



64MB- 8M x 64 SDRAM UNBUFFERED

FEATURES

- PC100 and PC133 compatible
- Burst Mode Operation
- Auto and Self Refresh capability
- LVTTTL compatible inputs and outputs
- Serial Presence Detect with EEPROM
- Fully synchronous: All signals are registered on the positive edge of the system clock
- Programmable Burst Lengths: 1, 2, 4, 8 or Full Page
- 3.3V ± 0.3v Power Supply
- 168 pin DIMM JEDEC

DESCRIPTION

The WED3DG649V is a 8M x 64 synchronous DRAM module which consists of four 8M x 16 SDRAM components in TSOP II package and one 2K EEPROM in an 8 pin TSSOP package for Serial Presence Detect which are mounted on a 168 pin DIMM multilayer FR4 Substrate.

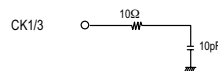
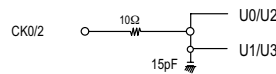
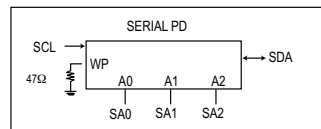
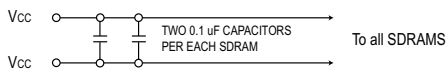
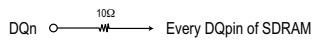
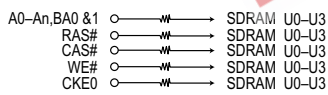
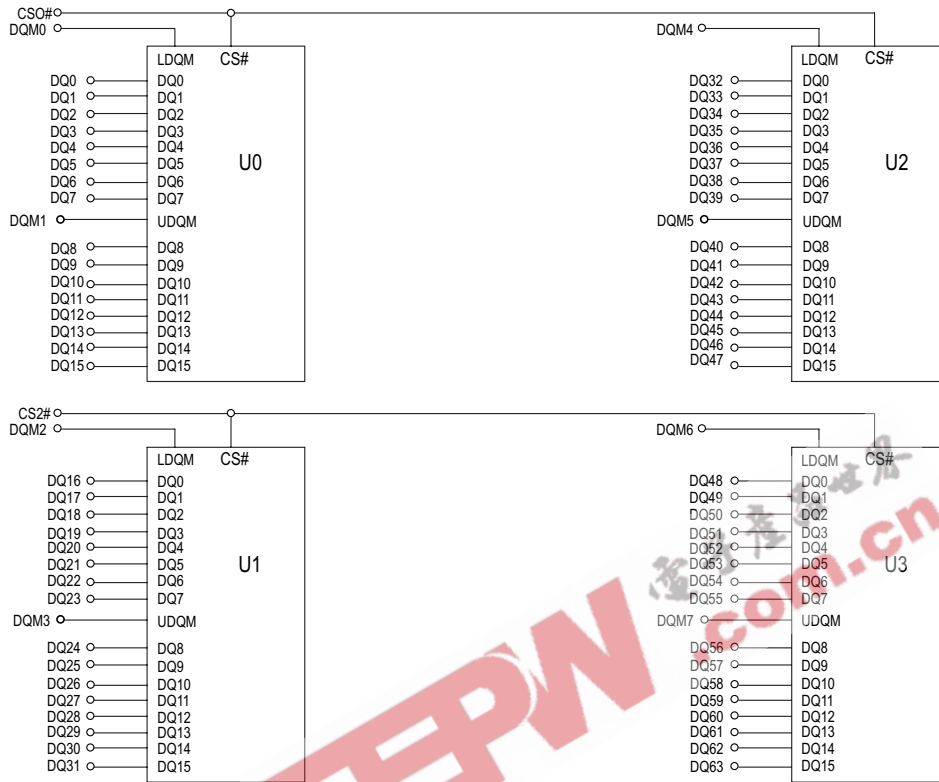
*This product is under development, is not qualified or characterized and is subject to change or cancellation without notice.

