

Module Features

- 2x64Kx72 Synchronous, Synchronous Burst
- Flow-Through Architecture
- Linear Burst MODE
- Clock Controlled Registered Bank Enables (E1\,E2\)
- Clock Controlled Byte Write Mode Enable (BWE\)
- Clock Controlled Byte Write Enables (BW1\ - BW8\)
- Clock Controlled Registered Address
- Clock Controlled Registered Global Write (GW\)
- Asynchronous Output Enable (G\)
- Internally self-timed Write
- Gold Lead Finish
- 3.3V $\pm 10\%$ Operation
- Access Speed(s): TKHQV=8.5, 9, 10, 12ns
- Common Data I/O
- High Capacitance (30pf) drive, at rated Access Speed
- Single total array Clock
- Multiple Vcc and Gnd

2x64Kx72, 3.3V

Sync/Sync Burst Flow-Through

The EDI2AG27264VxxD1 is a Synchronous/Synchronous Burst SRAM, 72 position SO-DIMM (144 contacts) Module, organized as 2x64Kx72. The Module contains four(4) Synchronous Burst Ram Devices, packaged in the industry standard JEDEC 14mmx20mm TQFP placed on a Multilayer FR4 Substrate. The module architecture is defined as a Sync/Sync Burst, Flow-Through, with support for linear burst. This module provides High Performance, 2-1-1-1 accesses when used in Burst Mode, and used as a Synchronous Only Mode, provides a high performance cost advantage over BiCMOS asynchronous device architectures.

Synchronous Only operations are performed via strapping ADSC\ Low, and ADSP\ / ADV\ High, which provides for Ultra Fast Accesses in Read Mode while providing for internally self-timed Early Writes.

Synchronous/Synchronous Burst operations are in relation to an externally supplied clock, Registered Address, Registered Global Write, Registered Enables as well as an Asynchronous Output enable. This Module has been defined with full flexibility, which allows individual control of each of the eight bytes, as well as Quad Words in both Read and Write Operations.

Pin Names

DQ0-DQ63	Input/Output Bus
DQP0-DQP7	Parity Bits
A0-A15	Address Bus
E1\, E2\,	Synchronous Bank Enables
BWE\	Byte Write Mode Enable
BW1\-BW8\	Byte Write Enables
Clk	Array Clock
GW\	Synchronous Global write Enable
G\	Asynchronous Output Enable
Vcc	3.3V Power Supply
Vss	Gnd

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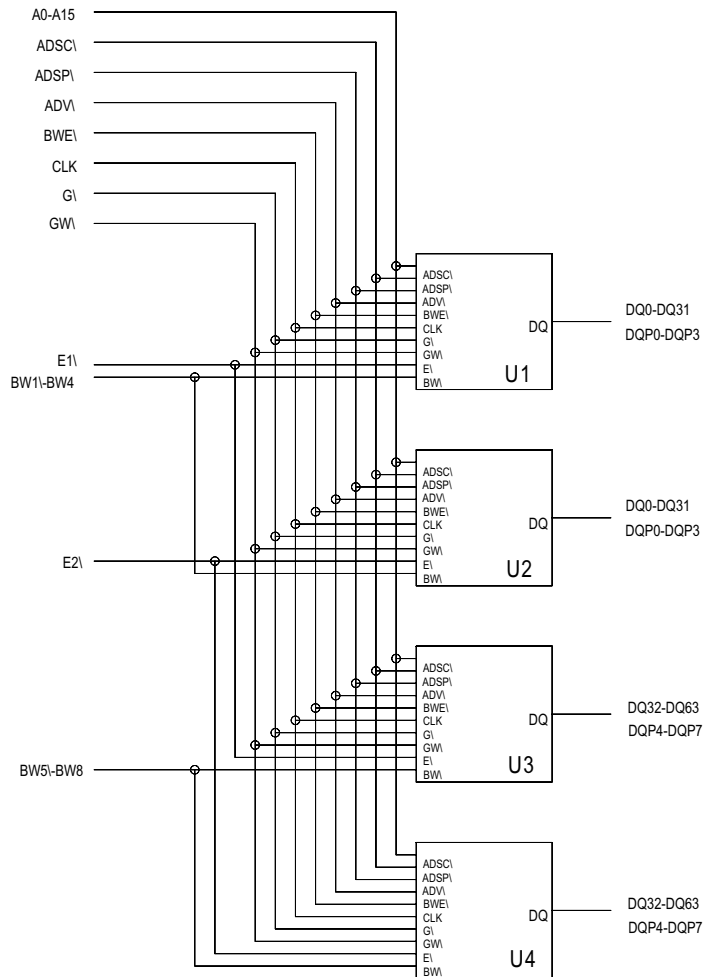
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Pin Configuration

