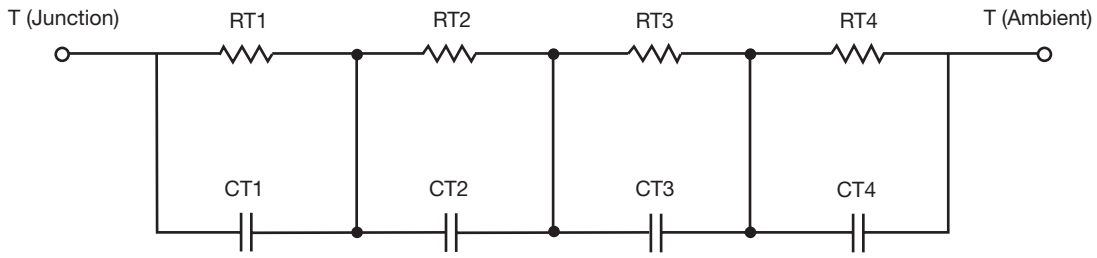
R-C Thermal Model Parameters

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

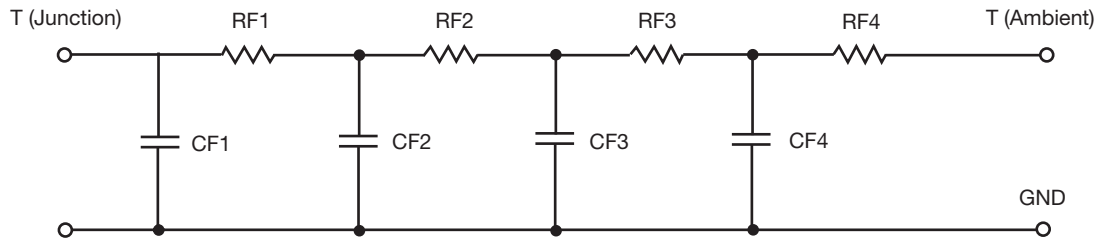


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	11.1761	468.1299m	N/A
RT2	11.8051	621.4149m	N/A
RT3	4.0869	328.4142m	N/A
RT4	37.4963	1.1854	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	91.1490m	5.5390m	N/A
CT2	1.3509	26.9138m	N/A
CT3	11.0451m	1.7362m	N/A
CT4	2.3685	13.5986m	N/A

Note
N/A indicates not applicable

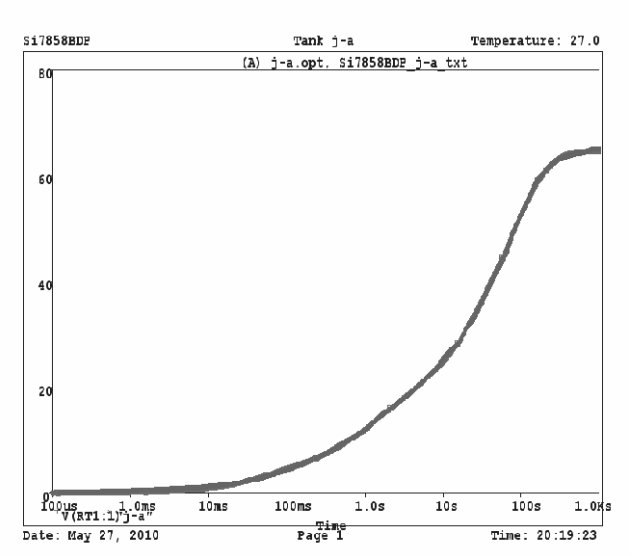
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

