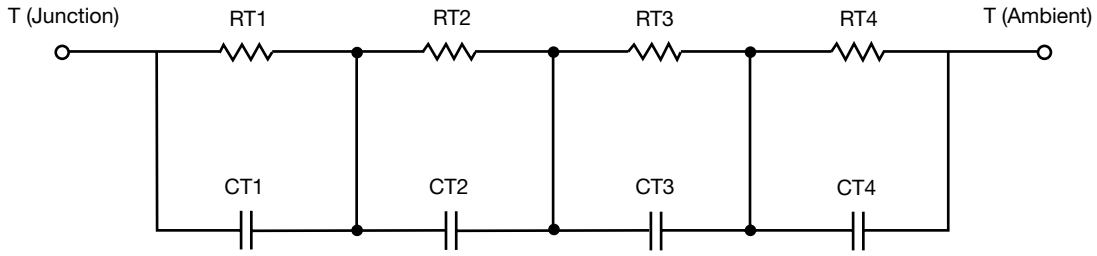
R-C Thermal Model Parameters

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

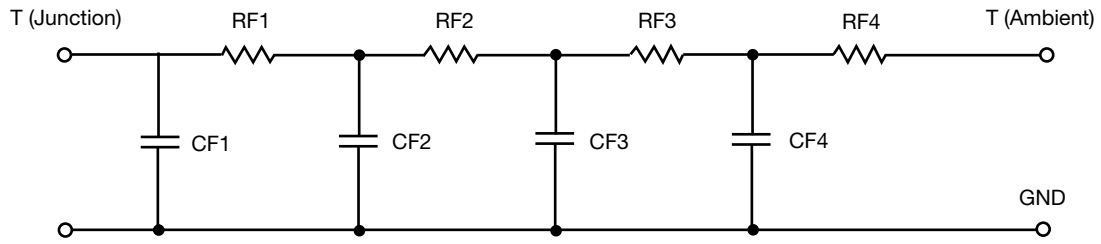


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	26.1098	583.5124 m	N/A
RT2	25.7523	2.5349	N/A
RT3	13.0011	91.0151 m	N/A
RT4	5.4979	1.2803	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.4839	2.5656 m	N/A
CT2	3.3810	31.9321 m	N/A
CT3	85.8065 m	2.8140 u	N/A
CT4	7.0719 m	39.3120 m	N/A

Note
N/A indicates not applicable

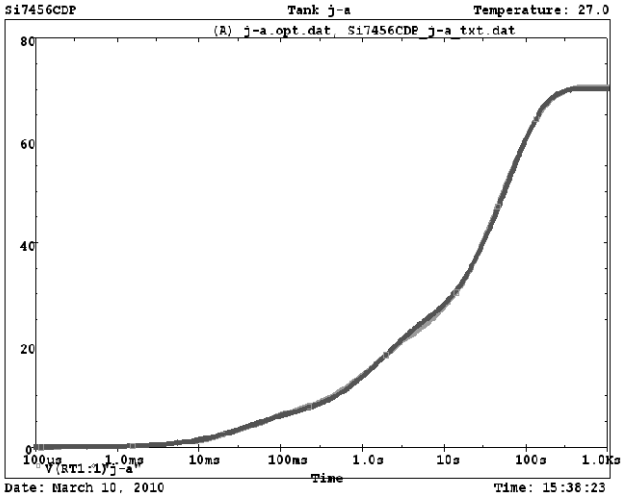
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

