

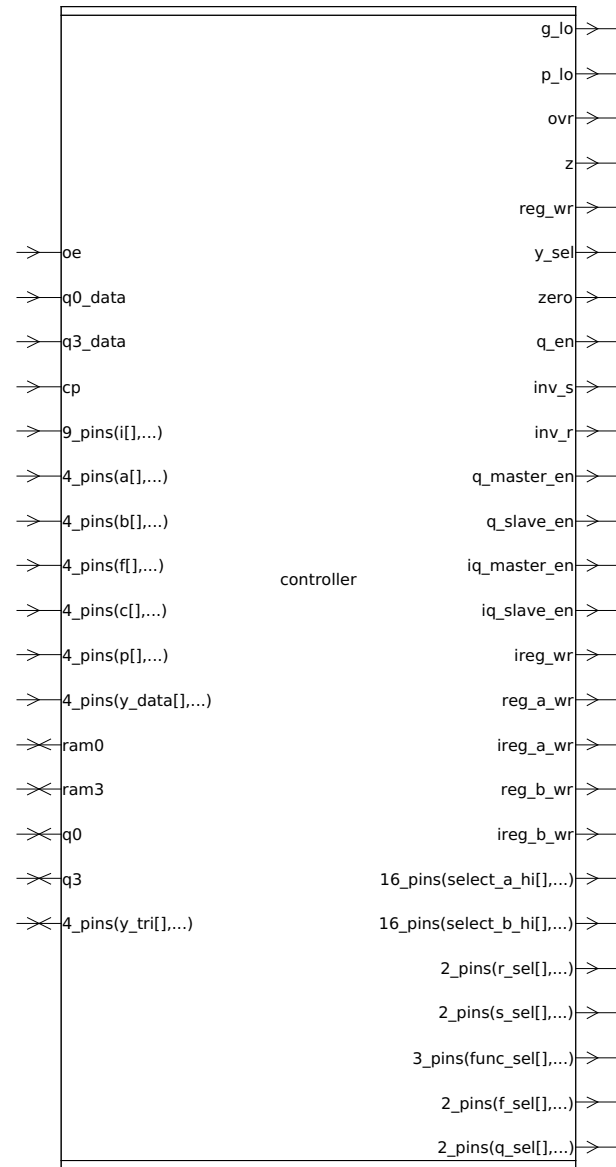
The total area of the am2901 layout is $338.4 * 108.72 = 36,790.85\mu\text{m}^2$.

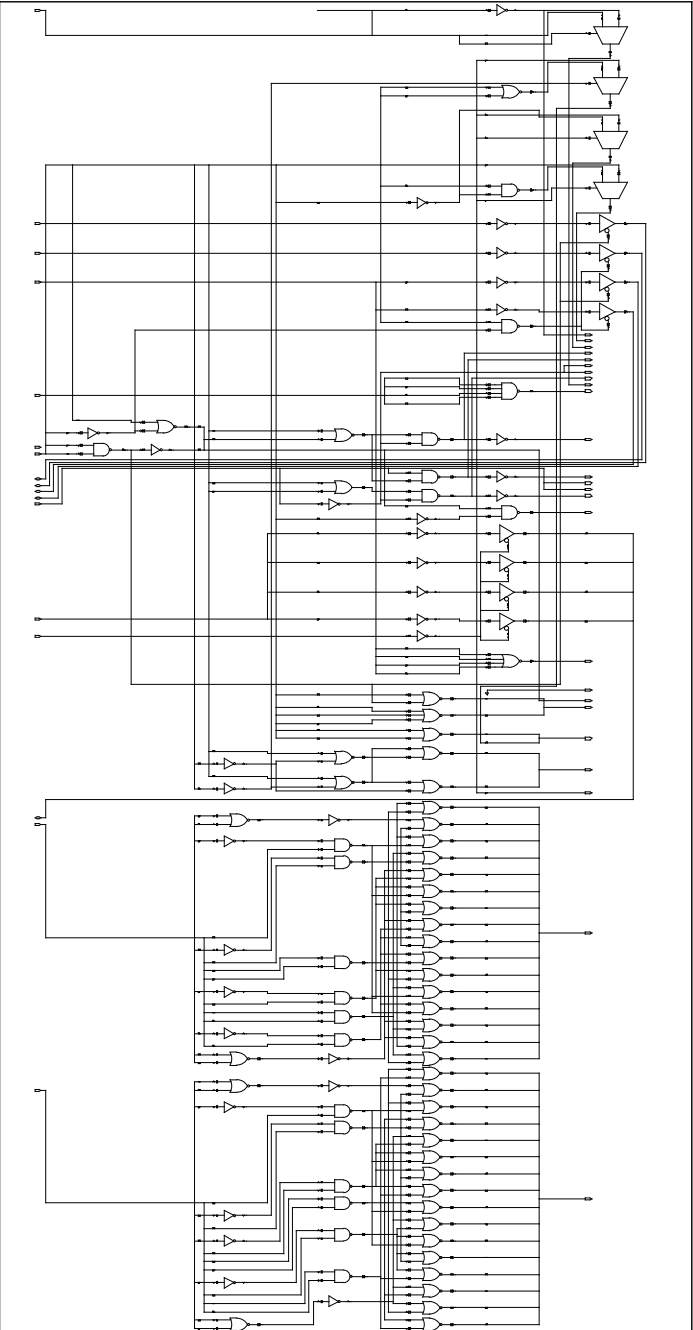
Area of Design With 275 Max Rise/Fall:

Number of combinational cells:	127
Number of sequential cells:	8
Number of macros/black boxes:	0
Number of buf/inv:	55
Number of references:	12
Combinational area:	8491.391930
Buf/Inv area:	2694.384003
Noncombinational area:	653.184021
Macro/Black Box area:	0.000000
Net Interconnect area:	undefined (No wire load specified)
Total cell area:	9144.575951
Total area:	undefined

Area of Design With 325 Max Rise/Fall:

Number of combinational cells:	100
Number of sequential cells:	8
Number of macros/black boxes:	0
Number of buf/inv:	28
Number of references:	11
Combinational area:	5780.678368
Buf/Inv area:	1371.686401
Noncombinational area:	653.184021
Macro/Black Box area:	0.000000
Net Interconnect area:	undefined (No wire load specified)
Total cell area:	6433.862389
Total area:	undefined
***** End Of Report *****	





```
#####
# Generated by:      Cadence Encounter 14.28-s033_1
# OS:               Linux x86_64(Host ID linux-06.ews.illinois.edu)
# Generated on:      Thu May  2 17:37:56 2019
# Design:           controller
# Command:          summaryReport -noHtml -outfile summaryReport.rpt
#####
```

```
=====
General Design Information
=====
```

```
Design Status: Routed
Design Name: controller
# Instances: 112
# Hard Macros: 0
# Std Cells: 112
```

```
-----
Standard Cells in Netlist
-----
```

Cell Type	Instance Count	Area (um^2)
inv_1	20	979.7760
inv_2	6	293.9328
inv_4	6	293.9328
invzp_1	8	653.1840
mux2_1	4	457.2288
nand2_1	7	457.2288
nand2_2	12	783.8208
nand4_1	1	81.6480
nor2_1	33	1616.6304
nor2_2	8	391.9104
nor2_4	4	457.2288
nor3_1	1	65.3184
nor4_1	1	81.6480
or2_1	1	81.6480

```
# Pads: 0
# Net: 168
# Special Net: 2
# IO Pins:
```

```
-----
Issued IO Information
-----
```

```
# Unplaced IO Pin 0
# Floating IO
```

```
-----
Floating IO
-----
```

```
Floating IO Name
q_en
zero
c[0]
c[1] 4
```

```
# IO Connected to Non-IO Inst
```

```
-----
IO Connected to Non-IO Inst
-----
```