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	VSS	37	DQ0	73	VSS	109	DQ41
2	VSS	38	DQ7	74	VSS	110	DQ46
3	A0	39	DQ1	75	BW4\	111	DQ42
4	RFU	40	DQ6	76	DQP3	112	DQ45
5	RFU	41	DQ2	77	VCC	113	DQ43
6	A1	42	DQ5	78	VCC	114	DQ44
7	A2	43	DQ3	79	DQ24	115	VSS
8	A15	44	DQ4	80	DQ31	116	VSS
9	A14	45	VSS	81	DQ25	117	BW7\
10	A3	46	VSS	82	DQ30	118	DQP6
11	A4	47	BW2\	83	DQ26	119	VCC
12	A13	48	DQP1	84	DQ29	120	VCC
13	A12	49	VCC	85	DQ27	121	DQ48
14	A5	50	VCC	86	DQ28	122	DQ55
15	A6	51	DQ8	87	VSS	123	DQ49
16	A11	52	DQ15	88	VSS	124	DQ54
17	A10	53	DQ9	89	BW5\	125	DQ50
18	A7	54	DQ14	90	DQP4	126	DQ53
19	A8	55	DQ10	91	VCC	127	DQ51
20	A9	56	DQ13	92	VCC	128	DQ52
21	VCC	57	DQ11	93	DQ32	129	VSS
22	VCC	58	DQ12	94	DQ39	130	VSS
23	G\	59	VSS	95	DQ33	131	BW8\
24	RFU	60	VSS	96	DQ38	132	DQP7
25	GW\	61	BW3\	97	DQ34	133	VCC
26	ADV\	62	DQP2	98	DQ37	134	VCC
27	ADSP\	63	VCC	99	DQ35	135	DQ56
28	ADSC\	64	VCC	100	DQ36	136	DQ63
29	E1\	65	DQ16	101	VSS	137	DQ57
30	CLK	66	DQ23	102	VSS	138	DQ62
31	E2\	67	DQ17	103	BW6\	139	DQ58
32	BWE\	68	DQ22	104	DQP5	140	DQ61
33	BW\	69	DQ18	105	VCC	141	DQ59
34	DQP0	70	DQ21	106	VCC	142	DQ60
35	VCC	71	DQ19	107	DQ40	143	VSS
36	VCC	72	DQ20	108	DQ47	144	VSS

