

512Kx36 & 1Mx18-Bit Synchronous Pipelined Burst SRAM

FEATURES

- Synchronous Operation.
- 2 Stage Pipelined operation with 4 Burst.
- On-Chip Address Counter.
- Self-Timed Write Cycle.
- On-Chip Address and Control Registers.
- $V_{DD} = 3.3V \pm 0.165V / -0.165V$ Power Supply.
- I/O Supply Voltage $3.3V \pm 0.165V / -0.165V$ for 3.3V I/O or $2.5V \pm 0.4V / -0.125V$ for 2.5V I/O.
- 5V Tolerant Inputs Except I/O Pins.
- Byte Writable Function.
- Global Write Enable Controls a full bus-width write.
- Power Down State via ZZ Signal.
- LBO Pin allows a choice of either a interleaved burst or a linear burst.
- Three Chip Enables for simple depth expansion with No Data Contention only for TQFP ; 2cycle Enable, 1cycle Disable.
- Asynchronous Output Enable Control.
- $\overline{ADSP}$, $\overline{ADSC}$, $\overline{ADV}$ Burst Control Pins.
- TTL-Level Three-State Output.
- 100-TQFP-1420A / 119BGA(7x17 Ball Grid Array Package)

FAST ACCESS TIMES

PARAMETER	Symbol	-16	-15	-14	Unit
Cycle Time	tcyc	6.0	6.7	7.2	ns
Clock Access Time	tcd	3.5	3.8	4.0	ns
Output Enable Access Time	toe	3.5	3.8	4.0	ns

GENERAL DESCRIPTION

The K7A163600A and K7A161800A are 18,874,368-bit Synchronous Static Random Access Memory designed for high performance second level cache of Pentium and Power PC based System.

It is organized as 512K(1M) words of 36(18) bits and integrates address and control registers, a 2-bit burst address counter and added some new functions for high performance cache RAM applications; $\overline{GW}$, $\overline{BW}$, $\overline{LBO}$, $\overline{ZZ}$. Write cycles are internally self-timed and synchronous.

Full bus-width write is done by $\overline{GW}$, and each byte write is performed by the combination of $\overline{WEx}$ and $\overline{BW}$ when $\overline{GW}$ is high. And with $\overline{CS}_1$ high, $\overline{ADSP}$ is blocked to control signals.

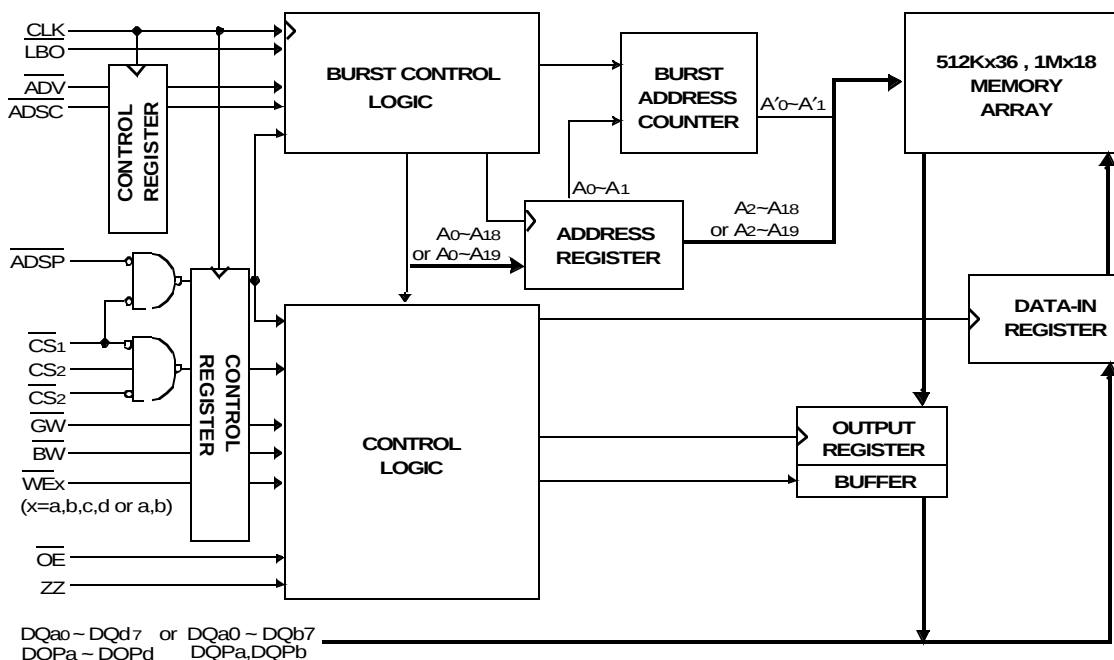
Burst cycle can be initiated with either the address status processor($\overline{ADSP}$) or address status cache controller($\overline{ADSC}$) inputs. Subsequent burst addresses are generated internally in the system's burst sequence and are controlled by the burst address advance($\overline{ADV}$) input.

