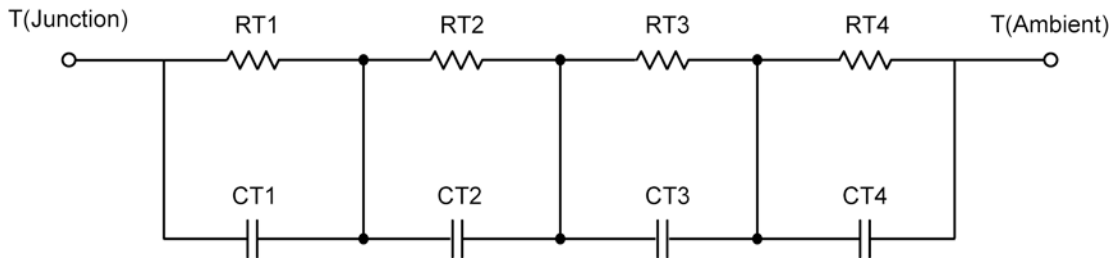
R-C Thermal Model Parameters

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."

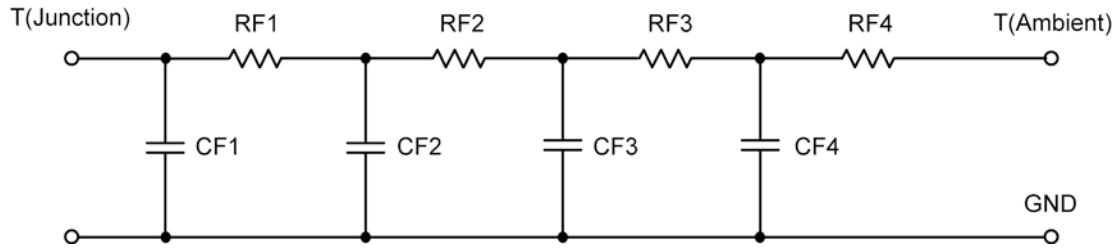
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	3.0152	998.1239 m	N/A
RT2	13.8502	227.9924 m	N/A
RT3	8.3595	724.5173 m	N/A
RT4	55.7751	449.3664 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	3.0556 m	15.0441 m	N/A
CT2	23.3581 m	1.0849 m	N/A
CT3	349.0843 m	18.3766 m	N/A
CT4	1.2544	2.5350 m	N/A

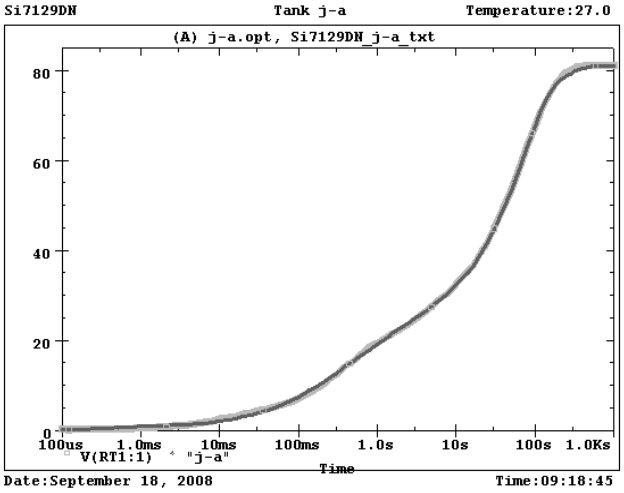
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

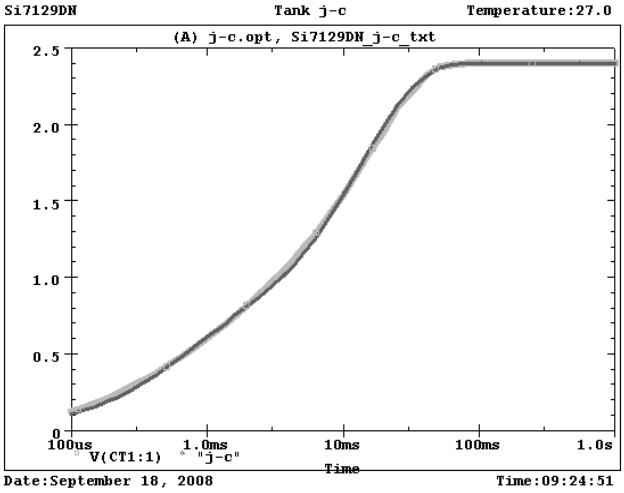
R-C THERMAL MODEL FOR FILTER CONFIGURATION

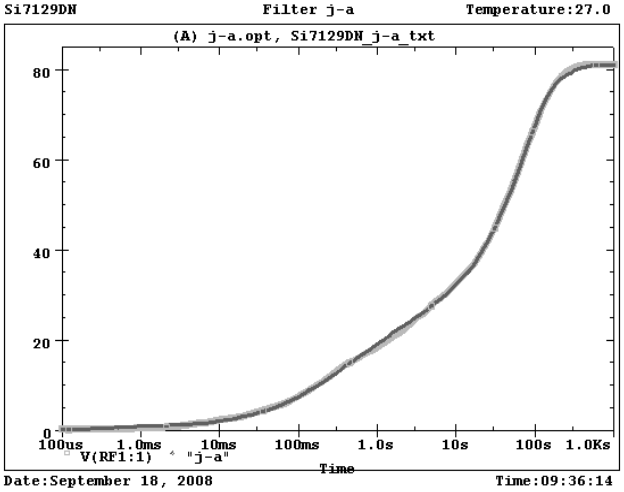


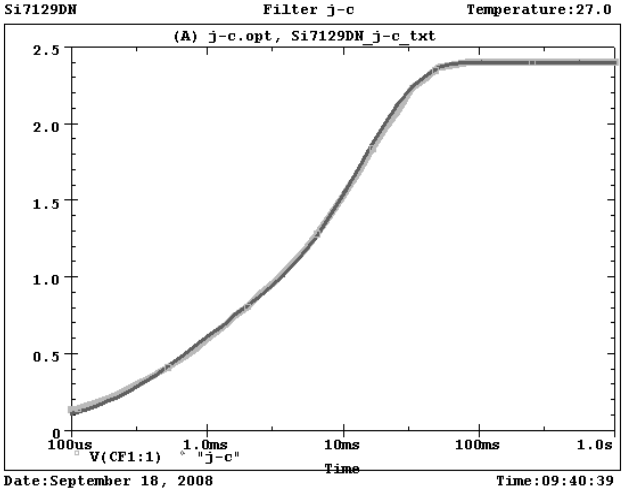
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.0096	397.1010 m	N/A
RF2	12.4407	475.5647 m	N/A
RF3	13.6084	785.3746 m	N/A
RF4	51.9413	741.9597 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.8275 m	667.3444 u	N/A
CF2	11.7413 m	1.2543 m	N/A
CF3	168.8535 m	6.1282 m	N/A
CF4	1.1587	3.6387 m	N/A

Note
NA indicates not applicable


Si7129DN
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7129DN_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:September 18, 2008
Time:09:18:45


Si7129DN
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7129DN_j-c_txt
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)
"j-c"
Time
Date:September 18, 2008
Time:09:24:51


Si7129DN
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7129DN_j-a_txt
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:September 18, 2008
Time:09:36:14


Si7129DN
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7129DN_j-c_txt
2.5
2.0
1.5
1.0
0.5
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)
"j-c"
Time
Date:September 18, 2008
Time:09:40:39