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Small Outline DIMM

Functional Block Diagram



Pin Descriptions

DIMM Pins	Symbol	Type	Description
3, 6, 7, 10, 11 14, 15, 18, 19, 20 17, 16, 13, 12, 9, 8	A0-A15	Input Synchronous	Addresses: These inputs are registered and must meet the setup and hold times around the rising edge of CLK. The burst counter generates internal addresses associated with A0 and A1, during burst and wait cycle.
33, 47, 61 75, 89, 103 117, 131	BW1\, BW2\ BW3\, BW4\ BW5\, BW6\ BW7\, BW8\	Input Synchronous	Byte Write: A byte write is LOW for a WRITE cycle and HIGH for a READ cycle. BW0\ controls DQ0-7 and DQP0, BW1\ controls DQ8-15 and DQP1. BW2\ controls DQ16-23 and DQP2. BW3\ controls DQ24-31 and DQP3. BW4\ controls DQ32-39 and DQP4. BW5\ controls DQ40-47 and DQP5. BW6\ controls DQ48-55 and DQP6. BW7\ controls DQ56-64 and DQP7.
32	BWE\	Input Synchronous	Write Enable: This active LOW input gates byte write operations and must meet the setup and hold times around the rising edge of CLK.
25	GM\	Input Synchronous	Global Write: This active LOW input allows a full 72-bit WRITE to occur independent of the BWE\ and BWx\ lines and must meet the setup and hold times around the rising edge of CLK.
30	CLK	Input Synchronous	Clock: This signal registers the addresses, data, chip enables, write control and burst control inputs on its rising edge. All synchronous inputs must meet setup and hold times around the clock's rising edge.
29, 31	E1\, E2\	Input	Bank Enables: These active LOW inputs are used to enable each individual Synchronous bank and to gate ADSPL.
23	G\	Input	Output Enable: This active LOW asynchronous input enables the data output drivers.
26	ADV\	Input Synchronous	Address Status Processor: This active LOW input is used to control the internal burst counter. A HIGH on this pin generates wait cycle (no address advance).
27	ADSPL Synchronous	Input	Address Status Processor: This active LOW input, along with E1\ and E2\ being LOW, causes a new external address to be registered and a READ cycle is initiated using the new address.
28	ADSC\ Synchronous	Input	Address Status Controller: This active LOW input causes device to be de-selected or selected along with new external address to be registered. A READ or WRITE cycle is initiated depending upon write control inputs.
Various	DQ0-63	Input/Output	Data Inputs/Outputs: First byte is DQ0-7, second byte is DQ8-15, third byte is DQ16-23, fourth byte is DQ24-31, fifth byte is DQ32-39, sixth byte is DQ40-47, seventh byte is DQ48-55 and the eighth byte is DQ56-64.
34, 48, 62 76, 90, 104 118, 132	DQP0-7	Input/Output	Parity Inputs/Outputs: DQP0 is parity bit for DQ0-7. DQP1 is parity bit for DQ8-15. DQP2 is parity bit for DQ16-23. DQP3 is parity bit for DQ24-31. DQP4 is parity bit for DQ32-39. DQP5 is parity bit for DQ40-47. DQP6 is parity bit for DQ48-55. DQP7 is parity bit for DQ56-64 and DQP7. In order to use the device configured as a 128Kx64, the parity bits need to be tied to Vss through a 10K ohm resistor.
Various	Vcc	Supply	Core power supply: +3.3V -5%/+10%
Various	Vss	Ground	Ground

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Synchronous Burst - Truth Table