$\overline{LBO}$ pin is DC operated and determines burst sequence(linear or interleaved).

$\overline{ZZ}$ pin controls Power Down State and reduces Stand-by current regardless of CLK.

The K7A163600A and K7A161800A are fabricated using SAMSUNG's high performance CMOS technology and is available in a 100pin TQFP and 119BGA package. Multiple power and ground pins are utilized to minimize ground bounce.

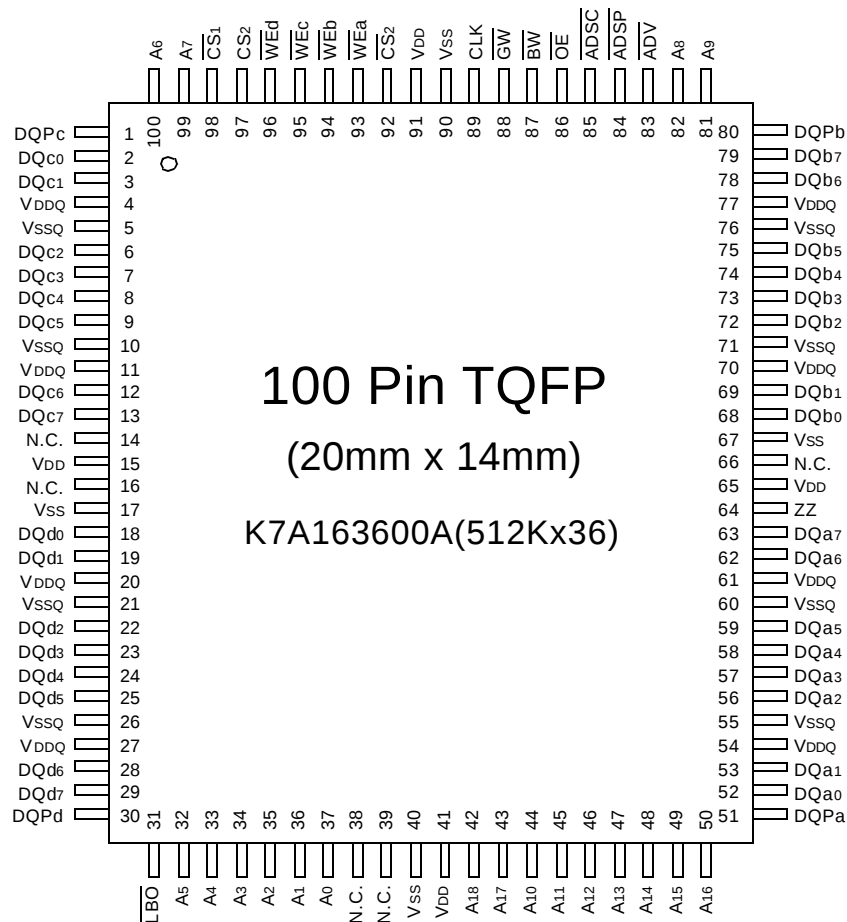
LOGIC BLOCK DIAGRAM



K7A163600A
K7A161800A

PRELIMINARY
512Kx36 & 1Mx18 Synchronous SRAM

PIN CONFIGURATION(TOP VIEW)



