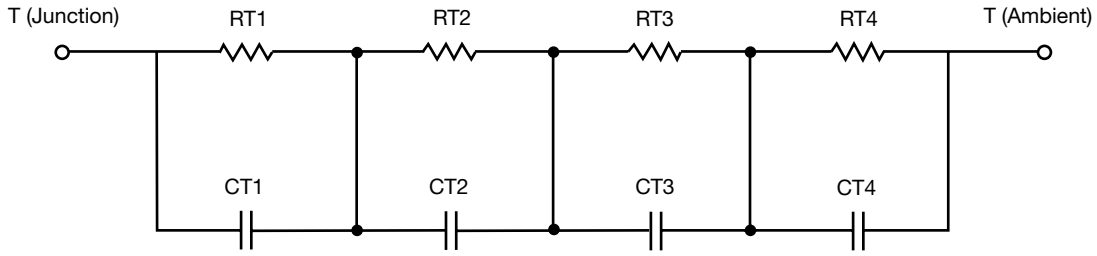
R-C Thermal Model Parameters

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



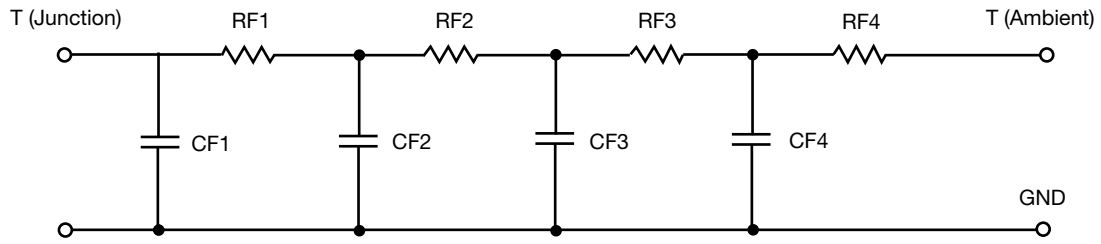
R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
RT1	N/A	36.5216 m	382.0129 m
RT2	N/A	159.1027 m	898.2424 m
RT3	N/A	183.4020 m	1.9197
RT4	N/A	220.9737 m	300.0447 m
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
CT1	N/A	358.8225 u	122.5897 m
CT2	N/A	245.6045 m	615.7682 m
CT3	N/A	14.1786 m	1.3143
CT4	N/A	173.1871 m	3.8080 m

Notes

- 1. N/A indicates not applicable
- 2. Package Names: SiHP... TO220AB, SiHB... D2PAK(TO263), SiHF... TO220 FullPAK

This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

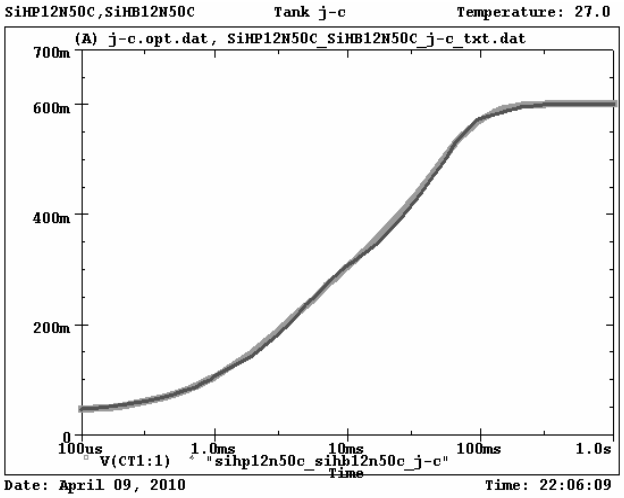
R-C THERMAL MODEL FOR FILTER CONFIGURATION

