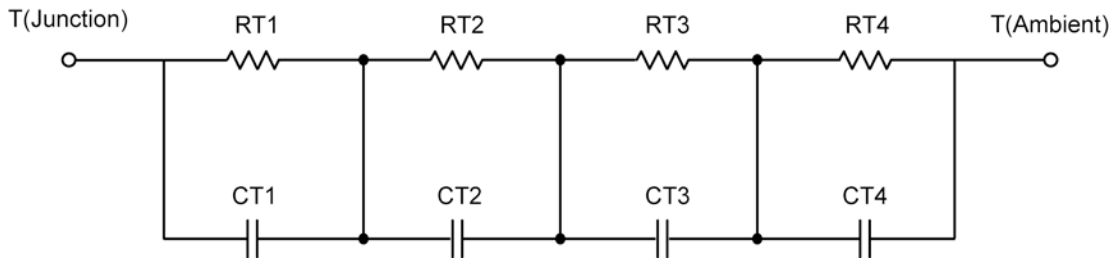
R-C Thermal Model Parameters

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."

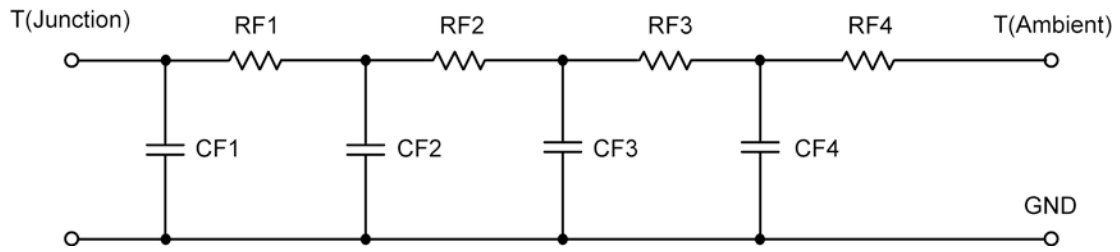
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	2.6589	78.8700 m	N/A
RT2	6.5775	1.1503	N/A
RT3	9.6454	108.1800 m	N/A
RT4	46.1182	462.6500 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	19.3342 m	5.5342 u	N/A
CT2	108.8288 m	13.3983 m	N/A
CT3	487.0439 m	139.3863 m	N/A
CT4	1.5446	9.6801 m	N/A

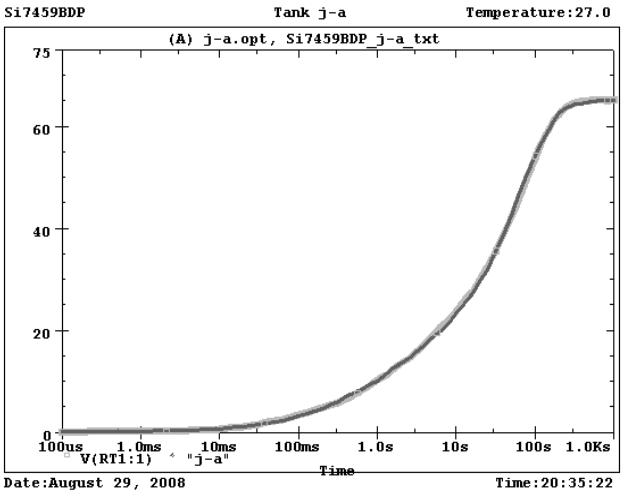
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

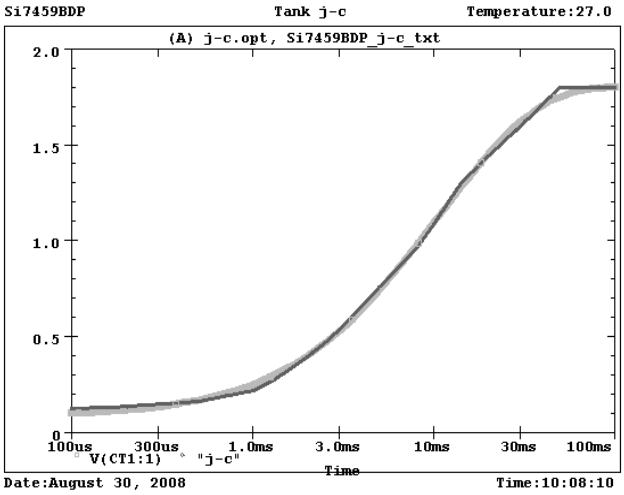
R-C THERMAL MODEL FOR FILTER CONFIGURATION