IO Name	Non-IO Inst Name
cp	U128
ireg_b_wr	U128
reg_b_wr	U128
ireg_a_wr	U128
reg_a_wr	U128
ireg_wr	U141

iq_slave_en	U151
iq_master_en	U149
q_slave_en	U152
q_master_en	U150
inv_r	U188
inv_s	U186
q_sel[0]	U183
q_sel[1]	U184
f_sel[0]	U147
f_sel[1]	U144
y_sel	U195
func_sel[0]	U188
func_sel[1]	U185
func_sel[2]	U186
s_sel[0]	U191
s_sel[1]	U193
r_sel[0]	U179
r_sel[1]	U182
reg_wr	U142
q3_data	U132
q0_data	U135
q3	drvqshl
q0	drvqshr
ram3	drvraml
ram0	drvramr
oe	U137
y_data[0]	U133
y_data[1]	U131
y_data[2]	U129
y_data[3]	U136
y_tri[0]	drvvy0
y_tri[1]	drvvy1
y_tri[2]	drvvy2
y_tri[3]	drvvy3
z	U139
ovr	U177
p_lo	U138
g_lo	U145
p[0]	U138
p[1]	U138
p[2]	U138
p[3]	U138
c[2]	U177
c[3]	U145
f[0]	U134
f[1]	U139
f[2]	U139
f[3]	U130
select_b_hi[0]	U114
select_b_hi[1]	U164
select_b_hi[2]	U168
select_b_hi[3]	U156
select_b_hi[4]	U116
select_b_hi[5]	U163
select_b_hi[6]	U167
select_b_hi[7]	U98
select_b_hi[8]	U115
select_b_hi[9]	U162
select_b_hi[10]	U166
select_b_hi[11]	U99
select_b_hi[12]	U122
select_b_hi[13]	U161
select_b_hi[14]	U100

select_b_hi[15]	U153
select_a_hi[0]	U117
select_a_hi[1]	U172
select_a_hi[2]	U176
select_a_hi[3]	U160
select_a_hi[4]	U119
select_a_hi[5]	U171
select_a_hi[6]	U175
select_a_hi[7]	U101
select_a_hi[8]	U118
select_a_hi[9]	U170
select_a_hi[10]	U174
select_a_hi[11]	U102
select_a_hi[12]	U123
select_a_hi[13]	U169
select_a_hi[14]	U103
select_a_hi[15]	U157
b[0]	U92
b[1]	U94
b[2]	U104
b[3]	U105
a[0]	U93
a[1]	U95
a[2]	U106
a[3]	U107
i[0]	U180
i[1]	U179
i[2]	U179
i[3]	U188
i[4]	U185
i[5]	U186
i[6]	U148
i[7]	U140
i[8]	U140 103 107

Pins:

 Correctness of Pin Connectivity for All Instances

Floating Terms 0
 # Output Term Marked Tie Hi/Lo 0
 # Output Term Shorted to PG Net 0 313

PG Pins:

 Correctness of PG Pin Connectivity for All Instances

Instances that No Net Defined for Any PG Pin

 The Instances that No Net Defined for any PG Pin

Instance Name
 U196
 U195
 U194
 U193
 U192
 U191
 U190
 U189
 U188
 U187
 U186
 U185
 U184

U183
U182
U181
U180
U179
U177
U176
U175
U174
U173
U172
U171
U170
U169
U168
U167
U166
U165
U164
U163
U162
U161
U160
U159
U158
U157
U156
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U154
U153
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U128
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U125
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U123
U122
U121
U120

U119
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U117
U116
U115
U114
U113
U112
U111
U110
U109
U108
U107
U106
U105
U104
U103
U102
U101
U100
U99
U98
U97
U96
U95
U94
U93
U92
drvraml
drvqshl
drvramr
drvqshr
drvy3
drvy2
drvy1
drvy0 112

Floating PG Terms 0
PG Pins Connect to Non-PG Net 0
Power Pins Connect Ground Net 0
Ground Pins Connect Power Net 0 224

Average Pins Per Net(Signal): 1.863

=====
General Library Information
=====

Routing Layers: 5
Masterslice Layers: 12
Pin Layers:

General Caution:

1) Library have metal1, metal2, metal3, metal4 and metal5 pins, you should setP
reRouteAsObs {1 2 3} to ensure these pins are accessibl
e after placement

Pin Layers

metal5
metal4
metal3
metal2
metal1 5

Layers:

Layer metal5 Information

Type Routing
Wire Pitch X 2.160 um
Wire Pitch Y 2.160 um
Wire Width 0.480 um
Spacing 0.480 um

Layer via4 Information

Type Cut
Vias

Via list in layer via4

Vias in via4 Default

M5_M4 Yes For complete list click here

Multiple Orientation Vias CAUTION: There is only one default via in this layer

Layer metal4 Information

Type Routing
Wire Pitch X 1.080 um
Wire Pitch Y 1.080 um
Wire Width 0.360 um
Spacing 0.480 um

Layer via3 Information

Type Cut
Vias

Via list in layer via3

Vias in via3 Default

M4_M3 Yes For complete list click here

Multiple Orientation Vias CAUTION: There is only one default via in this layer

Layer metal3 Information

Type Routing
Wire Pitch X 1.080 um
Wire Pitch Y 1.080 um
Wire Width 0.360 um
Spacing 0.480 um

Layer via2 Information

Type Cut
Vias

Via list in layer via2

Vias in via2 Default

M3_M2 Yes For complete list click here

Multiple Orientation Vias CAUTION: There is only one default via in this layer

Layer metal2 Information

Type Routing
Wire Pitch X 1.080 um
Wire Pitch Y 1.080 um
Wire Width 0.360 um

Spacing 0.480 um

Layer via Information

Type Cut
Vias

Via list in layer via

Vias in via Default

M2_M1 Yes For complete list click here

Multiple Orientation Vias CAUTION: There is only one default via in this layer

Layer metall Information

Type Routing
Wire Pitch X 1.080 um
Wire Pitch Y 1.080 um
Wire Width 0.360 um
Spacing 0.360 um

Layer cc Information

Type Cut
Vias

Via list in layer cc

Vias in cc Default

M1_POLY No

NTAP No

M1_N No

M1_P No For complete list click here

Layer nodrc Information

Type Masterslice

Layer metalcap Information

Type Masterslice

Layer cap_id Information

Type Masterslice

Layer res_id Information

Type Masterslice

Layer text Information

Type Masterslice

Layer sblock Information

Type Masterslice

Layer pad Information

Type Masterslice

Layer glass Information

 Type Masterslice

Layer poly Information

Type Masterslice

Layer pactive Information

Type Masterslice

Layer nactive Information

Type Masterslice

Layer nwell Information

Type Masterslice 22

Pins without Physical Port: 0

Pins in Library without Timing Lib:

 Pins in Library without timing lib

Cell Name	List of Pin Name
ABnorC	ip1
ABnorC	ip2
ABnorC	ip3
ABnorC	op
ABorC	ip1
ABorC	ip2
ABorC	ip3
ABorC	op
ab_or_c_or_d	ip1
ab_or_c_or_d	ip2
ab_or_c_or_d	ip3
ab_or_c_or_d	ip4
ab_or_c_or_d	op
and2_1	ip1
and2_1	ip2
and2_1	op
and2_2	ip1
and2_2	ip2
and2_2	op
and2_4	ip1
and2_4	ip2
and2_4	op
and3_1	ip1
and3_1	ip2
and3_1	ip3
and3_1	op
and3_2	ip1
and3_2	ip2
and3_2	ip3
and3_2	op
and3_4	ip1
and3_4	ip2
and3_4	ip3
and3_4	op
and4_1	ip1
and4_1	ip2
and4_1	ip3
and4_1	ip4
and4_1	op