Operation	E1\	E2\	ADSP\	ADSC\	ADV\	GW\	G\	CLK	DQ	Addr. Used
Deselected Cycle, Power Down; Bank 1	H	X	X	L	X	X	X	L-H	High-Z	None
Deselected Cycle, Power Down; Bank 2	X	H	X	L	X	X	X	L-H	High-Z	None
Read Cycle, Begin Burst; Bank 1	L	H	L	X	X	X	L	L-H	Q	External
Read Cycle, Begin Burst; Bank 1	L	H	L	X	X	X	H	L-H	High-Z	External
Read Cycle, Begin Burst; Bank 2	H	L	L	X	X	X	L	L-H	Q	External
Read Cycle, Begin Burst; Bank 2	H	L	L	X	X	X	H	L-H	High-Z	External
Write Cycle, Begin Burst; Bank 1	L	H	H	L	X	L	X	L-H	D	External
Write Cycle, Begin Burst; Bank 2	H	L	H	L	X	L	X	L-H	D	External
Read Cycle, Begin Burst; Bank 1	L	H	H	L	X	H	L	L-H	Q	External
Read Cycle, Begin Burst; Bank 1	L	H	H	L	X	H	H	L-H	High-Z	External
Read Cycle, Begin Burst; Bank 2	H	L	H	L	X	H	L	L-H	Q	External
Read Cycle, Begin Burst; Bank 2	H	L	H	L	X	H	H	L-H	High-Z	External
Read Cycle, Continue Burst; Bank 1	X	H	X	H	L	H	L	L-H	Q	Next
Read Cycle, Continue Burst; Bank 1	X	H	X	H	L	H	H	L-H	High-Z	Next
Read Cycle, Continue Burst; Bank 2	H	X	X	H	L	H	L	L-H	Q	Next
Read Cycle, Continue Burst; Bank 2	H	X	X	H	L	H	H	L-H	High-Z	Next
Read Cycle, Continue Burst; Bank 1	H	H	X	H	L	H	L	L-H	Q	Next
Read Cycle, Continue Burst; Bank 1	H	H	X	H	L	H	H	L-H	High-Z	Next
Read Cycle, Continue Burst; Bank 2	H	H	X	H	L	H	L	L-H	Q	Next
Read Cycle, Continue Burst; Bank 2	H	H	X	H	L	H	H	L-H	High-Z	Next
Write Cycle, Continue Burst; Bank 1	X	H	H	H	L	L	X	L-H	D	Next
Write Cycle, Continue Burst; Bank 1	H	H	X	H	L	L	X	L-H	D	Next
Write Cycle, Continue Burst; Bank 2	H	X	H	H	L	L	X	L-H	D	Next
Write Cycle, Continue Burst; Bank 2	H	H	X	H	L	L	X	L-H	D	Next
Read Cycle, Suspend Burst; Bank 1	X	H	H	H	H	H	L	L-H	Q	Current
Read Cycle, Suspend Burst; Bank 1	X	H	H	H	H	H	H	L-H	High-Z	Current
Read Cycle, Suspend Burst; Bank 2	H	X	H	H	H	H	L	L-H	Q	Current
Read Cycle, Suspend Burst; Bank 2	H	X	H	H	H	H	H	L-H	High-Z	Current
Read Cycle, Suspend Burst; Bank 1	H	H	X	H	H	H	L	L-H	Q	Current
Read Cycle, Suspend Burst; Bank 1	H	H	X	H	H	H	H	L-H	High-Z	Current
Read Cycle, Suspend Burst; Bank 2	H	H	X	H	H	H	L	L-H	Q	Current
Read Cycle, Suspend Burst; Bank 2	H	H	X	H	H	H	H	L-H	High-Z	Current
Write Cycle, Suspend Burst; Bank 1	X	H	H	H	H	L	X	L-H	D	Current
Write Cycle, Suspend Burst; Bank 1	H	H	X	H	H	L	X	L-H	D	Current
Write Cycle, Suspend Burst; Bank 2	H	X	H	H	H	L	X	L-H	D	Current
Write Cycle, Suspend Burst; Bank 2	H	H	X	H	H	L	X	L-H	D	Current

*All Truth Table Functions Repeat for Bank 3 (E3\) and Bank 4 (E4\)

Synchronous Only - Truth Table

Operation	E1\	E2\	GW\	G\	ZZ	CLK	DQ
Synchronous Write-Bank 1	L	H	L	H	L		High-Z ↑
Synchronous Read-Bank 1	L	H	H	L	L		↑
Synchronous Write-Bank 2	H	L	L	H	L		High-Z ↑
Synchronous Read-Bank 2	H	L	H	L	L		↑

Absolute Maximum Ratings*

Voltage on Vcc Relative to Vss	-0.5V to +4.6V
Vin	-0.5V to Vcc +0.5V
Storage Temperature	-55°C to +125°C
Operating Temperature (Commercial)	0°C to +70°C
Operating Temperature (Industrial)	-40°C to +85°C
Short Circuit Output Current	10 mA

*Stress greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions greater than those indicated in operational sections of this specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

AC Test Conditions

Input Pulse Levels	Vss to 3.0V
Input and Output Timing Ref.	1.25V
Output Test equivalencies	