PIN NAME

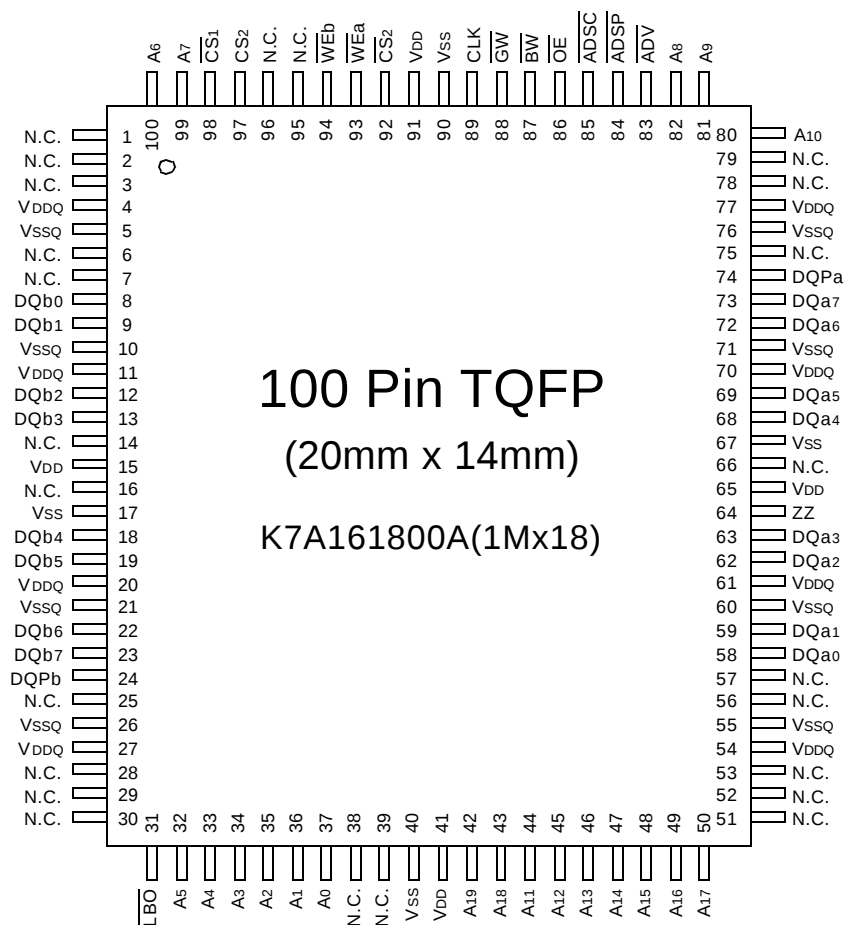
SYMBOL	PIN NAME	TQFP PIN NO.	SYMBOL	PIN NAME	TQFP PIN NO.
A0 - A18	Address Inputs	32,33,34,35,36,37,42 43,44,45,46,47,48,49 50,81,82,99,100	VDD	Power Supply(+3.3V)	15,41,65,91
			VSS	Ground	17,40,67,90
ADV	Burst Address Advance	83	N.C.	No Connect	14,16,38,39,66
ADSP	Address Status Processor	84			
ADSC	Address Status Controller	85	DQa0-a7	Data Inputs/Outputs	52,53,56,57,58,59,62,63
CLK	Clock	89	DQb0-b7		68,69,72,73,74,75,78,79
CS1	Chip Select	98	DQc0-c7		2,3,6,7,8,9,12,13
CS2	Chip Select	97	DQd0-d7		18,19,22,23,24,25,28,29
CS2	Chip Select	92	DQPa-Pd		51,80,1,30
WEx(x=a,b,c,d)	Byte Write Inputs	93,94,95,96			
OE	Output Enable	86	VDDQ	Output Power Supply (3.3V or 2.5V)	4,11,20,27,54,61,70,77
GW	Global Write Enable	88	VSSQ	Output Ground	5,10,21,26,55,60,71,76
BW	Byte Write Enable	87			
ZZ	Power Down Input	64			
LBO	Burst Mode Control	31			

