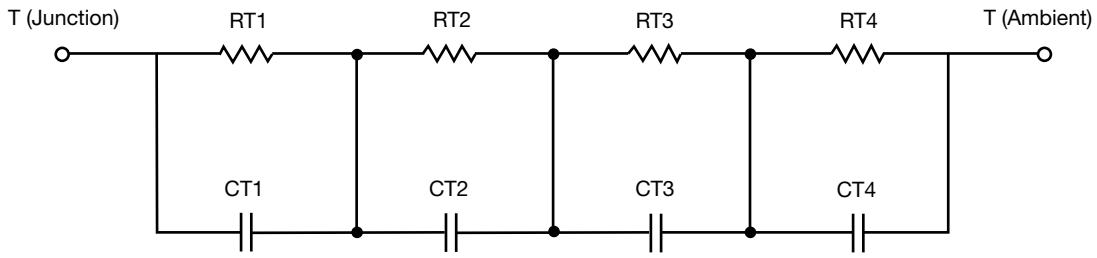
R-C Thermal Model Parameters

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

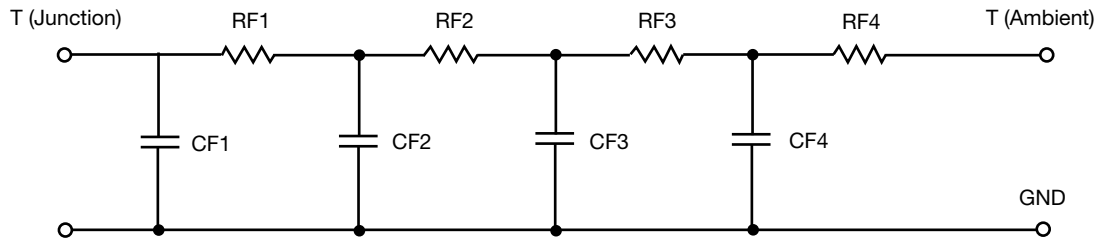


R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	29.9051	N/A	6.8884
RT2	12.3130	N/A	6.7442
RT3	26.5676	N/A	12.2668
RT4	55.6207	N/A	18.8009
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	3.0447m	N/A	101.8654m
CT2	447.9052u	N/A	177.7198u
CT3	34.1936m	N/A	5.1065m
CT4	1.2625	N/A	1.6297m

Note
N/A indicates not applicable

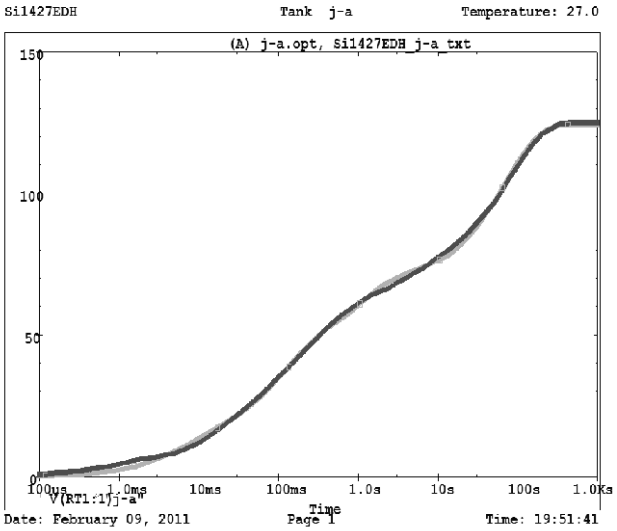
This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

