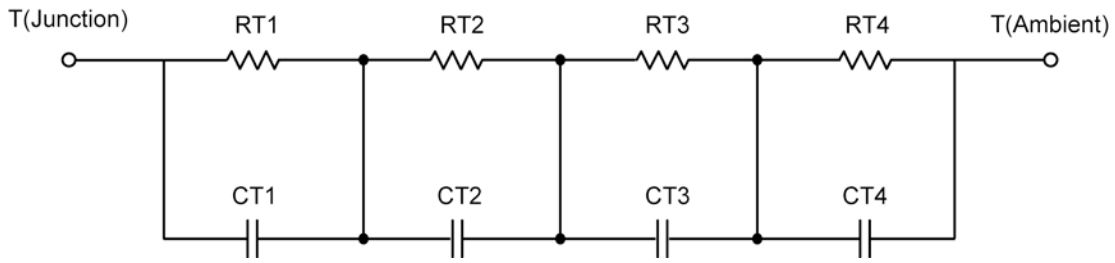
R-C Thermal Model Parameters

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."

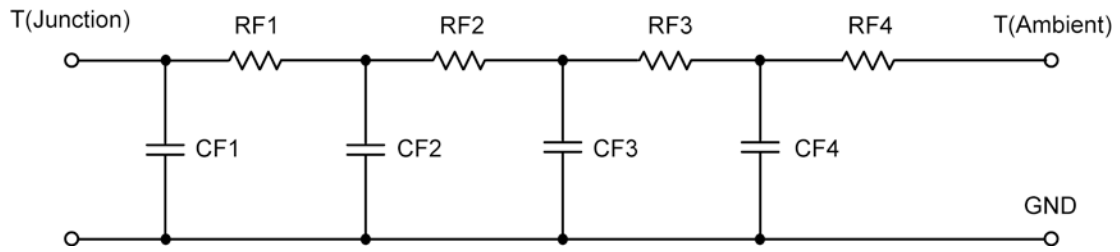
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.1347	1.4063	N/A
RT2	48.9391	7.6202	N/A
RT3	27.7389	42.3000 m	N/A
RT4	15.1873	431.2000 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	226.1399 u	65.6424 u	N/A
CT2	1.7894	105.7480 u	N/A
CT3	4.2299 m	19.2457 m	N/A
CT4	298.1358 m	18.5333 m	N/A

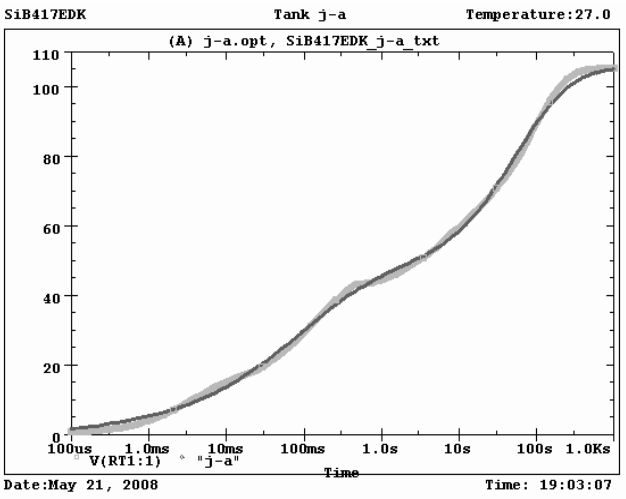
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

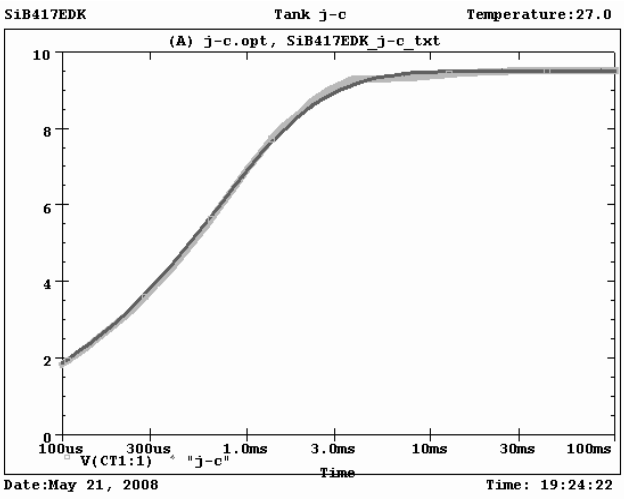
R-C THERMAL MODEL FOR FILTER CONFIGURATION