Note : 1. A0 and A1 are the two least significant bits(LSB) of the address field and set the internal burst counter if burst is desired.

K7A163600A
K7A161800A

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512Kx36 & 1Mx18 Synchronous SRAM

PIN CONFIGURATION(TOP VIEW)



PIN NAME

SYMBOL	PIN NAME	TQFP PIN NO.	SYMBOL	PIN NAME	TQFP PIN NO.
A0 - A19	Address Inputs	32,33,34,35,36,37,42 43,44,45,46,47,48,49 50 80,81,82,99,100	VDD	Power Supply(+3.3V)	15,41,65,91
			VSS	Ground	17,40,67,90
ADV	Burst Address Advance	83	N.C.	No Connect	1,2,3,6,7,14,16,25,28,29 30,38,39,51,52,53,56,57 66,75,78,79,95,96
ADSP	Address Status Processor	84			
ADSC	Address Status Controller	85			
CLK	Clock	89			
CS1	Chip Select	98	DQa0 ~ a7	Data Inputs/Outputs	58,59,62,63,68,69,72,73 8,9,12,13,18,19,22,23 74,24
CS2	Chip Select	97	DQb0 ~ b7		
CS2	Chip Select	92	DQPa, Pb		
WEx(x=a,b)	Byte Write Inputs	93,94			
OE	Output Enable	86	VDDQ	Output Power Supply (3.3V or 2.5V)	4,11,20,27,54,61,70,77
GW	Global Write Enable	88	VSSQ	Output Ground	5,10,21,26,55,60,71,76
BW	Byte Write Enable	87			
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LBO	Burst Mode Control	31			

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K7A161800A

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119BGA PACKAGE PIN CONFIGURATIONS(TOP VIEW)

K7A163600A(512Kx36)

	1	2	3	4	5	6	7
A	VDDQ	A	A	ADSP	A	A	VDDQ
B	NC	A	A	ADSC	A	A	NC
C	NC	A	A	VDD	A	A	NC
D	DQc	DQPc	VSS	NC	VSS	DQPb	DQb
E	DQc	DQc	VSS	CS1	VSS	DQb	DQb
F	VDDQ	DQc	VSS	OE	VSS	DQb	VDDQ
G	DQc	DQc	WEc	ADV	WEb	DQb	DQb
H	DQc	DQc	VSS	GW	VSS	DQb	DQb
J	VDDQ	VDD	NC	VDD	NC	VDD	VDDQ
K	DQd	DQd	VSS	CLK	VSS	DQa	DQa
L	DQd	DQd	WE d	NC	WEa	DQa	DQa
M	VDDQ	DQd	VSS	BW	VSS	DQa	VDDQ
N	DQd	DQd	VSS	A1*	VSS	DQa	DQa
P	DQd	DQPd	VSS	A0*	VSS	DQPa	DQa
R	NC	A	LBO	VDD	NC	A	NC
T	NC	NC	A	A	A	NC	ZZ
U	VDDQ	TMS	TDI	TCK	TDO	NC	VDDQ

Note : * A₀ and A₁ are the two least significant bits(LSB) of the address field and set the internal burst counter if burst is desired.

