



2-PORT Register File

512 WORDS X 48 BITS, MUX 2

SMIC 0.18um G Logic Process

Version 0.2.b

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OVERVIEW

The 2-PORT Register File is designed for SMIC's 0.18um CMOS Logic process. The memory is optimized for speed, power and area. It operates at a voltage range of 1.62V to 1.98V and a temperature range of -40° C to 125°C.

Chip enable (CENA,CENB), address (AA[i-1:0],AB[i-1:0]) and data in (DB[n-1:0]) signals are latched on the rising-edge of the clock. When CENA is low, the memory is in read-mode. Data is read from the memory location specified on the address bus AA[i-1:0] and appears on the data output bus QA[n-1:0].When CENB is low, the memory is in write-mode. The word on the data port DB[n-1:0] will be written into the location specified by the address AB[i-1:0] and the data will appear on the output port QA[n-1:0].When CENA is high, port A enters the standby mode. Data outputs remained stable.When CENB is high, port B enters the standby mode. Data stored in the memory is retained, but the new data writes is not allowed.

CONFIGURATION:

PARAMETER	VALUE
Mux	2
Words	512
Bits	48
Width	676.66um
Height	496.905um
Area	336235.737um ²

PIN DEFINITION:

PIN	DIRECTION	DEFINITION
AA[8:0]	Input	A Port Address Inputs
AB[8:0]	Input	B Port Address Inputs
DB[47:0]	Input	B Port Data Inputs
CENA	Input	A Port Enable
CENB	Input	B Port Enable
CLKA	Input	A Port Clock Input
CLKB	Input	B Port Clock Input
QA[47:0]	Output	Data Outputs

TIMING:

PARAMETER	DESCRIPTION	FF CORNER 1.98V, -40°C		FF CORNER 1.98V, 0°C		FF CORNER 1.98V, 125°C		SS CORNER 1.62V, -40°C		SS CORNER 1.62V, 125°C		TT CORNER 1.8V, 25°C	
(ns)		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Tcyc	Cycle Time	1.495		1.615		1.970		3.493		4.427		2.375	
Ta	¹ Access Time	0.716		0.773		0.943			2.646		3.353		1.799
Tah	Address Hold	0.330		0.361		0.432		0.609		0.741		0.541	
Tas	Address Setup	0.594		0.619		0.694		1.129		1.297		0.792	
Tch	Cen Hold	0.100		0.100		0.100		0.100		0.100		0.100	
Tcs	Cen Setup	0.460		0.469		0.495		0.603		0.658		0.526	
Tdh	Data Hold	0.111		0.109		0.116		0.181		0.194		0.177	
Tds	Data Setup	0.330		0.379		0.455		0.781		0.954		0.496	
Tclkh	Clock High	0.050		0.060		0.060		0.060		0.080		0.070	
Tclkl	Clock Low	0.200		0.220		0.240		0.210		0.260		0.290	
Tclkr	Clock Rise Skew	1.500		1.500		1.500		3.000		3.000		2.000	
Tcc	Clock Collision	1.495		1.615		1.970		3.493		4.427		2.375	

Timing simulation conditions:

1. Access time = best case for fast corner and worst case for slow/typical corners

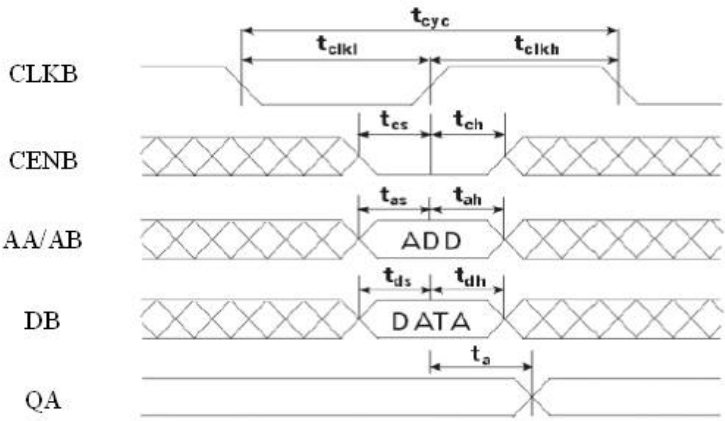
POWER:

PARAMETER	FF CORNER 1.98V, -40°C	FF CORNER 1.98V, 0°C	FF CORNER 1.98V, 125°C	SS CORNER 1.62V, -40°C	SS CORNER 1.62V, 125°C	TT CORNER 1.8V, 25°C
² AC Current (uA/MHz)	90.223	92.752	104.932	67.725	35.526	48.033
Read AC Current (uA/MHz)	69.409	67.806	91.901	37.646	28.069	48.333
Write AC Current (uA/MHz)	111.036	117.697	117.964	97.805	42.983	47.733
Standby Power (mW)	0.208754	0.300359	3.043087	0.001134	0.066834	0.060462
³ Deselect Current (uA/MHz)	17.368	16.892	13.889	8.537	12.179	8.749

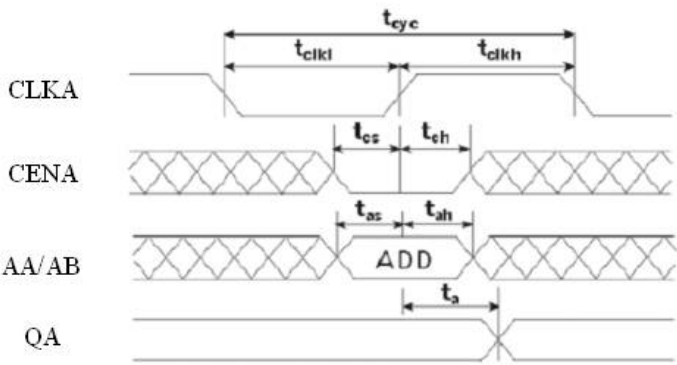
Power simulation conditions:

2. CEN is low, 50% read / 50% write operations, all addresses and 50% of input pins toggle at 1MHz
3. CEN is high, 50% of input pins toggle at 1MHz

WRITE CYCLE TIMING:



READ CYCLE TIMING:



Datasheet Revision History

Date	Version	Changes
	null	

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