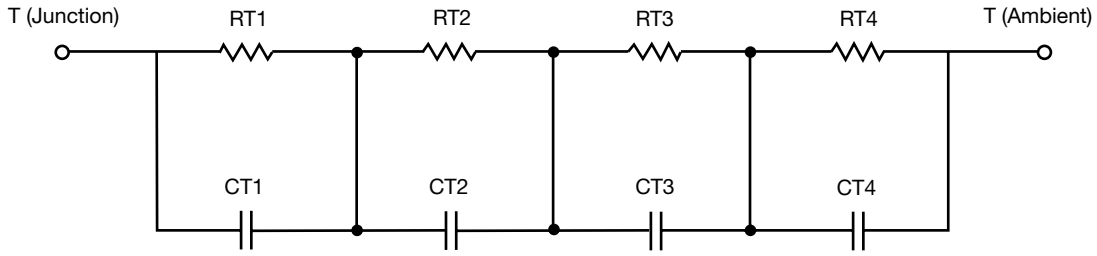
R-C Thermal Model Parameters

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



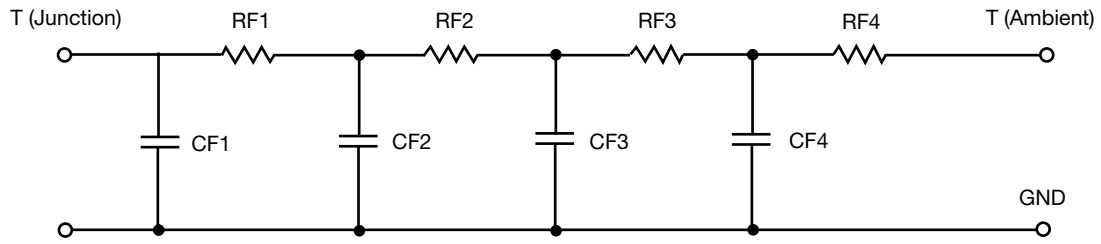
R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
RT1	N/A	32.3517 m	167.5117 m
RT2	N/A	188.0759 m	1.2673
RT3	N/A	201.3236 m	1.7202
RT4	N/A	78.2488 m	144.9883 m
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
CT1	N/A	12.1244 m	82.7807 m
CT2	N/A	135.8367 m	1.0857
CT3	N/A	59.5808 m	731.5658 m
CT4	N/A	336.9463 m	3.3959 m

Note:

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

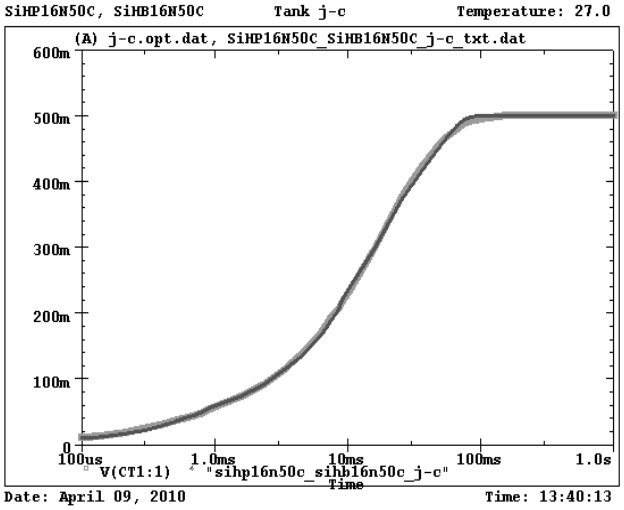


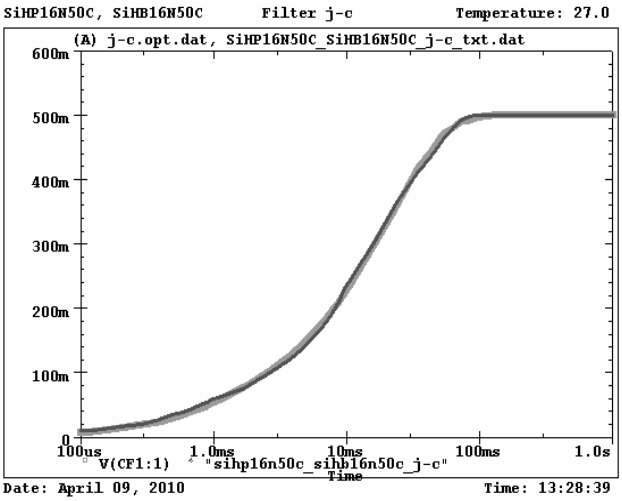
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
RF1	N/A	104.6594 m	51.2178 m
RF2	N/A	312.0074 m	134.7475 m
RF3	N/A	5.4260 m	206.4347 m
RF4	N/A	77.9072 m	2.9076
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**SiHP-SiHB Case**	**SiHF Case**
CF1	N/A	13.9178 m	137.1847 u
CF2	N/A	32.5839 m	10.6770 m
CF3	N/A	50.0700 m	73.0024 m
CF4	N/A	20.0146 m	364.3531 m

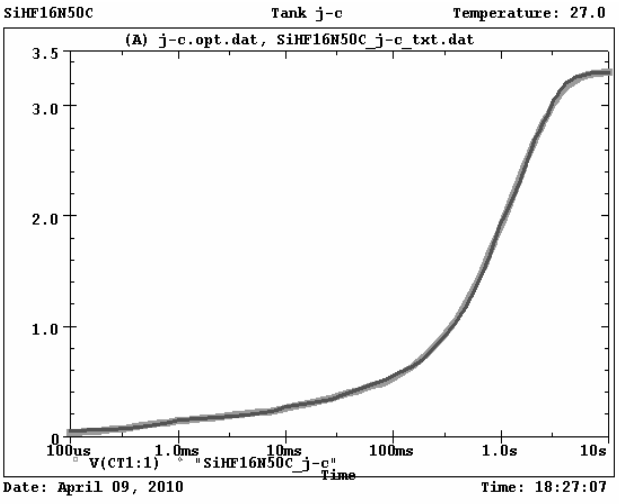
Note:

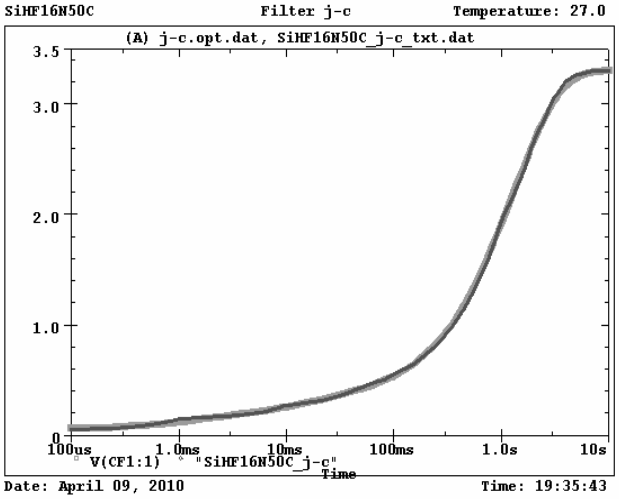
1. N/A indicates not applicable

2. Package Names: SiHP..TO220AB, SiHB..D2PAK(TO263), SiHF..TO220 FullPAK


SiHP16N50C, SiHB16N50C
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHP16N50C_SiHB16N50C_j-c_txt.dat
600m
500m
400m
300m
200m
100m
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"sihp16n50c_sihb16n50c_j-c"
Time
Date: April 09, 2010
Time: 13:40:13


SiHP16N50C, SiHB16N50C
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHP16N50C_SiHB16N50C_j-c_txt.dat
600m
500m
400m
300m
200m
100m
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"sihp16n50c_sihb16n50c_j-c"
Time
Date: April 09, 2010
Time: 13:28:39


SiHF16N50C
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHF16N50C_j-c_txt.dat
3.5
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)
"SiHF16N50C_j-c"
Time
Date: April 09, 2010
Time: 18:27:07


SiHF16N50C
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, SiHF16N50C_j-c_txt.dat
3.5
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"SiHF16N50C_j-c"
Time
Date: April 09, 2010
Time: 19:35:43