AC Test Load

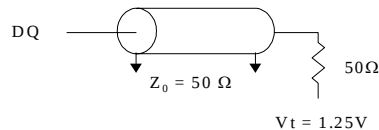


Fig. 1 Output Load Equivalent

Recommended DC Operating Conditions

Parameter	Sym	Min	Typ	Max	Units
Supply Voltage	VCC	3.14	3.3	3.6	V
Supply Voltage	VSS	0.0	0.0	0.0	V
Input High	VIH	1.1	3.0	VCC+0.3	V
Input Low	VIL	-0.3	0.0	0.3	V
Input Leakage	ILi	-2	1	2	μA
Output Leakage	ILO	-2	1	2	μA

DC Electrical Characteristics - Read Cycle

Description	SYM	Typ	8.5	9	10	12	Units
Power Supply Current	Icc1	1.55	1.2	1.1	1.1	1.0	A
Power Supply Current	Icc	700	950	800	750	700	A
Device Selected, No Operation							
CMOS Standby	Icc3	200	300	300	300	300	mA
Clock Running-Deselect	IccK	500	750	750	750	750	mA

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Burst Address Table (MODE=NC/Vcc)

First Address (external)	Second Address (internal)	Third Address (internal)	Fourth Address (internal)
A..A00	A..A01	A..A10	A..A11
A..A01	A..A00	A..A11	A..A10
A..A10	A..A11	A..A00	A..A01
A..A11	A..A10	A..A01	A..A00

Burst Address Table (MODE=GND)

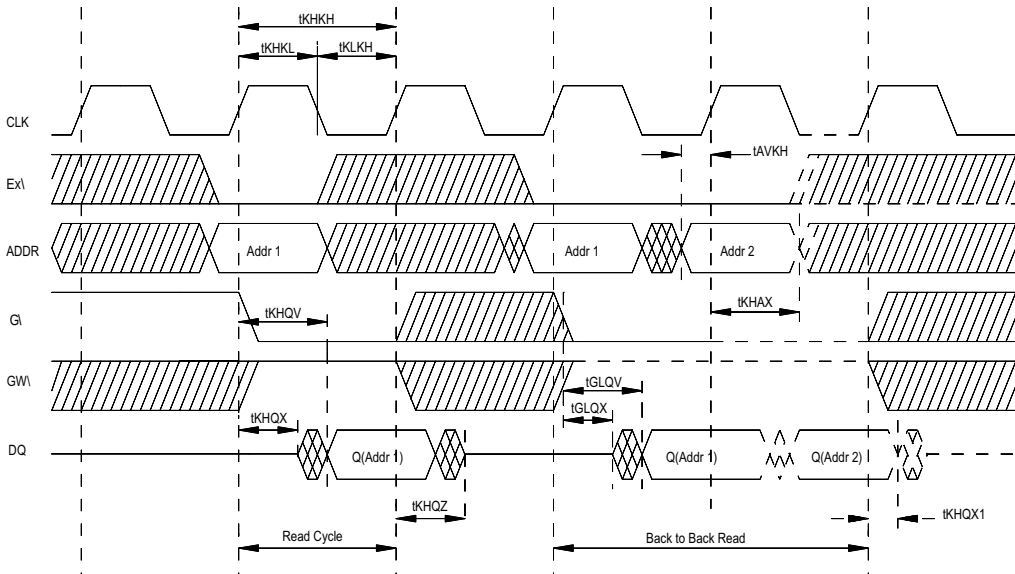
First Address (external)	Second Address (internal)	Third Address (internal)	Fourth Address (internal)
A..A00	A..A01	A..A10	A..A11
A..A01	A..A10	A..A11	A..A00
A..A10	A..A11	A..A00	A..A01
A..A11	A..A00	A..A01	A..A10

