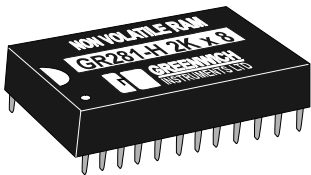


**GR281-H (2K x 8)  
NON-VOLATILE RAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Min	Max	Units
Vdd	-0.3	7.0	Volts
V <sub>IO</sub>	-0.3	Vdd +0.3	Volts
Temp	-40	+85	deg. C

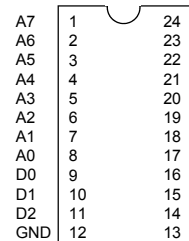
**OPERATING CONDITIONS**

Symbol	Min	Typ	Max	Unit
Vdd	4.75	5.0	5.5	Volts
V <sub>in</sub> (1)	2.2		Vdd+0.3	Volts
V <sub>in</sub> (0)	-0.3		0.8	Volts
I <sub>in</sub> (CE)			1.0	LSTTL Load
I <sub>in</sub> (any other pin)	-1.0		+1.0	µA
V <sub>out</sub> (1)(I <sub>out</sub> = -1mA)	2.4			Volts
V <sub>out</sub> (0)(I <sub>out</sub> = +2mA)			0.4	Volts
I <sub>dd</sub> (Active)		25		mA
I <sub>dd</sub> (Deselected)		1.0		mA
T <sub>cycle</sub>			70	nS
C <sub>in</sub> (any pin)			10	pF

**OPERATING MODE**

CE	OE	WR	MODE	OUTPUT	I <sub>dd</sub>
H	X	X	Unsel.	Hi-Z	Standby
L	H	H	Unsel.	Hi-Z	Active
L	L	H	Read	Dout	Active
L	X	L	Write	Din	Active

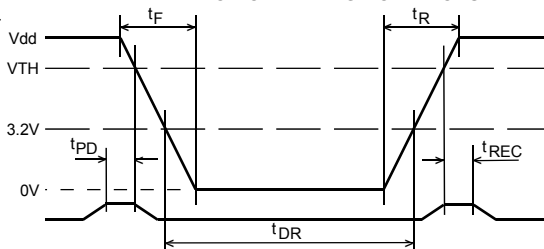
**PIN CONNECTIONS**



**PIN DESIGNATIONS**

Pin	Function
A0-A10	Address I/P's
D0-D7	Data in/out
OE	Output Enable
CE	Chip Enable
WR	Write Input
Vdd	+5Volt Power
GND	Ground

**DATA RETENTION OPERATING CONDITIONS**



Symbol	Parameter	Min	Typ	Max	Units
Vdd	Operating supply voltage	4.75	5.0	5.50	Volts
VTH	Data retention voltage		4.5		Volts
t <sub>F</sub>	Vdd slew to 0V		15		µS
t <sub>R</sub>	Vdd slew 0V to 5.0V		15		µS
t <sub>REC</sub>	CE to O/P valid from power up			15	µS
t <sub>DR</sub>	Data retention time		10		Years
t <sub>PD</sub>	CE at Vin(1) before power down	0			µS

The GR281-H is an industrial temperature range, 2048 word by 8 bits (2K x 8) non-volatile CMOS Static Ram, fabricated from advanced silicon gate CMOS technology and a high reliability lithium power cell. The pin-out of the GR281-H conforms to the JEDEC standards and is fully compatible with normal static RAM.

The power down circuit is fully automatic and is referenced at 4.5 volts. At this point the GR281-H is write protected by an internal inhibit function for Data Protection and the memory contents are retained by the lithium power source.

Power down is very fast, this being essential for data integrity, taking a maximum of 15 µS (15 microseconds) to power down from 5 volts to 0 volts. This is much faster than system power failure conditions. Therefore there are no special conditions required when installing the GR281-H.

The GR281-H can, without external power, retain data almost indefinitely. The limiting factor will be the shelf life of the lithium cell, which is typically ten years. It is possible that this figure may be extended in view of the extremely light duty imposed upon the cell.

**APPLICATION**

When powered down, the GR881-H is transportable and data can be moved from system to system, this makes it ideal for program development, data collection in data loggers, program changes in process control, automation and robotics and user definable lookup tables, etc.

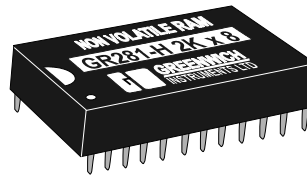
**DISPOSAL INSTRUCTIONS**

Do not dispose of non-volatile memory devices by incineration or crushing. Devices may be returned carriage paid to Greenwich Instruments Ltd., for disposal.

