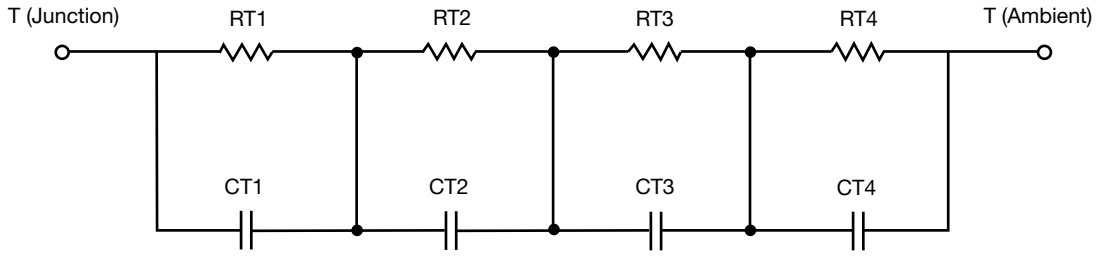
R-C Thermal Model Parameters

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

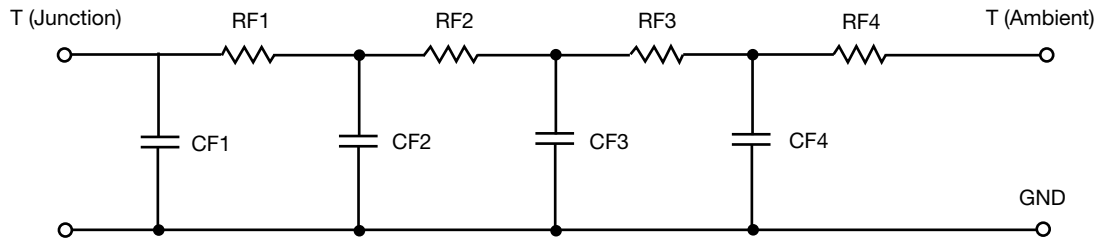


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	42.5172	N/A	10.4622
RT2	9.8002	N/A	4.3569
RT3	33.2456	N/A	8.0217
RT4	44.4370	N/A	26.6506
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	2.4220	N/A	3.9592m
CT2	397.5835u	N/A	459.3946u
CT3	130.3693m	N/A	520.4369m
CT4	3.6403m	N/A	4.9100m

Note
N/A indicates not applicable

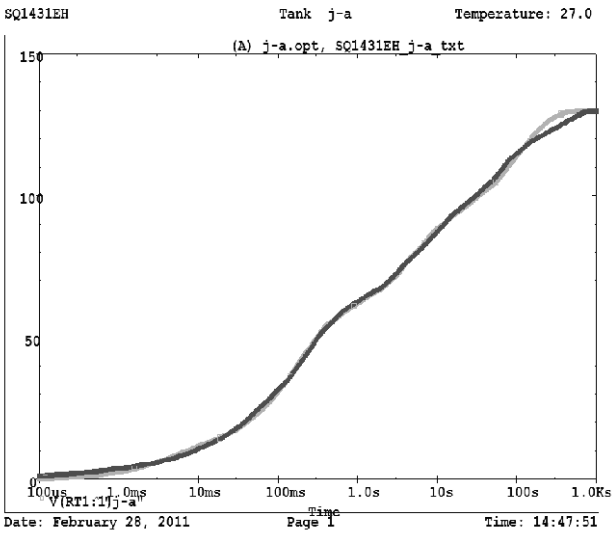
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	12.6113	N/A	5.1631
RF2	36.8847	N/A	16.8005
RF3	37.2257	N/A	20.4533
RF4	43.2783	N/A	7.3127
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	405.6089u	N/A	376.5842u
CF2	2.7183m	N/A	1.3904m
CF3	64.3923m	N/A	3.4283m
CF4	2.0419	N/A	753.5436m

Note
N/A indicates not applicable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Tank j-a
Temperature: 27.0
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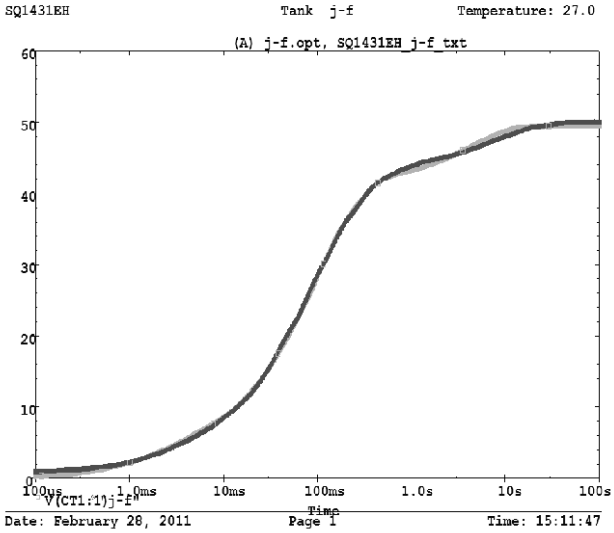
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)/j-a
Time
Date: February 28, 2011
Page 1
Time: 14:47:51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30
20
10
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Time
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Page 1
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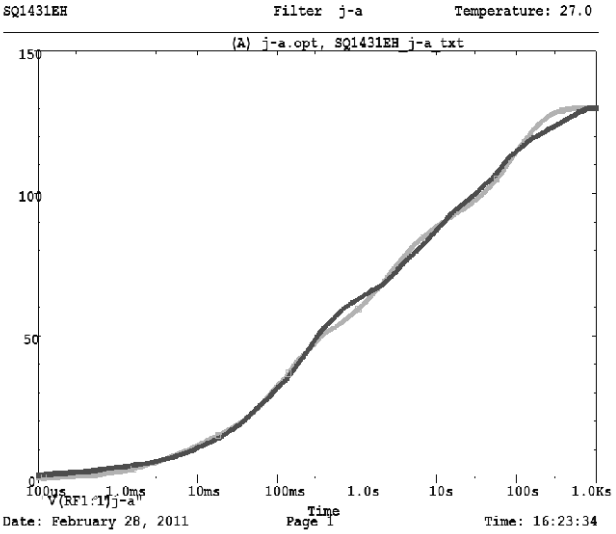
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Filter j-a
Temperature: 27.0
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100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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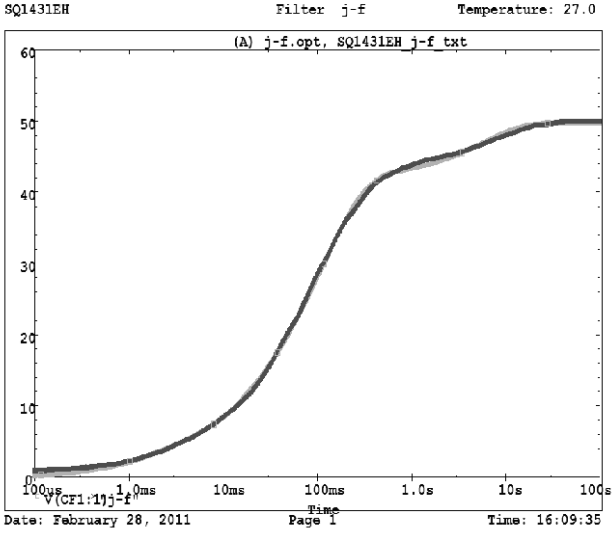
Time
Date: February 28, 2011
Page 1
Time: 16:23:34


SQ1431EH
Filter j-f
Temperature: 27.0
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50
40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)/j-f
Time
Date: February 28, 2011
Page 1
Time: 16:09:35