Read Cycle Timing Parameters

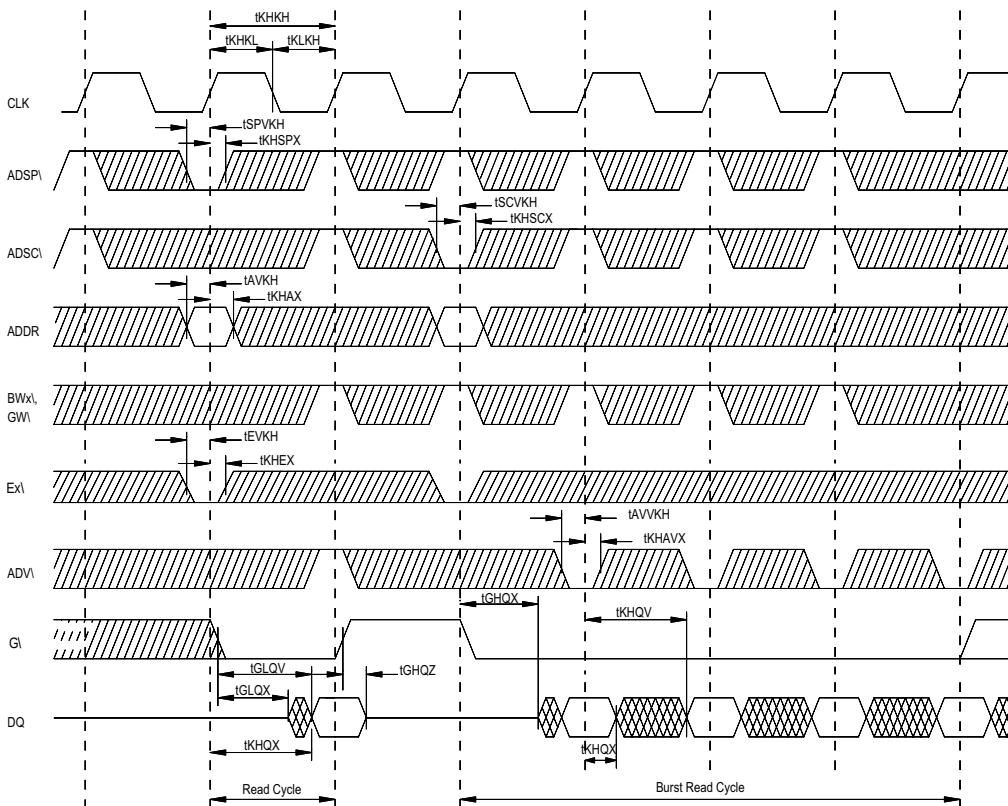
Description	Sym	8.5ns		9ns		10ns		12ns		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Clock Cycle Time	tKhKh	*	*	10		12		15		ns
Clock High Time	tKHKL	*	*	4		5		5		ns
Clock Low Time	tKLKH	*	*	4		5		5		ns
Clock to Output Valid	tKHQV	*	*		9		10		12	ns
Clock to Output Invalid	tKHQX1	*	*	3		3		3		ns
Clock to Output Low-Z	tKHQX	*	*	2		2		2		ns
Output Enable to Output Valid	tGLQV	*	*		4		4		5	ns
Output Enable to Output Low-Z	tGLQX	*	*	0		0		0		ns
Output Enable to Output High-Z	tGHQZ	*	*		4		4		5	ns
Address Setup	tAVKH	*	*	2.5		2.5		2.5		ns
Bank Enable Setup	tEVKH	*	*	2.5		2.5		2.5		ns
Address Hold	tKHAX	*	*	1.0		1.0		1.0		ns
Bank Enable Hold	tKHEX	*	*	1.0		1.0		1.0		ns

