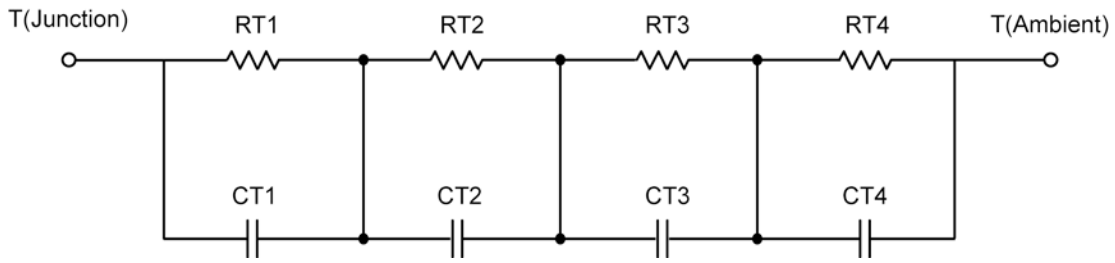
R-C Thermal Model Parameters

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."

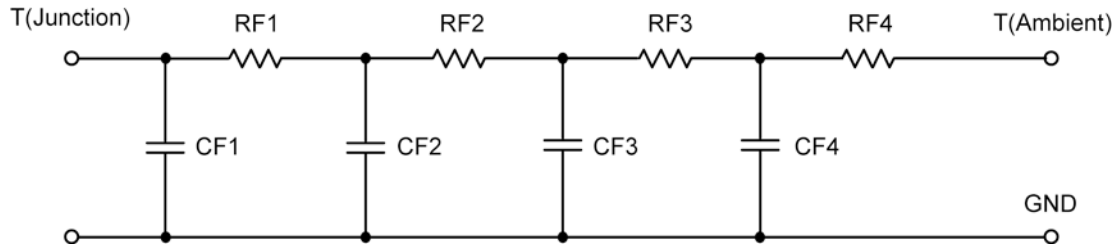
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	1.8893	N/A	5.9257
RT2	7.7258	N/A	345.6000 m
RT3	22.4515	N/A	5.5936
RT4	47.9334	N/A	7.1351
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	7.9550 m	N/A	10.6497 m
CT2	25.8424 m	N/A	289.8569 u
CT3	86.3098 m	N/A	54.7381 m
CT4	1.4304	N/A	297.8510 m

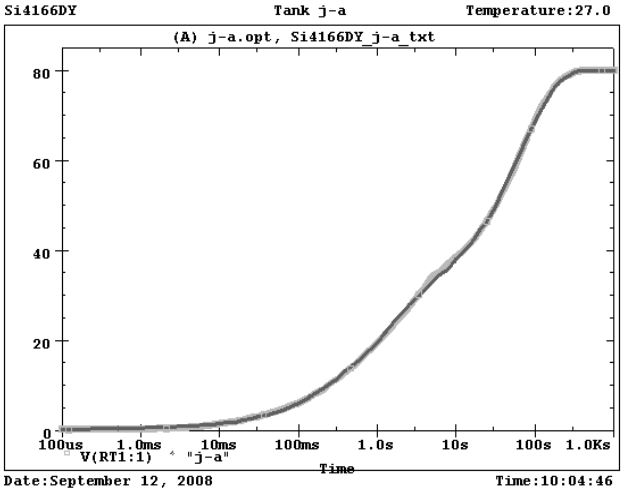
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	2.2847	N/A	511.8000 m
RF2	16.4129	N/A	8.4038
RF3	17.1412	N/A	4.9446
RF4	44.1612	N/A	5.1398
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	2.0908 m	N/A	1.7158 m
CF2	20.2591 m	N/A	7.1375 m
CF3	121.5741 m	N/A	51.0688 m
CF4	1.3723	N/A	334.7504 m

Note
NA indicates not applicable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Tank j-a
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60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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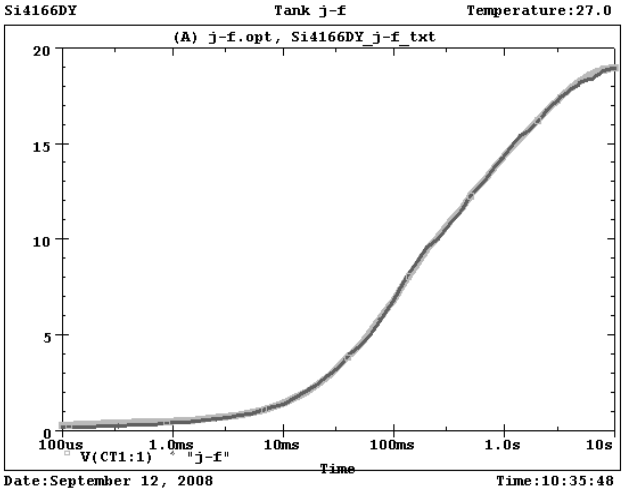
Time
Date:September 12, 2008
Time:10:04:46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10
5
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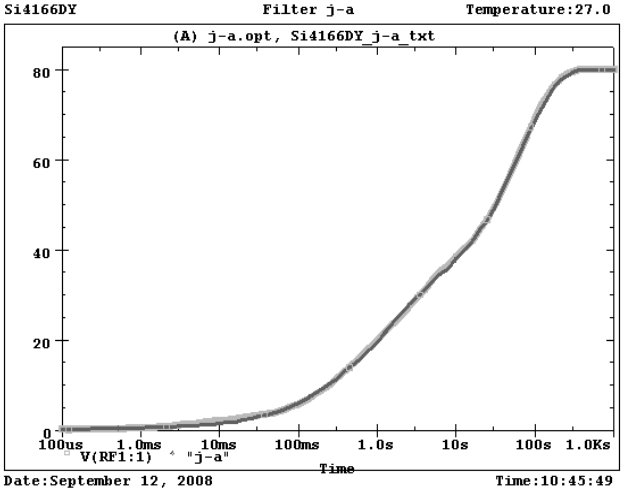
Si4166DY
Filter j-a
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60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
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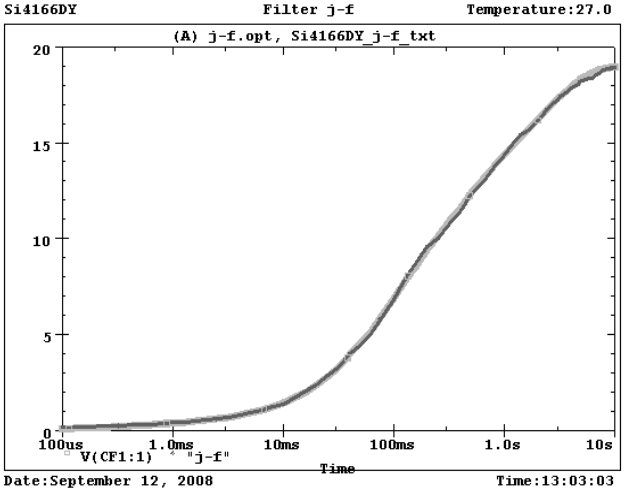
Time
Date:September 12, 2008
Time:10:45:49


Si4166DY
Filter j-f
Temperature:27.0
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15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
V(CF1:1)
"j-f"
Time
Date:September 12, 2008
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