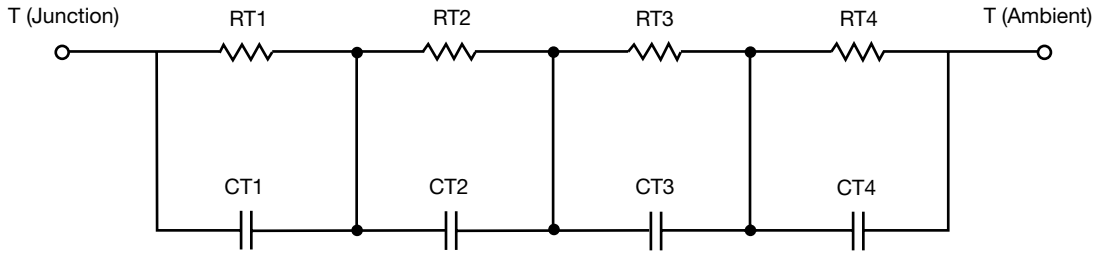
R-C Thermal Model Parameters

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



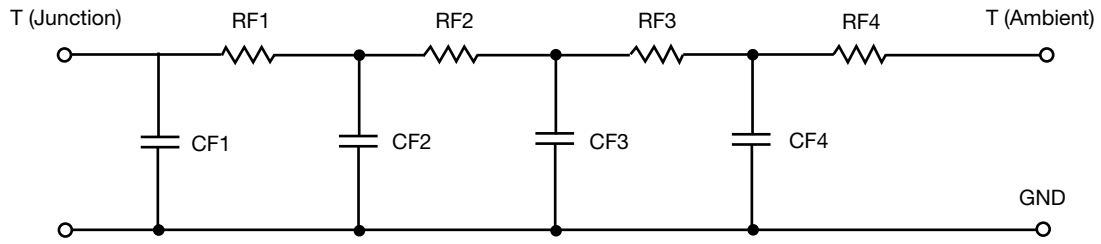
R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.3012	N/A	5.9936
RT2	21.1915	N/A	16.1486
RT3	35.9030	N/A	16.3247
RT4	54.6043	N/A	6.5331
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	424.3211 u	N/A	163.0698 u
CT2	79.0955 m	N/A	1.7122 m
CT3	3.3967 m	N/A	3.6031 m
CT4	1.4048	N/A	147.2090 m

Note

- N/A indicates not applicable

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.

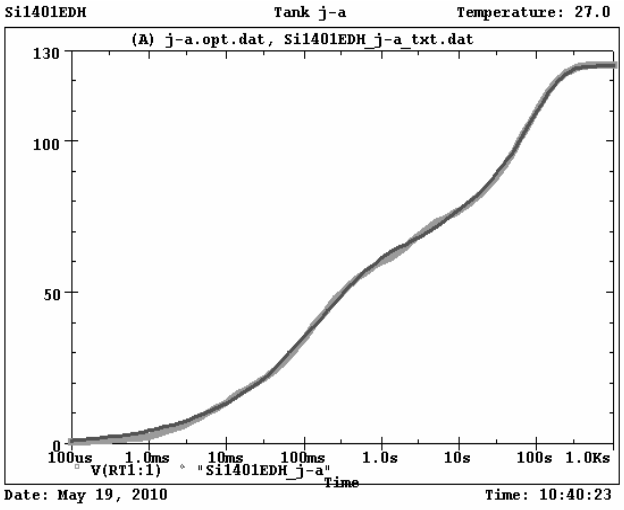
R-C THERMAL MODEL FOR FILTER CONFIGURATION

