

# GR281

## DESCRIPTION

The GR281 is a 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 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 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  $\mu$ S (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. The GR281 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.

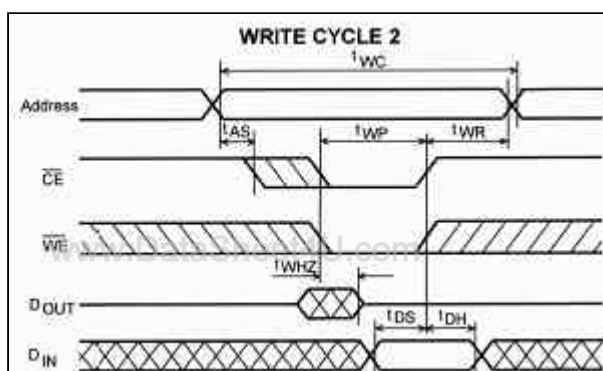
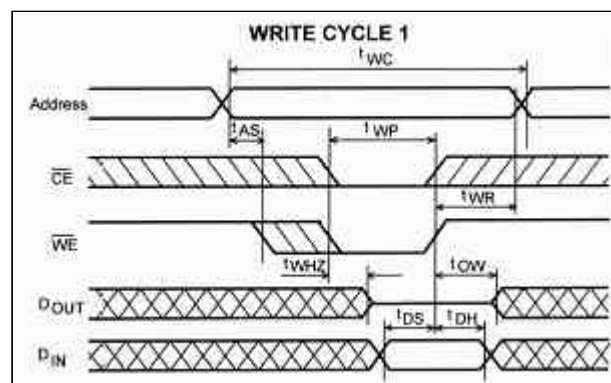
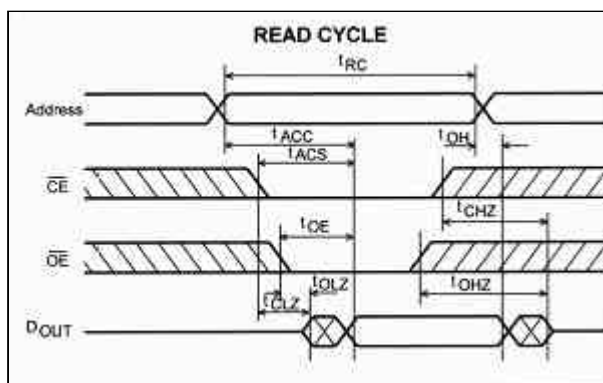
## TECHNICAL DATA

ABSOLUTE MAXIMUM RATINGS			
Symbol	Min	Max	Units
Vdd	-0.3	7.0	Volts
V <sub>io</sub>	-0.3	Vdd + 0.3	Volts
Temp	-20	+70	deg. C

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	
A7	1	24	Vdd
A6	2	23	A8
A5	3	22	A9
A4	4	21	WR
A3	5	20	OE
A2	6	19	A10
A1	7	18	CE
A0	8	17	D7
D0	9	16	D6
D1	10	15	D5
D2	11	14	D4
GND	12	13	D3

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	$\mu$ A
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>			100	nS
C <sub>in</sub> (any pin)			10	pF



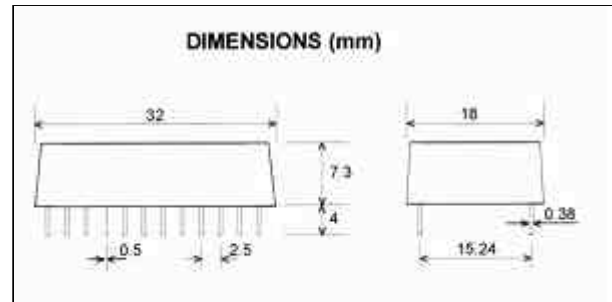
DATA RETENTION OPERATING CONDITIONS					
Symbol	Parameter	Min	Typ	Max	Units
Vdd	Operating supply voltage	4.75	5.0	5.50	Volts
VTH	Data retention voltage		4.5		Volts
t <sub>F</sub>	Vdd slew to 0V	15			$\mu$ S

t <sub>R</sub>	V <sub>dd</sub> 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

TIMING (nS-nano seconds)			
Read Cycle 100mS			
Symbol	Parameter	Min	Max
t <sub>RC</sub>	Read cycle time	100	
t <sub>ACC</sub>	Access time		100
t <sub>ACS</sub>	CE to output valid		100
t <sub>OE</sub>	OE to output valid		40
t <sub>CLZ</sub>	CE to output active	10	
t <sub>OLZ</sub>	OE to output active	10	
t <sub>OH</sub>	Output hold time	10	
t <sub>CHZ</sub>	CE to output disable		40
t <sub>OHZ</sub>	OE to output disable		40
Write Cycle 100nS			
Symbol	Parameter	Min	Max
t <sub>WC</sub>	Write cycle time	100	
t <sub>WP</sub>	Write pulse width	60	
t <sub>AS</sub>	Address setup time	0	
t <sub>WR</sub>	Write recovery time	10	
t <sub>WHZ</sub>	WR to output disable		30
t <sub>OW</sub>	Output active from WR	10	
t <sub>DS</sub>	Data setup time	30	
t <sub>DH</sub>	Data HOLD TIME	10	

**Notes**

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



## APPLICATION

When powered down, the GR281 is transportable and data can be moved from system to system. Being pin compatible with 2716 EPROM makes it ideal for programme development, data collection in data loggers, programme changes in process control, automation and robotics and user definable lookup tables, etc.

Additional information available through our technical services department.