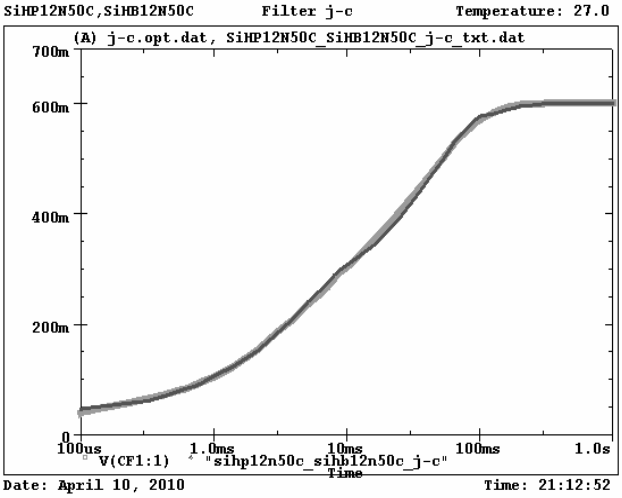


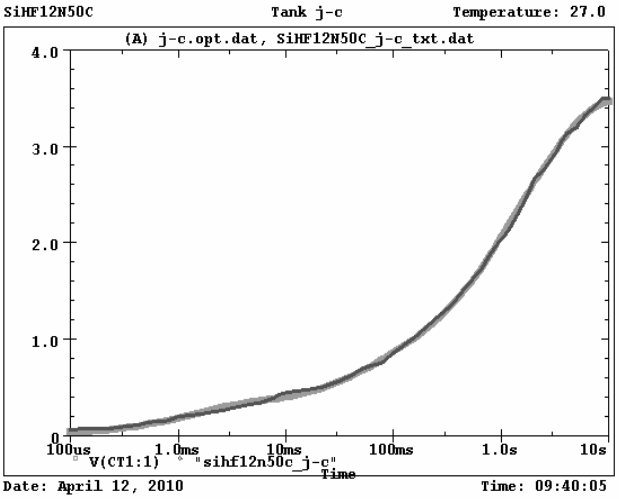
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
RF1	N/A	53.8533 m	172.4805 m
RF2	N/A	197.0193 m	343.0195 m
RF3	N/A	83.2677 m	1.0414
RF4	N/A	265.8597 m	1.9431
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
CF1	N/A	1.5124 m	2.4599 m
CF2	N/A	12.8769 m	18.1870 m
CF3	N/A	34.7902 m	192.0047 m
CF4	N/A	94.1547 m	864.1585 m

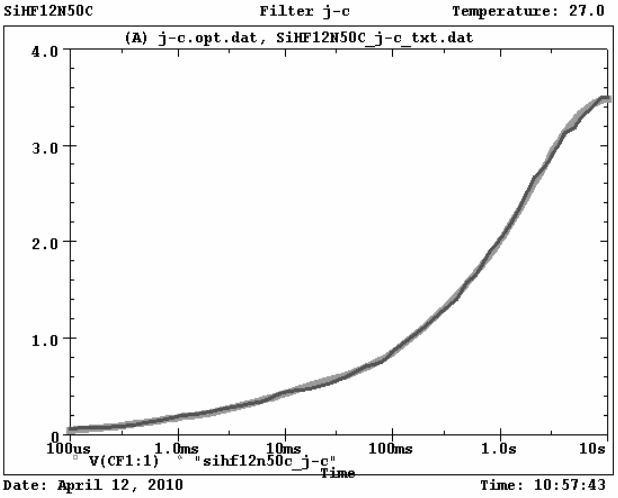
Notes

- 1. N/A indicates not applicable
- 2. Package Names: SiHP... TO220AB, SiHB... D2PAK(TO263), SiHF... TO220 FullPAK


SiHP12N50C,SiHB12N50C
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHP12N50C_SiHB12N50C_j-c_txt.dat
700m
600m
400m
200m
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"sihp12n50c_sihb12n50c_j-c"
Time
Date: April 09, 2010
Time: 22:06:09


SiHP12N50C,SiHB12N50C
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHP12N50C_SiHB12N50C_j-c_txt.dat
700m
600m
400m
200m
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"sihp12n50c_sihb12n50c_j-c"
Time
Date: April 10, 2010
Time: 21:12:52


SiHF12N50C
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHF12N50C_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"sihf12n50c_j-c"
Time
Date: April 12, 2010
Time: 09:40:05


SiHF12N50C
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHF12N50C_j-c_txt.dat
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"sihf12n50c_j-c"
Time
Date: April 12, 2010
Time: 10:57:43