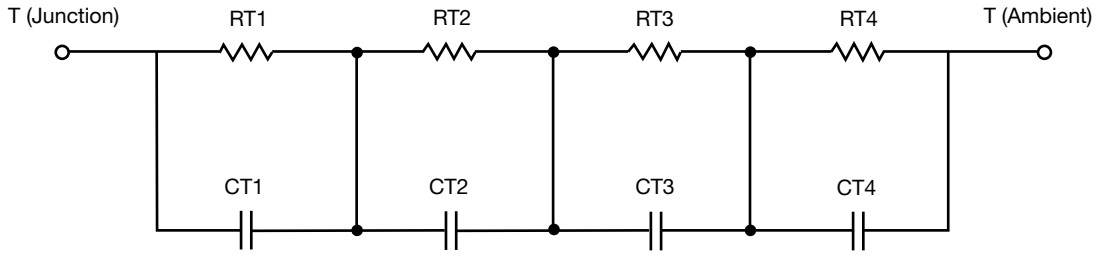
R-C Thermal Model Parameters

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

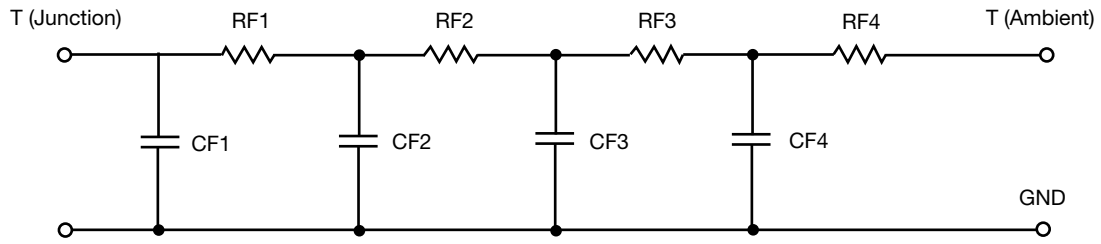


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	13.7016	N/A	12.2624
RT2	37.9537	N/A	22.2686
RT3	18.6986	N/A	5.8773
RT4	54.3960	N/A	4.5781
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	412.2737u	N/A	1.5785m
CT2	3.6448m	N/A	3.0765m
CT3	100.2109m	N/A	186.0262u
CT4	1.3660	N/A	383.8945m

Note
N/A indicates not applicable

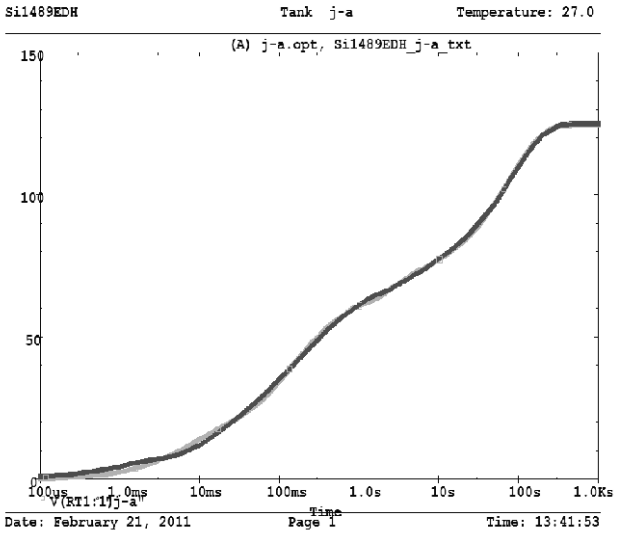
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

