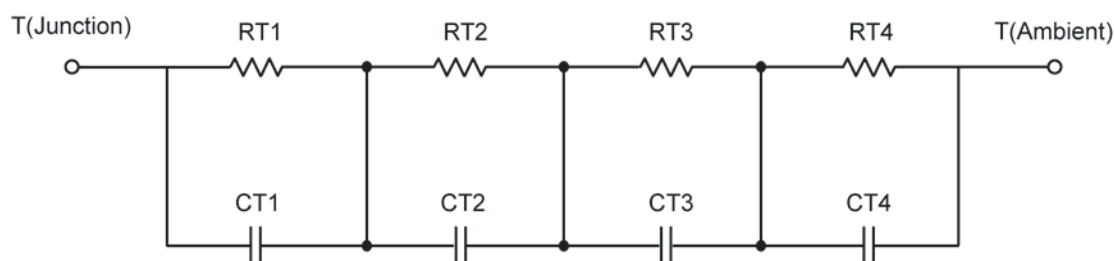
The parametric values in the R-C thermal model have been derived using curve-fitting techniques. These techniques are described in "[A Simple Method of Generating Thermal Models for a Power MOSFET](#)"[1]. When implemented in P-Spice, these values have matching characteristic curves to the Single Pulse 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:*

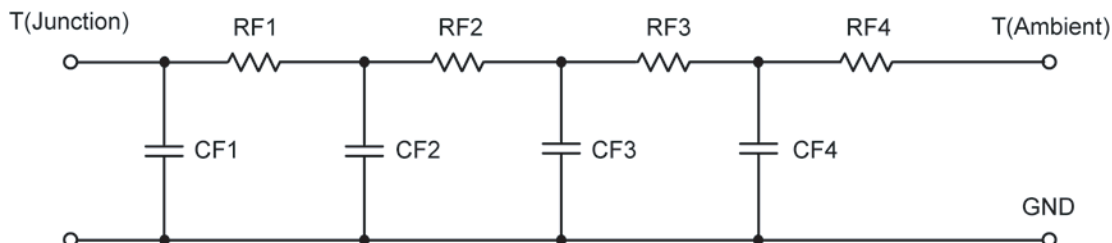
For a detailed explanation of implementing these values in P-SPICE, refer to [Application Note AN609 Thermal Simulations Of Power MOSFETs on P-SPICE Platform](#).

### R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION					
Thermal Resistance (°C/W)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
RT1	13.9801	19.1970	N/A	10.7492	12.7077
RT2	5.8486	4.7129	N/A	4.0840	3.8805
RT3	34.8180	31.4844	N/A	14.1365	13.4726
RT4	55.5013	53.7209	N/A	11.1475	9.6465
Thermal Capacitance (Joules/°C)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CT1	11.5806 m	9.6933 m	N/A	5.8508 m	2.9402 m
CT2	551.0224 u	1.1766 m	N/A	325.2780 u	271.8514 u
CT3	36.6618 m	55.0605 m	N/A	30.8848 m	8.2261 m
CT4	1.3499	1.5981	N/A	150.2602 m	92.3649 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	Case	Foot Nch	Foot Pch
RF1	6.4018	5.0570	N/A	5.6973	5.6609
RF2	14.1806	24.1491	N/A	16.9708	22.2334
RF3	35.6414	29.1383	N/A	13.8913	10.3611
RF4	53.7677	50.9400	N/A	3.3956	2.0712
Thermal Capacitance (Joules/°C)					
Junction to	Ambient Nch	Ambient Pch	Case	Foot Nch	Foot Pch
CF1	551.4551 u	1.0273 m	N/A	382.9011 u	261.7407 u
CF2	5.5300 m	5.9950 m	N/A	5.8147 m	2.1821 m
CF3	23.4106 m	53.8264 m	N/A	44.2682 m	36.4967 m
CF4	1.3488	1.6719	N/A	283.6987 m	3.2872