*TBD

Synchronous Only Read Cycle



Sync-Burst Read Cycle

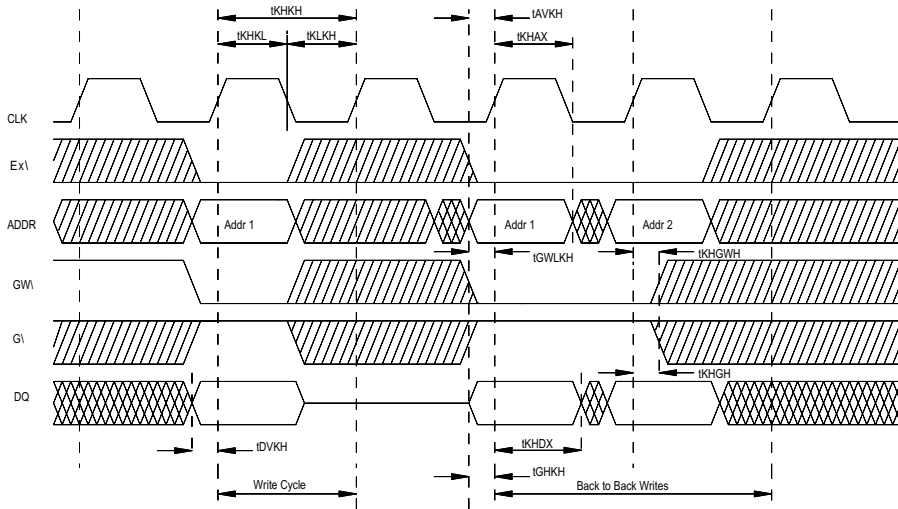


Write Cycle Timing Parameters

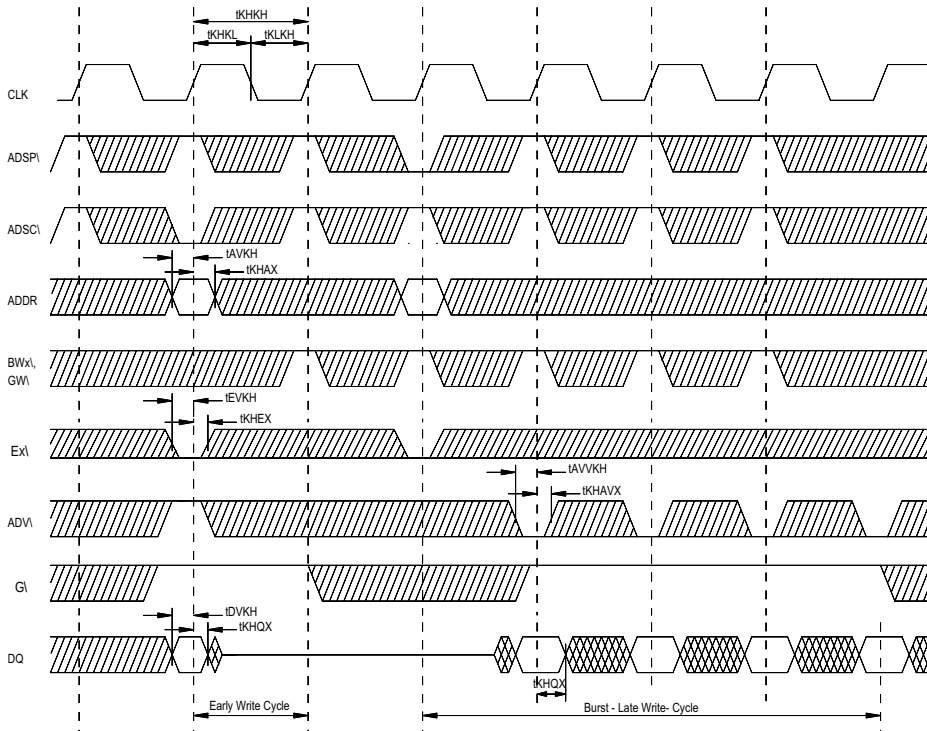
Description	Sym	8.5ns		9ns		10ns		12ns		Units
		Min	Max	Min	Max	Min	Max	Min	Max	
Clock Cycle Time	tKHKH			10		12		15		ns
Clock High Time	tKHKL			4		5		5		ns
Clock Low Time	tKCLKH			4		5		5		ns
Address Setup	tAVKH			2.5		2.5		2.5		ns
Address Hold	tKHAX			1.0		1.0		1.0		ns
Bank Enable Setup	tEVKH			2.5		2.5		2.5		ns
Bank Enable Hold	tKHEX			1.0		1.0		1.0		ns
Global Write Enable Setup	tWVKH			2.5		2.5		2.5		ns
Global Write Enable Hold	tKH WX			1.0		1.0		1.0		ns
Data Setup	tDVKH			2.5		2.5		2.5		ns
Data Hold	tKHDX			1.0		1.0		1.0		ns