PIN NAME

SYMBOL	PIN NAME	SYMBOL	PIN NAME
A	Address Inputs	VDD	Power Supply(+3.3V)
A ₀ , A ₁	Burst Count Address	VSS	Ground
ADV	Burst Address Advance	N.C.	No Connect
ADSP	Address Status Processor		
ADSC	Address Status Controller		
CLK	Clock	DQa	Data Inputs/Outputs
CS ₁	Chip Select	DQb	Data Inputs/Outputs
WEx	Byte Write Inputs	DQc	Data Inputs/Outputs
(x=a,b,c,d)		DQd	Data Inputs/Outputs
		DQPa~Pd	Data Inputs/Outputs
OE	Output Enable	VDDQ	Output Power Supply
GW	Global Write Enable		(2.5V or 3.3V)
BW	Byte Write Enable		
ZZ	Power Down Input		
LBO	Burst Mode Control		
TCK	JTAG Test Clock		
TMS	JTAG Test Mode Select		
TDI	JTAG Test Data Input		
TDO	JTAG Test Data Output		

K7A163600A
K7A161800A

PRELIMINARY
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119BGA PACKAGE PIN CONFIGURATIONS(TOP VIEW)

K7A161800A(1Mx18)

	1	2	3	4	5	6	7
A	VDDQ	A	A	$\overline{\text{ADSP}}$	A	A	VDDQ
B	NC	A	A	$\overline{\text{ADSC}}$	A	A	NC
C	NC	A	A	VDD	A	A	NC
D	DQb	NC	VSS	NC	VSS	DQPa	NC
E	NC	DQb	VSS	$\overline{\text{CS}}_1$	VSS	NC	DQa
F	VDDQ	NC	VSS	$\overline{\text{OE}}$	VSS	DQa	VDDQ
G	NC	DQb	$\overline{\text{WE}}_b$	$\overline{\text{ADV}}$	VSS	NC	DQa
H	DQb	NC	VSS	$\overline{\text{GW}}$	VSS	DQa	NC
J	VDDQ	VDD	NC	VDD	NC	VDD	VDDQ
K	NC	DQb	VSS	CLK	VSS	NC	DQa
L	DQb	NC	VSS	NC	$\overline{\text{WE}}_a$	DQa	NC
M	VDDQ	DQb	VSS	$\overline{\text{BW}}$	VSS	NC	VDDQ
N	DQb	NC	VSS	A ₁ *	VSS	DQa	NC
P	NC	DQPb	VSS	A ₀ *	VSS	NC	DQa
R	NC	A	$\overline{\text{LBO}}$	VDD	NC	A	NC
T	NC	A	A	NC	A	A	ZZ
U	VDDQ	TMS	TDI	TCK	TDO	NC	VDDQ

Note : * A₀ and A₁ are the two least significant bits(LSB) of the address field and set the internal burst counter if burst is desired.

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SYMBOL	PIN NAME	SYMBOL	PIN NAME
A	Address Inputs	VDD	Power Supply(+3.3V)
A ₀ ,A ₁	Burst Count Address	VSS	Ground
$\overline{\text{ADV}}$	Burst Address Advance	N.C.	No Connect
$\overline{\text{ADSP}}$	Address Status Processor		
$\overline{\text{ADSC}}$	Address Status Controller		
CLK	Clock	DQa	Data Inputs/Outputs
$\overline{\text{CS}}_1$	Chip Select	DQb	Data Inputs/Outputs
$\overline{\text{WE}}_x$	Byte Write Inputs	DQPa-Pb	Data Inputs/Output
(x=a,b)		VDDQ	Output Power Supply (2.5V or 3.3V)
$\overline{\text{OE}}$	Output Enable		
$\overline{\text{GW}}$	Global Write Enable		
$\overline{\text{BW}}$	Byte Write Enable		
ZZ	Power Down Input		
$\overline{\text{LBO}}$	Burst Mode Control		
TCK	JTAG Test Clock		
TMS	JTAG Test Mode Select		
TDI	JTAG Test Data Input		
TDO	JTAG Test Data Output		