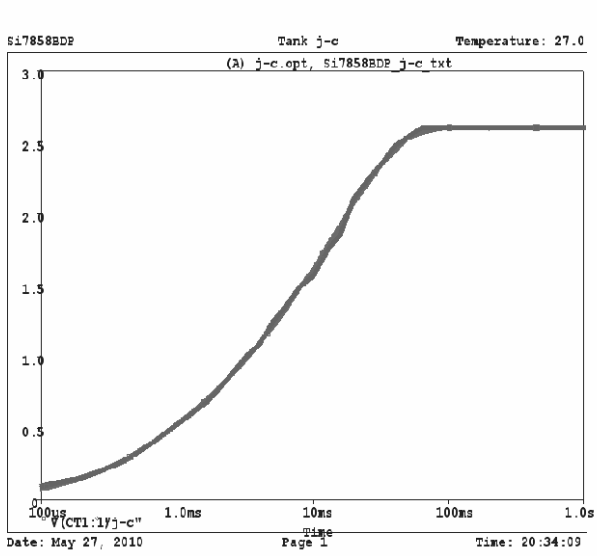
R-C THERMAL MODEL FOR FILTER CONFIGURATION

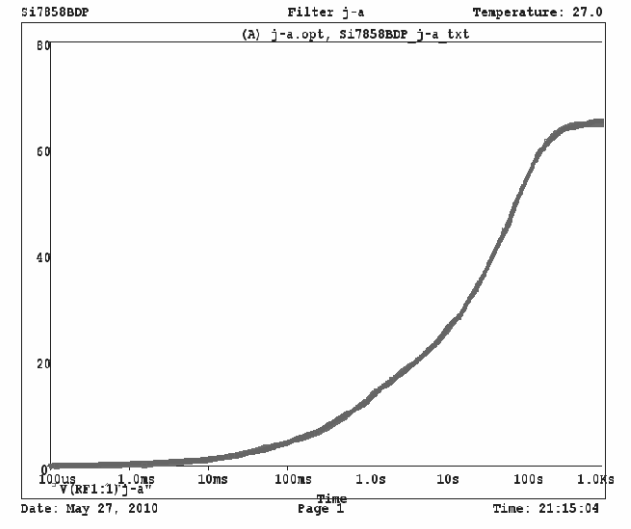


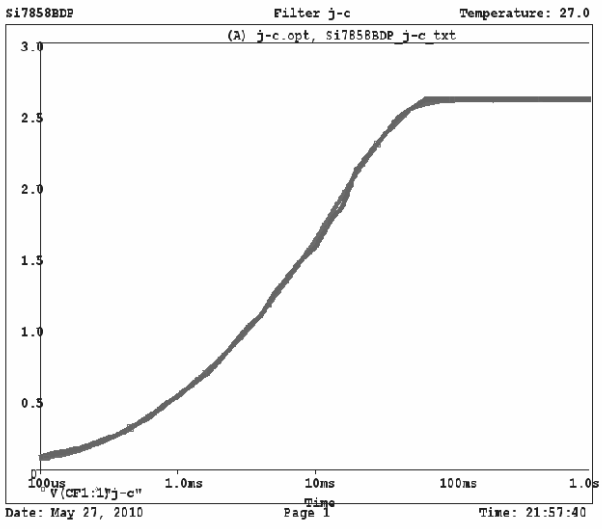
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.8716	675.1321m	N/A
RF2	13.1466	729.4455m	N/A
RF3	19.2851	866.9815m	N/A
RF4	28.0881	333.9002m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	7.0905m	1.1767m	N/A
CF2	60.9094m	3.0570m	N/A
CF3	755.5688m	6.4937m	N/A
CF4	1.8256	16.2959m	N/A

Note
N/A indicates not applicable


Si7858BDP
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si7858BDP_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: May 27, 2010
Page 1
Time: 20:19:23


Si7858BDP
Tank j-c
Temperature: 27.0
(A) j-c.opt, Si7858BDP_j-c_txt
3.0
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: May 27, 2010
Page 1
Time: 20:34:09


Si7858BDP
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si7858BDP_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: May 27, 2010
Page 1
Time: 21:15:04


Si7858BDP
Filter j-c
Temperature: 27.0
(A) j-c.opt, Si7858BDP_j-c_txt
3.0
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: May 27, 2010
Page 1
Time: 21:57:40