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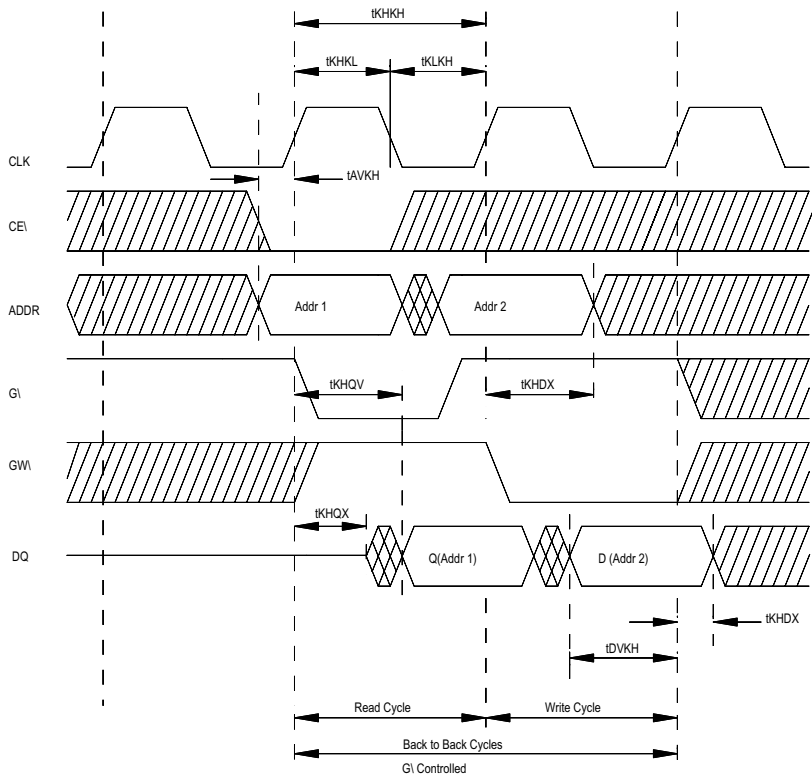
Sync (Non-Burst) Write Cycle



SyncBurst Write Cycle



Sync (Non-burst) Read/Write Cycle



Ordering Information

Part Number	Organization	Voltage	Speed (ns)	Package
EDI22AG27264V85D1	2x64Kx72	3.3	8.5	144 SO-DIMM
EDI22AG27264V9D1	2x64Kx72	3.3	9	144 SO-DIMM
EDI22AG27264V10D1	2x64Kx72	3.3	10	144 SO-DIMM
EDI22AG27264V12D1	2x64Kx72	3.3	12	144 SO-DIMM

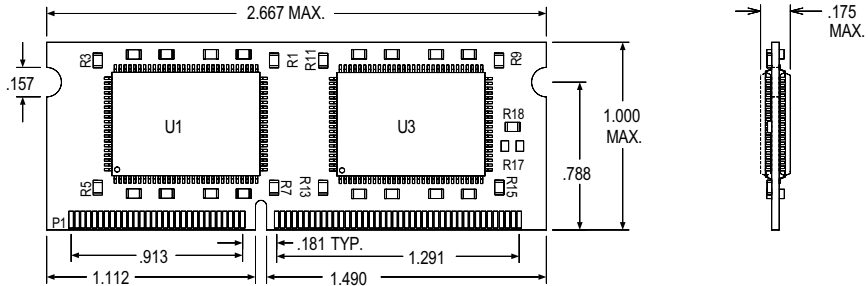
*Consult Factory for Availability

Package Description

Package No. 409

144 Lead

SO-DIMM



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