UK

Greenwich Instruments Ltd.,  
Meridian House, Park Road,  
Swanley, Kent. BR8 8AH  
Tele: 08700 505 404  
Fax: 08700 505 405

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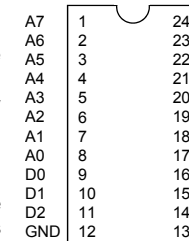
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**OPERATING MODE**

CE	OE	WR	MODE	OUTPUT	I <sub>dd</sub>
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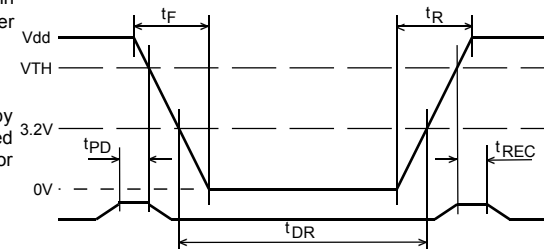
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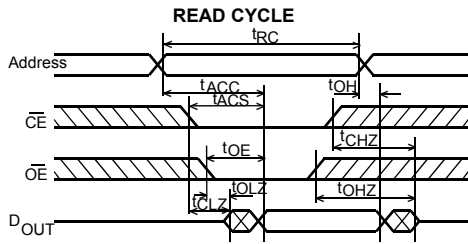
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UK

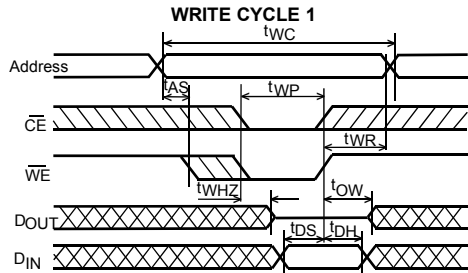
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**GR281- H (2K x 8)  
NON-VOLATILE RAM**

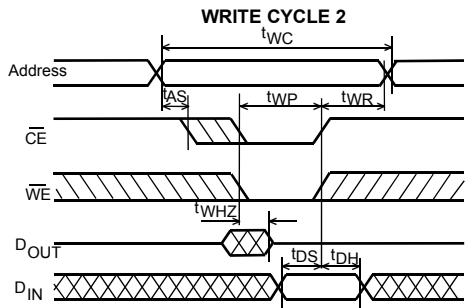


**TIMING (nS-nano seconds)**

Symbol	Parameter	70nS	
		Min	Max
tRC	Read cycle time	70	
tACC	Access time		70
tACS	CE to output valid		70
tOE	OE to output valid		35
tCLZ	CE to output active	10	
tOLZ	OE to output active	10	
tOH	Output hold time	10	
tCHZ	CE to output disable		25
tOHZ	OE to output disable		25



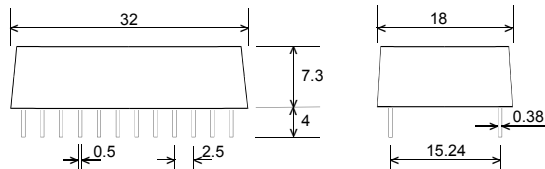
Symbol	Parameter	70nS	
		Min	Max
tWC	Write cycle time	70	
tWP	Write pulse width	50	
tAS	Address setup time	0	
tWR	Write recovery time	0	
tWHZ	WR to output disable		20
tOW	Output active from WR	5	
tDS	Data setup time	30	
tDH	Data HOLD TIME	10	



- Notes**
1. WE must be high during address transitions.
  2. A Write occurs during the overlap of active CE and a low WE.
  3. WE is high for a read cycle.

**REPLACES**  
2016., 6116., 8416., 5517., 4016., 2128., 5128., PD446., 8128., 4802., 5116., etc.

**DIMENSIONS (mm)**

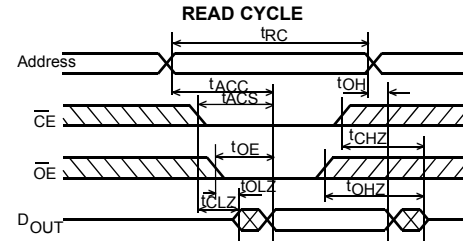


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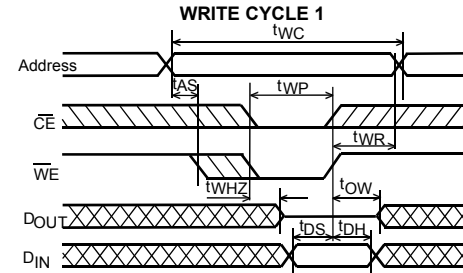
ISSUE 4 OCT 2005

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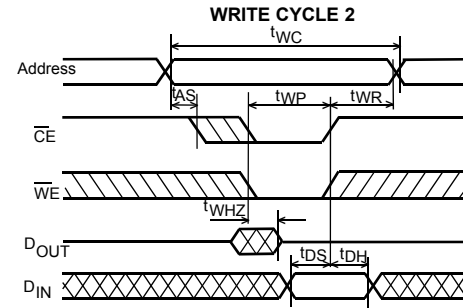


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tOLZ	OE to output active	10	
tOH	Output hold time	10	
tCHZ	CE to output disable		25
tOHZ	OE to output disable		25



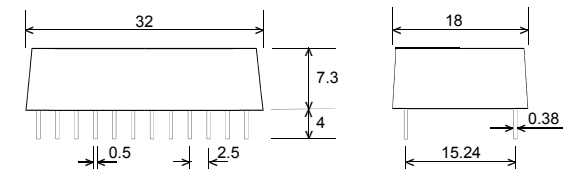
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