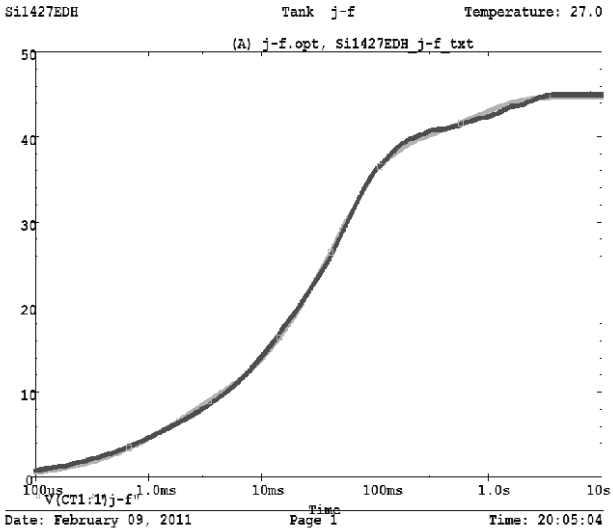
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	17.9927	N/A	9.3062
RF2	33.4660	N/A	23.7862
RF3	20.5779	N/A	5.2208
RF4	52.6284	N/A	6.4141
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	419.3515u	N/A	167.1636u
CF2	3.1736m	N/A	1.2141m
CF3	61.9349m	N/A	359.9215u
CF4	1.3280	N/A	107.1951m

Note
N/A indicates not applicable


Si1427EDH
Tank j-a
Temperature: 27.0
(A) j-a.opt, Si1427EDH_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 09, 2011
Page 1
Time: 19:51:41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Tank j-f
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40
30
20
10
0
100us
1.0ms
10ms
100ms
1.0s
10s
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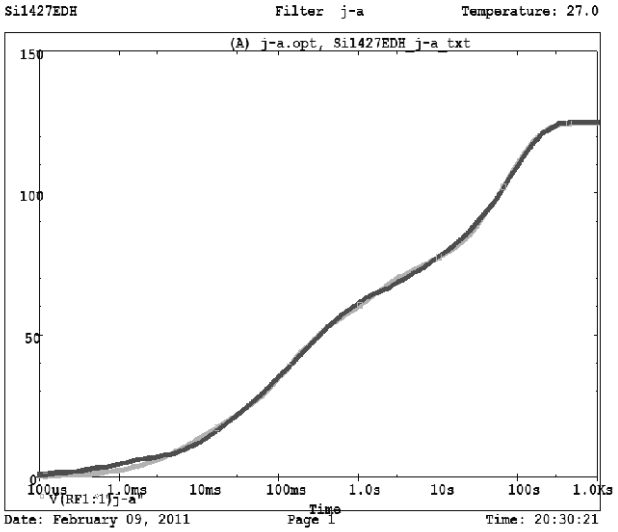
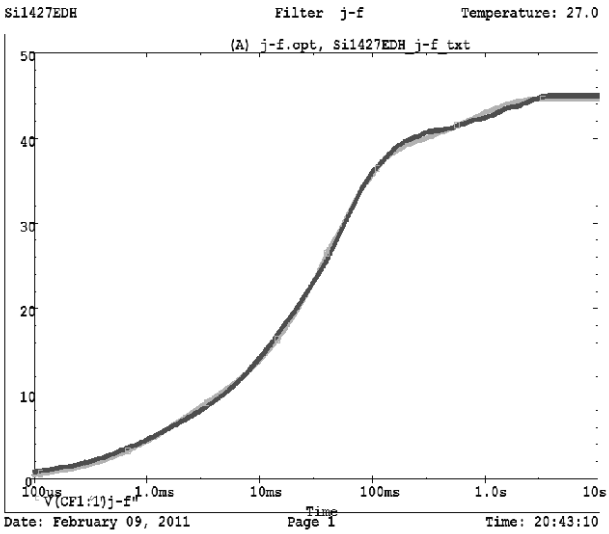
Time
Date: February 09, 2011
Page 1
Time: 20:05:04


Si1427EDH
Filter j-a
Temperature: 27.0
(A) j-a.opt, Si1427EDH_j-a_txt
150
100
50
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)j-a
Time
Date: February 09, 2011
Page 1
Time: 20:30:21


Si1427EDH
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 09, 2011
Page 1
Time: 20:43:10