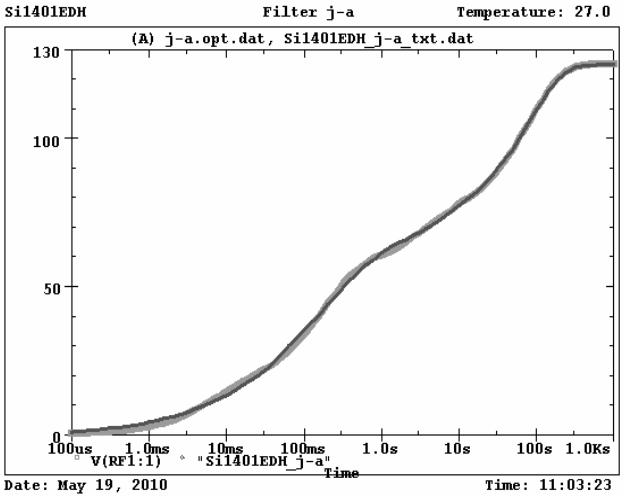


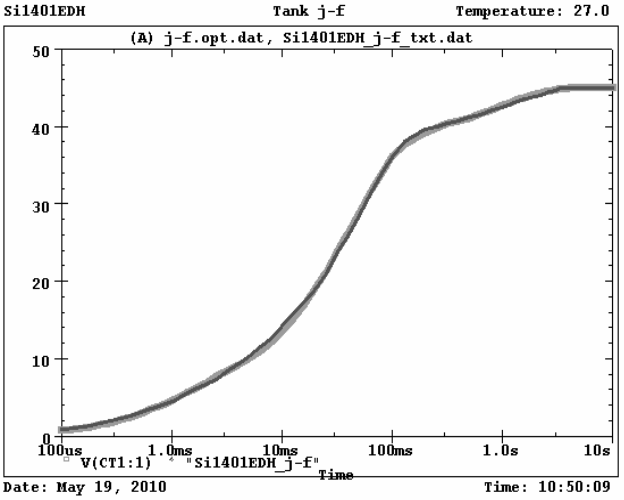
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	17.9683	N/A	9.7275
RF2	38.8748	N/A	26.9663
RF3	18.9528	N/A	4.0498
RF4	49.2041	N/A	4.2564
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	346.9260 u	N/A	176.9599 u
CF2	3.8872 m	N/A	1.2473 m
CF3	153.9065 m	N/A	22.1649 m
CF4	1.4492	N/A	276.6851 m

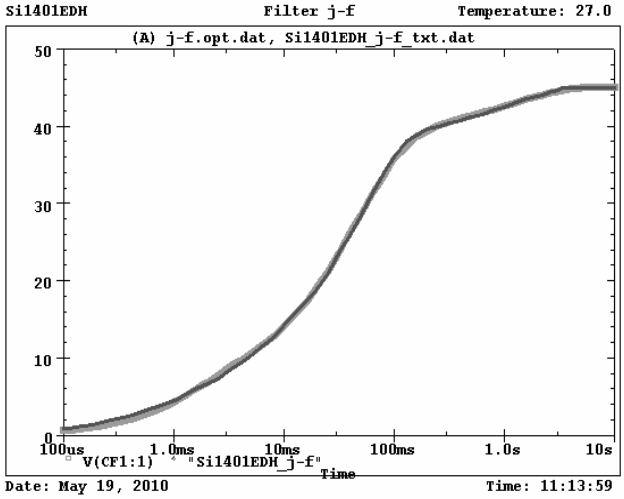
Note

- N/A indicates not applicable


Si1401EDH
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si1401EDH_j-a_txt.dat
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "Si1401EDH_j-a"
Time
Date: May 19, 2010
Time: 10:40:23


Si1401EDH
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si1401EDH_j-a_txt.dat
130
100
50
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "Si1401EDH_j-a"
Time
Date: May 19, 2010
Time: 11:03:23


Si1401EDH
Tank j-f
Temperature: 27.0
(A) j-f.opt.dat, Si1401EDH_j-f_txt.dat
50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CT1:1) "Si1401EDH_j-f"
Time
Date: May 19, 2010
Time: 10:50:09


Si1401EDH
Filter j-f
Temperature: 27.0
(A) j-f.opt.dat, Si1401EDH_j-f_txt.dat
50
40
30
20
10
0
100us 1.0ms 10ms 100ms 1.0s 10s
V(CF1:1) "Si1401EDH_j-f"
Time
Date: May 19, 2010
Time: 11:13:59