and4_2	ip1
and4_2	ip2
and4_2	ip3
and4_2	ip4
and4_2	op
and4_4	ip1
and4_4	ip2
and4_4	ip3
and4_4	ip4
and4_4	op
buf_1	ip
buf_1	op
buf_2	ip
buf_2	op
buf_4	ip
buf_4	op
bufzp_2	c
bufzp_2	ip
bufzp_2	op
cd_12	ip
cd_12	op
cd_16	ip
cd_16	op
cd_8	ip
cd_8	op
dksp_1	ck
dksp_1	ip
dksp_1	q
dksp_1	qb
dksp_1	sb
dp_1	ck
dp_1	ip
dp_1	q
dp_2	ck
dp_2	ip
dp_2	q
dp_4	ck
dp_4	ip
dp_4	q
drp_1	ck
drp_1	ip
drp_1	q
drp_1	rb
drp_2	ck
drp_2	ip
drp_2	q
drp_2	rb
drp_4	ck
drp_4	ip
drp_4	q
drp_4	rb
drsp_1	ck
drsp_1	ip
drsp_1	q
drsp_1	rb
drsp_1	s
drsp_2	ck
drsp_2	ip
drsp_2	q
drsp_2	rb
drsp_2	s
drsp_4	ck
drsp_4	ip

drsp_4	q
drsp_4	rb
drsp_4	s
dtrsp_2	ck
dtrsp_2	ip
dtrsp_2	q
dtrsp_2	rb
dtrsp_2	s
dtrsp_2	sip
dtrsp_2	sm
fulladder	a
fulladder	b
fulladder	ci
fulladder	co
fulladder	s
inv_1	ip
inv_1	op
inv_2	ip
inv_2	op
inv_4	ip
inv_4	op
invzp_1	c
invzp_1	ip
invzp_1	op
invzp_2	c
invzp_2	ip
invzp_2	op
invzp_4	c
invzp_4	ip
invzp_4	op
jkrp_2	ck
jkrp_2	j
jkrp_2	k
jkrp_2	q
jkrp_2	qb
jkrp_2	rb
lp_1	ck
lp_1	ip
lp_1	q
lp_2	ck
lp_2	ip
lp_2	q
lrp_1	ck
lrp_1	ip
lrp_1	q
lrp_1	rb
lrp_2	ck
lrp_2	ip
lrp_2	q
lrp_2	rb
lrp_4	ck
lrp_4	ip
lrp_4	q
lrp_4	rb
lrsp_1	ck
lrsp_1	ip
lrsp_1	q
lrsp_1	rb
lrsp_1	s
lrsp_2	ck
lrsp_2	ip
lrsp_2	q
lrsp_2	rb

lrsp_2	s
lrsp_4	ck
lrsp_4	ip
lrsp_4	q
lrsp_4	rb
lrsp_4	s
mux2_1	ip1
mux2_1	ip2
mux2_1	op
mux2_1	s
mux2_2	ip1
mux2_2	ip2
mux2_2	op
mux2_2	s
mux2_4	ip1
mux2_4	ip2
mux2_4	op
mux2_4	s
mux3_2	ip1
mux3_2	ip2
mux3_2	ip3
mux3_2	op
mux3_2	s0
mux3_2	s1
mux4_2	ip1
mux4_2	ip2
mux4_2	ip3
mux4_2	ip4
mux4_2	op
mux4_2	s0
mux4_2	s1
nand2_1	ip1
nand2_1	ip2
nand2_1	op
nand2_2	ip1
nand2_2	ip2
nand2_2	op
nand2_4	ip1
nand2_4	ip2
nand2_4	op
nand3_1	ip1
nand3_1	ip2
nand3_1	ip3
nand3_1	op
nand3_2	ip1
nand3_2	ip2
nand3_2	ip3
nand3_2	op
nand3_4	ip1
nand3_4	ip2
nand3_4	ip3
nand3_4	op
nand4_1	ip1
nand4_1	ip2
nand4_1	ip3
nand4_1	ip4
nand4_1	op
nand4_2	ip1
nand4_2	ip2
nand4_2	ip3
nand4_2	ip4
nand4_2	op
nand4_4	ip1