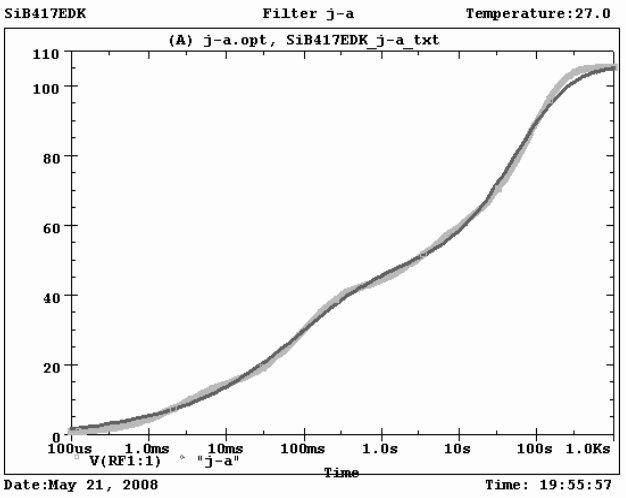


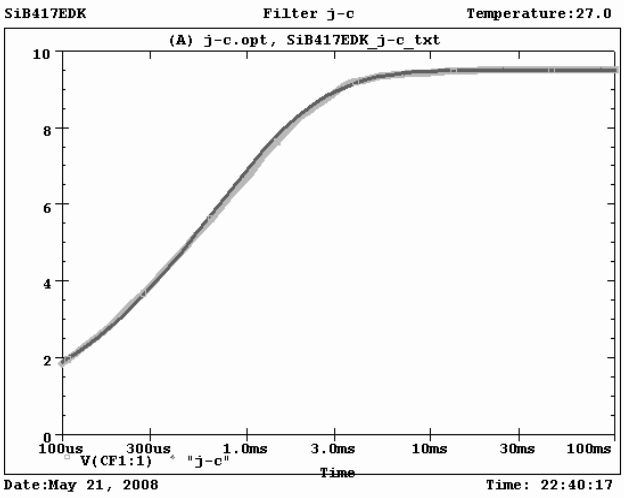
R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	13.2327	4.4570	N/A
RF2	27.3333	4.0136	N/A
RF3	18.1230	823.3409 m	N/A
RF4	46.3110	206.0591 m	N/A
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	186.7750 u	42.7031 u	N/A
CF2	3.4356 m	142.7275 u	N/A
CF3	189.8478 m	561.3551 u	N/A
CF4	1.6113	26.8961 m	N/A

Note
NA indicates not applicable


SiB417EDK
Tank j-a
Temperature:27.0
(A) j-a.opt, SiB417EDK_j-a_txt
110
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RT1:1) "j-a"
Time
Date:May 21, 2008
Time: 19:03:07


SiB417EDK
Tank j-c
Temperature:27.0
(A) j-c.opt, SiB417EDK_j-c_txt
10
8
6
4
2
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CT1:1) "j-c"
Time
Date:May 21, 2008
Time: 19:24:22


SiB417EDK
Filter j-a
Temperature:27.0
(A) j-a.opt, SiB417EDK_j-a_txt
110
100
80
60
40
20
0
100us 1.0ms 10ms 100ms 1.0s 10s 100s 1.0Ks
V(RF1:1) "j-a"
Time
Date:May 21, 2008
Time: 19:55:57


SiB417EDK
Filter j-c
Temperature:27.0
(A) j-c.opt, SiB417EDK_j-c_txt
10
8
6
4
2
0
100us 300us 1.0ms 3.0ms 10ms 30ms 100ms
V(CF1:1) "j-c"
Time
Date:May 21, 2008
Time: 22:40:17