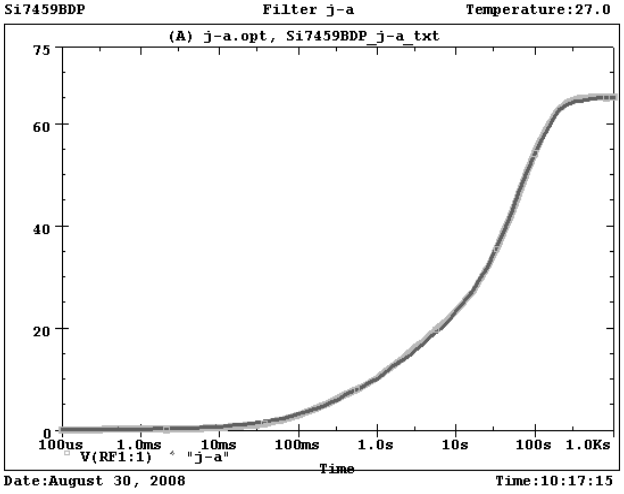


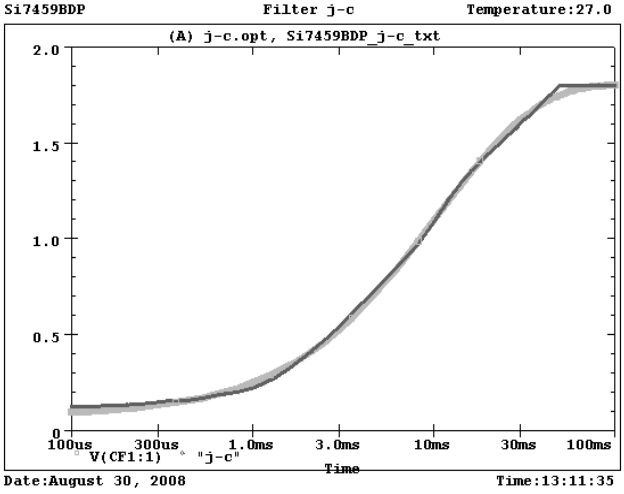
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	6.4734	90.7507 m	N/A
RF2	11.5611	1.2304	N/A
RF3	15.2442	102.0668 m	N/A
RF4	31.7213	376.7825 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	25.1473 m	467.3749 u	N/A
CF2	119.0129 m	5.0200 m	N/A
CF3	902.3964 m	19.2422 m	N/A
CF4	708.6585 m	6.3060 m	N/A

Note
NA indicates not applicable


Si7459BDP
Tank j-a
Temperature:27.0
(A) j-a.opt, Si7459BDP_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:August 29, 2008
Time:20:35:22


Si7459BDP
Tank j-c
Temperature:27.0
(A) j-c.opt, Si7459BDP_j-c_txt
2.0
1.5
1.0
0.5
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CT1:1)
"j-c"
Time
Date:August 30, 2008
Time:10:08:10


Si7459BDP
Filter j-a
Temperature:27.0
(A) j-a.opt, Si7459BDP_j-a_txt
75
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:August 30, 2008
Time:10:17:15


Si7459BDP
Filter j-c
Temperature:27.0
(A) j-c.opt, Si7459BDP_j-c_txt
2.0
1.5
1.0
0.5
0
100us
300us
1.0ms
3.0ms
10ms
30ms
100ms
V(CF1:1)
"j-c"
Time
Date:August 30, 2008
Time:13:11:35