nand4_4	ip2
nand4_4	ip3
nand4_4	ip4
nand4_4	op
nor2_1	ip1
nor2_1	ip2
nor2_1	op
nor2_2	ip1
nor2_2	ip2
nor2_2	op
nor2_4	ip1
nor2_4	ip2
nor2_4	op
nor3_1	ip1
nor3_1	ip2
nor3_1	ip3
nor3_1	op
nor3_2	ip1
nor3_2	ip2
nor3_2	ip3
nor3_2	op
nor3_4	ip1
nor3_4	ip2
nor3_4	ip3
nor3_4	op
nor4_1	ip1
nor4_1	ip2
nor4_1	ip3
nor4_1	ip4
nor4_1	op
nor4_2	ip1
nor4_2	ip2
nor4_2	ip3
nor4_2	ip4
nor4_2	op
nor4_4	ip1
nor4_4	ip2
nor4_4	ip3
nor4_4	ip4
nor4_4	op
not_ab_or_c_or_d	ip1
not_ab_or_c_or_d	ip2
not_ab_or_c_or_d	ip3
not_ab_or_c_or_d	ip4
not_ab_or_c_or_d	op
or2_1	ip1
or2_1	ip2
or2_1	op
or2_2	ip1
or2_2	ip2
or2_2	op
or2_4	ip1
or2_4	ip2
or2_4	op
or3_1	ip1
or3_1	ip2
or3_1	ip3
or3_1	op
or3_2	ip1
or3_2	ip2
or3_2	ip3
or3_2	op
or3_4	ip1

or3_4	ip2
or3_4	ip3
or3_4	op
or4_1	ip1
or4_1	ip2
or4_1	ip3
or4_1	ip4
or4_1	op
or4_2	ip1
or4_2	ip2
or4_2	ip3
or4_2	ip4
or4_2	op
or4_4	ip1
or4_4	ip2
or4_4	ip3
or4_4	ip4
or4_4	op
xnor2_1	ip1
xnor2_1	ip2
xnor2_1	op
xnor2_2	ip1
xnor2_2	ip2
xnor2_2	op
xor2_1	ip1
xor2_1	ip2
xor2_1	op
xor2_2	ip1
xor2_2	ip2
xor2_2	op
padgnd	pad
padbidirhe_025	di
padbidirhe_025	dib
padbidirhe_025	do
padbidirhe_025	oeb
padbidirhe_025	pad
padinc	di
padinc	dib
padinc	pad
padio	data
padio	pad
padout	di
padout	dib
padout	do
padout	pad
padvdd	pad
padnoconnect	pad 338

Pins Missing Direction: 0

Antenna Summary Report:

General Caution:

1) All Antenna Constructs are absent for the layer section of LEF.

2) All Antenna Constructs are absent for the macro section of LEF. For more info

rmation click here

Cells Missing LEF Info: 0

Cells with Dimension Errors: 0

=====
Netlist Information

HFO (>200) Nets: 0

No-driven Nets: 16

General Caution:

1) TODO

No-driven Nets

N35

N34

N33

N25

N24

N23

i_0

i_1

i_2

ireg_b_wr

reg_b_wr

reg_a_wr

q_en

i[3]

i[4]

i[5]

Multi-driven Nets: 0

Assign Statements: 16

General Caution:

1) The assignment statements can impact CTS and IPO.

2) You can use "setDoAssign" properly to solve the problem.

Verilog File Name: controller_synth.v

Module Name: controller

ireg_b_wr = ireg_a_wr

q_sel[1] = N35

q_sel[0] = N34

f_sel[0] = N33

r_sel[1] = N25

r_sel[0] = N24

f_sel[1] = N23

reg_a_wr = cp

reg_b_wr = reg_a_wr

func_sel[0] = i[3]

func_sel[1] = i[4]

func_sel[2] = i[5]

i_0 = i[0]

i_1 = i[1]

i_2 = i[2]

zero = 1'b0

Is Design Uniquified: YES

Pins in Netlist without timing lib:

Pins in Netlist without timing lib

Cell Name List of Pin Name

inv_1 ip

inv_1 op

inv_2 ip

inv_2 op

inv_4 ip

inv_4 op

invzp_1 c

invzp_1 ip

invzp_1 op

mux2_1 ip1

mux2_1 ip2

mux2_1 op

mux2_1 s

nand2_1 ip1

nand2_1 ip2

nand2_1 op

```
nand2_2 ip1
nand2_2 ip2
nand2_2 op
nand4_1 ip1
nand4_1 ip2
nand4_1 ip3
nand4_1 ip4
nand4_1 op
nor2_1 ip1
nor2_1 ip2
nor2_1 op
nor2_2 ip1
nor2_2 ip2
nor2_2 op
nor2_4 ip1
nor2_4 ip2
nor2_4 op
nor3_1 ip1
nor3_1 ip2
nor3_1 ip3
nor3_1 op
nor4_1 ip1
nor4_1 ip2
nor4_1 ip3
nor4_1 ip4
nor4_1 op
or2_1 ip1
or2_1 ip2
or2_1 op 45
```

=====

=====

: Internal External

```
No of Nets:      147      0
No of Connections: 269      0
Total Net Length (X): 3.2539e+03  0.0000e+00
Total Net Length (Y): 1.9172e+03  0.0000e+00
Total Net Length: 5.1711e+03  0.0000e+00
```

=====

Timing Information

=====

```
# Clocks in design: 0
# Generated clocks: 0
# "dont_use" cells from .libs: 0
# "dont_touch" cells from .libs: 0
# Cells in .lib with max_tran: 0
# Cells in .lib with max_cap: 0
# Cells in .lib with max_fanout: 0
SDC max_cap: N/A
SDC max_tran: N/A
SDC max_fanout: N/A
Default Ext. Scale Factor: 1.000
Detail Ext. Scale Factor: 1.000
```

=====

Floorplan/Placement Information

=====

```
Total area of Standard cells: 6695.136 um^2
Total area of Standard cells(Subtracting Physical Cells): 6695.136 um^2
Total area of Macros: 0.000 um^2
Total area of Blockages: 0.000 um^2
```

Total area of Pad cells: 0.000 um^2

Total area of Core: 10233.216 um^2

Total area of Chip: 10233.216 um^2

Effective Utilization: 6.8562e-01

Number of Cell Rows: 2

% Pure Gate Density #1 (Subtracting BLOCKAGES): 65.426%

% Pure Gate Density #2 (Subtracting BLOCKAGES and Physical Cells): 65.426%

% Pure Gate Density #3 (Subtracting MACROS): 65.426%

% Pure Gate Density #4 (Subtracting MACROS and Physical Cells): 65.426%

% Pure Gate Density #5 (Subtracting MACROS and BLOCKAGES): 65.426%

% Pure Gate Density #6 (Subtracting MACROS and BLOCKAGES and Physical Cells): 65.426%

% Core Density (Counting Std Cells and MACROS): 65.426%

% Core Density #2(Subtracting Physical Cells): 65.426%

% Chip Density (Counting Std Cells and MACROS and IOs): 65.426%

% Chip Density #2(Subtracting Physical Cells): 65.426%

Macros within 5 sites of IO pad: No

Macro halo defined?: No

=====

Wire Length Distribution

=====

Total metall wire length: 355.6800 um

Total metal2 wire length: 1630.3200 um

Total metal3 wire length: 2634.9000 um

Total metal4 wire length: 186.6600 um

Total metal5 wire length: 476.2800 um

Total wire length: 5283.8400 um

Average wire length/net: 31.4514 um

Area of Power Net Distribution:

Area of Power Net Distribution

Layer Name	Area of Power Net	Routable Area	Percentage
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metall	892.4256	10233.2160	8.7209%
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metal2	130.6368	10233.2160	1.2766%
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metal3	0.0000	10233.2160	0.0000%
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metal4	0.0000	10233.2160	0.0000%
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metal5	0.0000	10233.2160	0.0000%	For more information click here
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