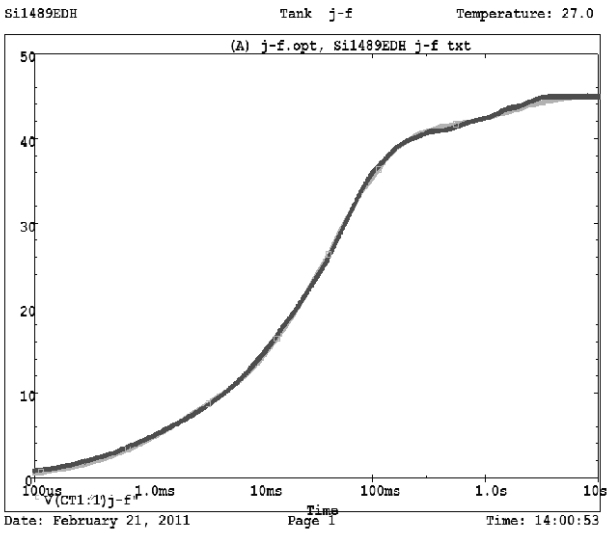
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	15.7473	N/A	10.5355
RF2	36.5364	N/A	28.5470
RF3	20.4166	N/A	4.3323
RF4	52.0410	N/A	1.6830
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	354.6019u	N/A	188.9369u
CF2	2.9400m	N/A	1.3654m
CF3	73.6557m	N/A	167.1823m
CF4	1.3534	N/A	154.6889m

Note
N/A indicates not applicable


Si1489EDH
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si1489EDH_j-a_txt
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)j-a
Time
Date: February 21, 2011
Page 1
Time: 13:41:53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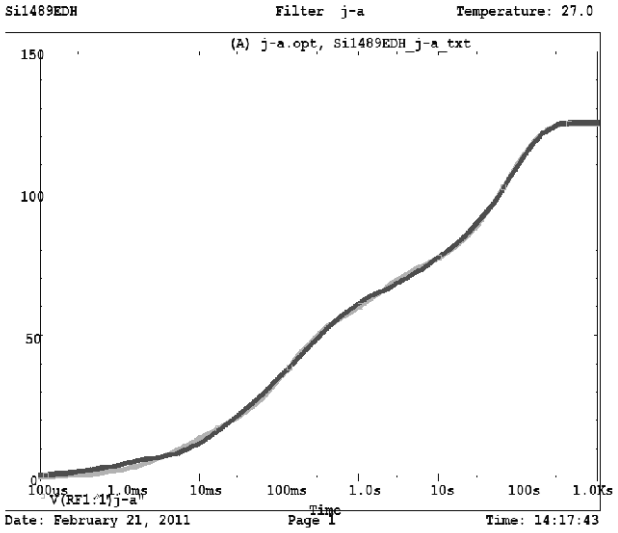
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CT1:1)j-f
Time
Date: February 21, 2011
Page 1
Time: 14:00:53


Si1489EDH
Filter j-a
Temperature: 27.0
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100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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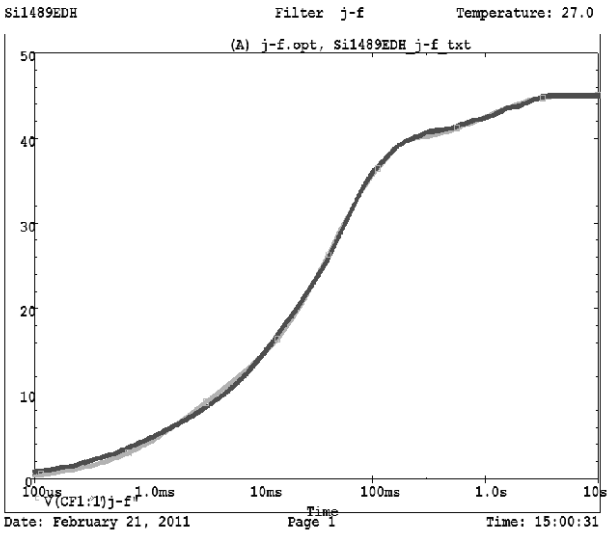
Time
Date: February 21, 2011
Page 1
Time: 14:17:43


Si1489EDH
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)j-f
Time
Date: February 21, 2011
Page 1
Time: 15:00:31