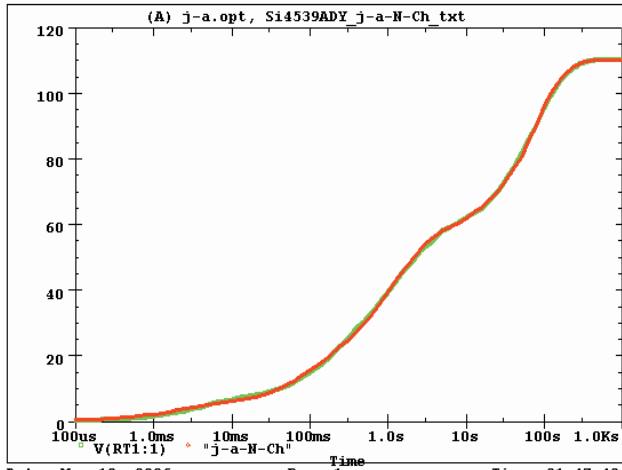
Note: NA indicates not applicable

## Reference:

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

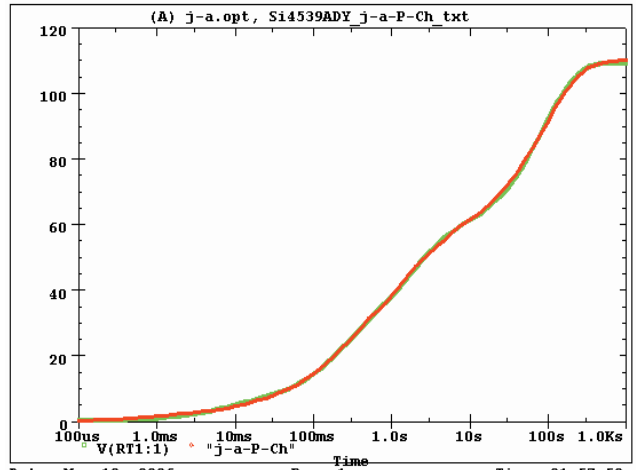


Si4539ADY Tank j-a-N-Ch Temperature: 27.0



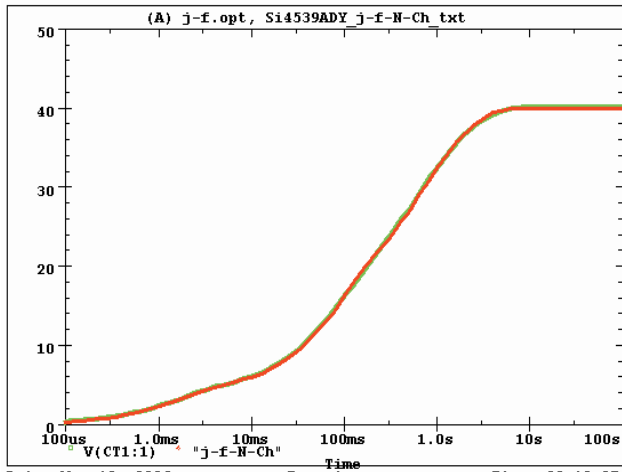
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Si4539ADY Tank j-a-P-Ch Temperature: 27.0



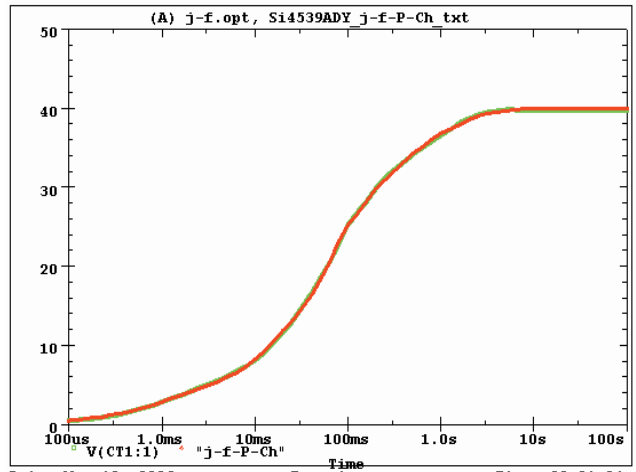
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Si4539ADY Tank j-f-P-Ch Temperature: 27.0



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