PIN CONFIGURATIONS (FRONT SIDE/BACK SIDE)												PIN NAMES	
Pin	Front	Pin	Front	Pin	Front	Pin	Back	Pin	Back	Pin	Back		
1	V _{SS}	29	DQM1	57	DQ18	85	V _{SS}	113	DQM5	141	DQ50	A0 – A11	Address input (Multiplexed)
2	DQ0	30	CS0#	58	DQ19	86	DQ32	114	CS1#	142	DQ51	BA0-1	Select Bank
3	DQ1	31	DNU	59	V _{CC}	87	DQ33	115	RAS#	143	V _{CC}	DQ0-63	Data Input/Output
4	DQ2	32	V _{SS}	60	DQ20	88	DQ34	116	V _{SS}	144	DQ52	CK0,CK2	Clock input
5	DQ3	33	A0	61	NC	89	DQ35	117	A1	145	NC	CKE0	Clock Enable input
6	V _{CC}	34	A2	62	NC	90	V _{CC}	118	A3	146	NC	CSE0	Chip select Input
7	DQ4	35	A4	63	NC	91	DQ36	119	A5	147	DNU	RAS#	Row Address Strobe
8	DQ5	36	A6	64	V _{SS}	92	DQ37	120	A7	148	V _{SS}	CAS#	Column Address Strobe
9	DQ6	37	A8	65	DQ21	93	DQ38	121	A9	149	DQ53	WE#	Write Enable
10	DQ7	38	A10/AP	66	DQ22	94	DQ39	122	BA0	150	DQ54	DQM0-7#	DQM
11	DQ8	39	BA1	67	DQ23	95	DQ40	123	A11	151	DQ55	V _{CC}	Power Supply (3.3V)
12	V _{SS}	40	V _{CC}	68	V _{SS}	96	V _{SS}	124	V _{CC}	152	V _{SS}	V _{SS}	Ground
13	DQ9	41	V _{CC}	69	DQ24	97	DQ41	125	NC	153	DQ56	SDA	Serial data I/O
14	DQ10	42	CK0	70	DQ25	98	DQ42	126	NC	154	DQ57	SCL	Serial clock
15	DQ11	43	V _{SS}	71	DQ26	99	DQ43	127	V _{SS}	155	DQ58	DNU	Do not use
16	DQ12	44	DNU	72	DQ27	100	DQ44	128	CKE0	156	DQ59	NC	No Connect
17	DQ13	45	CS2#	73	V _{CC}	101	DQ45	129	NC	157	V _{CC}		
18	V _{CC}	46	DQM2	74	DQ28	102	V _{CC}	130	DQM6	158	DQ60		
19	DQ14	47	DQM3	75	DQ29	103	DQ46	131	DQM7	159	DQ61		
20	DQ15	48	DNU	76	DQ30	104	DQ47	132	NC	160	DQ62		
21	NC	49	V _{CC}	77	DQ31	105	NC	133	V _{CC}	161	DQ63		
22	NC	50	NC	78	V _{SS}	106	NC	134	NC	162	V _{SS}		
23	V _{SS}	51	NC	79	CK2	107	V _{SS}	135	NC	163	NC		
24	NC	52	NC	80	NC	108	NC	136	NC	164	NC		
25	NC	53	NC	81	*WP	109	NC	137	NC	165	**SA0		
26	V _{CC}	54	V _{SS}	82	**SDA	110	V _{CC}	138	V _{SS}	166	**SA1		
27	WE#	55	DQ16	83	**SCL	111	CAS#	139	DQ48	167	**SA2		
28	DQM0	56	DQ17	84	V _{CC}	112	DQM4	140	DQ49	168	V _{CC}		

* WP (write protect) option available on pin 81, see ordering information on page 5.
 ** These pins should be NC in the system which does not support SPD.



FUNCTIONAL BLOCK DIAGRAM





Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Voltage on any pin relative to Vss	V _{IN} , V _{OUT}	-1.0 ~ 4.6	V
Voltage on Vcc supply relative to Vss	V _{CC} , V _{CCQ}	-1.0 ~ 4.6	V
Storage Temperature	T _{STG}	-55 ~ +150	°C
Power Dissipation	P _D	4	W
Short Circuit Current	I _{OS}	50	mA

Note: Permanent device damage may occur if "ABSOLUTE MAXIMUM RATINGS" are exceeded.
 Functional operation should be restricted to recommended operating condition.
 Exposure to higher than recommended voltage for extended periods of time could affect device reliability.

RECOMMENDED DC OPERATING CONDITIONS

(Voltage Referenced to: V_{SS} = 0V, 0°C ≤ T_A ≤ 70°C)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	V _{CC}	3.0	3.3	3.6	V	
Input High Voltage	V _{IH}	2.0	3.0	V _{CCQ} +0.3	V	1
Input Low Voltage	V _{IL}	-0.3	—	0.8	V	2
Output High Voltage	V _{OH}	2.4	—	—	V	I _{OH} = -2mA
Output Low Voltage	V _{OL}	—	—	0.4	V	I _{OL} = -2mA
Input Leakage Current	I _{LI}	-10	—	10	A	3

Note: 1. V_{IH} (max)= 5.6V AC. The overshoot voltage duration is ≤ 3ns.
 2. V_{IL} (min)= -2.0V AC. The undershoot voltage duration is ≤ 3ns.
 3. Any input 0V ≤ V_{IN} ≤ V_{CCQ}
 Input leakage currents include Hi-Z output leakage for all bi-directional buffers with Tri-State outputs.