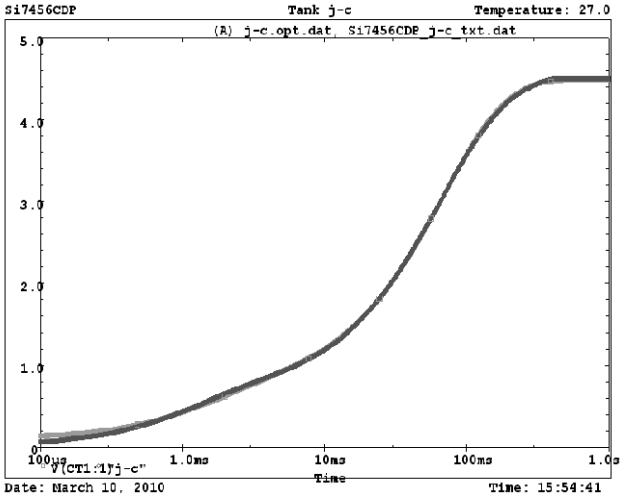
R-C THERMAL MODEL FOR FILTER CONFIGURATION

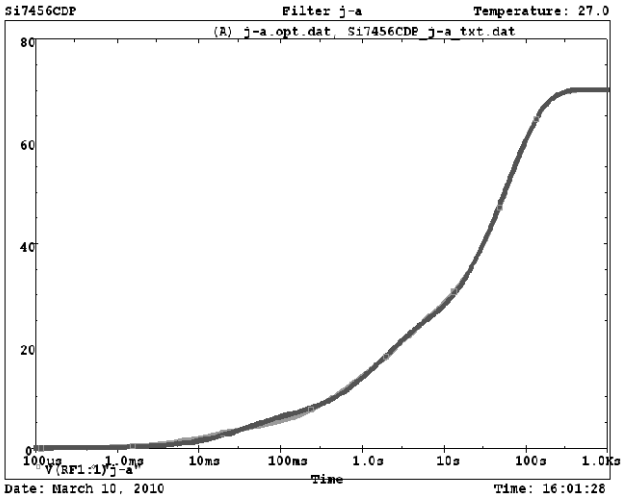


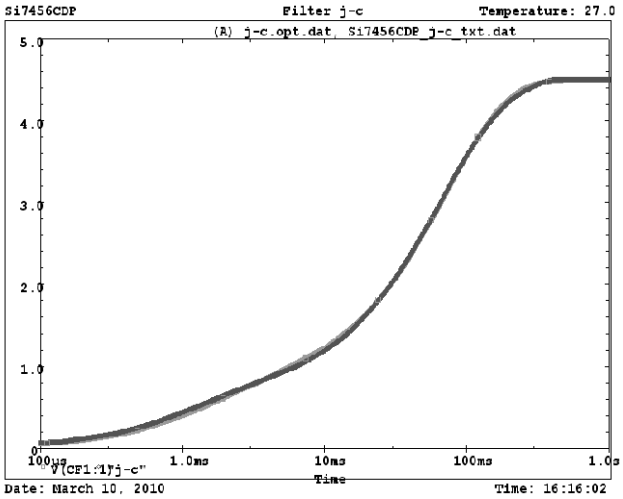
R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	3.9118	835.7971 m	N/A
RF2	10.4670	837.5778 m	N/A
RF3	16.9455	2.7757	N/A
RF4	44.6037	49.8071 m	N/A
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	3.6974 m	1.8758 m	N/A
CF2	43.0396 m	12.3570 m	N/A
CF3	165.6204 m	8.3839 m	N/A
CF4	1.1806	3.4317 m	N/A

Note
N/A indicates not applicable


Si7456CDP
Tank j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7456CDP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)/j-a
Time
Date: March 10, 2010
Time: 15:38:23


Si7456CDP
Tank j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7456CDP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CT1:1)/j-c"
Time
Date: March 10, 2010
Time: 15:54:41


Si7456CDP
Filter j-a
Temperature: 27.0
(A) j-a.opt.dat, Si7456CDP_j-a_txt.dat
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)/j-a"
Time
Date: March 10, 2010
Time: 16:01:28


Si7456CDP
Filter j-c
Temperature: 27.0
(A) j-c.opt.dat, Si7456CDP_j-c_txt.dat
5.0
4.0
3.0
2.0
1.0
0
100us
1.0ms
10ms
100ms
1.0s
V(CF1:1)/j-c"
Time
Date: March 10, 2010
Time: 16:16:02