Capacitance

(T_A = 23°C, f = 1MHz, V_{CC} = 3.3V, V_{REF}=1.4V ± 200mV)

Parameter	Symbol	Min	Max	Unit
Input Capacitance (A0-A12)	C _{IN1}	-	25	pF
Input Capacitance (RAS#,CAS#,WE#)	C _{IN2}	-	25	pF
Input Capacitance (CKE0)	C _{IN3}	-	25	pF
Input Capacitance (CK0,CK2)	C _{IN4}	-	13	pF
Input Capacitance (CS0#,CS2#)	C _{IN5}	-	15	pF
Input Capacitance (DQM0-DQM7)	C _{IN6}	-	10	pF
Input Capacitance (BA0-BA1)	C _{IN7}	-	25	pF
Data input/output capacitance (DQ0-DQ63)	C _{OUT}	-	12	pF



OPERATING CURRENT CHARACTERISTICS
($V_{CC} = 3.3V, 0^{\circ}C \leq T_A \leq 70^{\circ}C$)

Parameters	Symbol	Conditions	Versions		Units	Note
			133	100		
Operating Current (One bank active)	I _{CC1}	Burst Length = 1 $t_{RC} \geq t_{RC(min)}$ $I_{OL} = 0mA$	520	440	mA	1
Precharge Standby Current in Power Down Mode	I _{CC2P}	$CKE \leq V_{IL(max)}, t_{CC} = 10ns$	10		mA	
	I _{CC2PS}	$CKE \& CK \leq V_{IL(max)}, t_{CC} = \infty$	10		mA	
Precharge Standby Current in Non-Power Down Mode	I _{CC2N}	$CKE \geq V_{IH(min)}, CS \geq V_{IH(min)}, t_{CC} = 10ns$ Input signals are charged one time during 20	80		mA	
	I _{CC2NS}	$CKE \geq V_{IH(min)}, CK \leq V_{IL(max)}, t_{CC} = \infty$ Input signals are stable	40		mA	
Active standby current in power- down mode	I _{CC3P}	$CKE \geq V_{IL(max)}, t_{CC} = 10ns$	20		mA	
	I _{CC3PS}	$CKE \& CK \leq V_{IL(max)}, t_{CC} = \infty$	20			
Active standby in current non power-down mode	I _{CC3N}	$CKE \geq V_{IH(min)}, CS \geq V_{IH(min)}, t_{CC} = 10ns$ Input signals are charged one time during 20ns	120		mA	
	I _{CC3NS}	$CKE \geq V_{IH(min)}, CK \leq V_{IL(max)}, t_{CC} = \infty$ input signals are stable	100		mA	
Operating current (Burst mode)	I _{CC4}	$I_O = mA$ Page burst 4 Banks activated $t_{CCD} = 2CK$	600	520	mA	1
Refresh current	I _{CC5}	$t_{RC} \geq t_{RC(min)}$	880	760	mA	2
Self refresh current	I _{CC6}	$CKE \leq 0.2V$	10		mA	

Notes: 1. Measured with outputs open.
2. Refresh period is 64ms.
3. Unless otherwise noticed, input swing level is CMOS ($V_{IH}/V_{IL} = V_{CC}/V_{SS0}$)



ORDERING INFORMATION

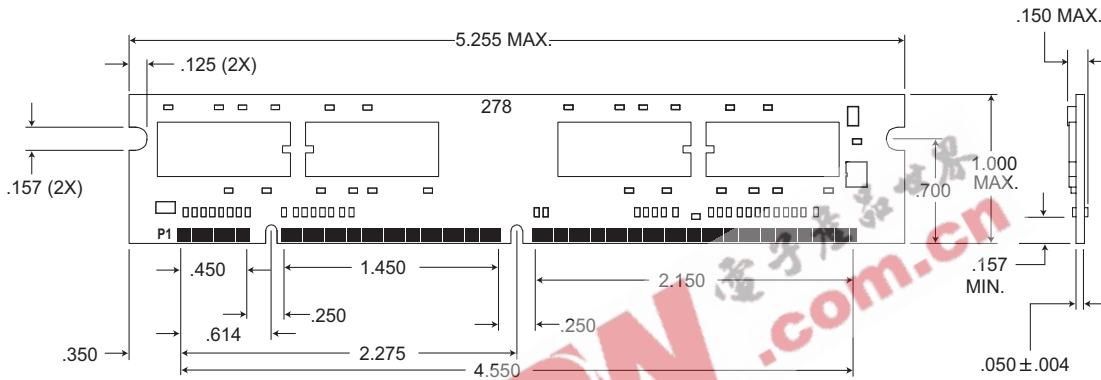
Part Number	Speed	CAS Latency
WED3DG649V10D2	100MHz	CL=2
WED3DG649V7D2	133MHz	CL=2
WED3DG649V75D2	133MHz	CL=3

Note: Modules are available in industrial temperature - 40°C ≤ T_A ≤ 85°C. Add an "I" to the end of the part number.

Part Number	Speed	CAS Latency
WED3DG639V10D2	100MHz	CL=2
WED3DG639V7D2	133MHz	CL=2
WED3DG639V75D2	133MHz	CL=3

Note: Available with WP (write protect) on pin 81.

PACKAGE DIMENSIONS



ALL DIMENSIONS ARE IN INCHES

White Electronic Designs Corp. reserves the right to change products or specifications without notice.