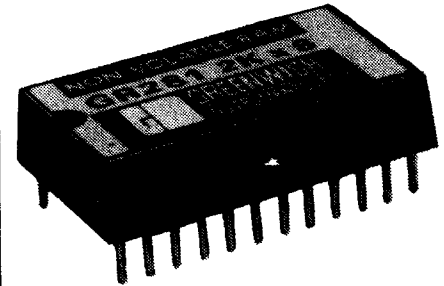


- * Plug-in replacement for Static RAM
- * 10 years data retention
- * No erasure required
- * Fast power down
- * Functions as Data or Program RAM
- * No limit to number of programming cycles
- * Standard 24-pin JEDEC pinout

GR281 is 2 kilobyte of non-volatile memory which is pin-compatible with normal Static RAM and offers immediate conversion to non-volatile memory of all or part of a system. Data is protected by an automatic write inhibit function during power loss with a minimum decay time from Vdd to 0V of 15 μ S.



ABSOLUTE MAXIMUM RATINGS

Symbol	Min	Max	Unit
Vdd	-0.3	7.0	Volts
Vi/o	-0.3	Vdd +0.3	Volts
Temp.	-20	+70	deg. C

OPERATING CONDITIONS

Symbol	Min	Typ	Max	Unit
Vdd	4.75	5.0	5.5	V
Vin (1)	2.2		Vdd +0.3	V
Vin (0)	-0.3		0.8	V
Iin (\overline{CE})			1	LSTTL Load
Iin (any other pin)	-1		+1	μ A
Vout(1) (Iout=-1mA)	2.4			V
Vout(0) (Iout=2mA)			0.4	V
Idd (Active)		25		mA
Idd (Deselected)		1		mA
Tcycle			100	nS
Cin (any pin)			10	pF

OPERATING MODE

\overline{CE}	\overline{OE}	\overline{WR}	MODE	OUTPUT	Idd
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

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

PIN DESIGNATIONS

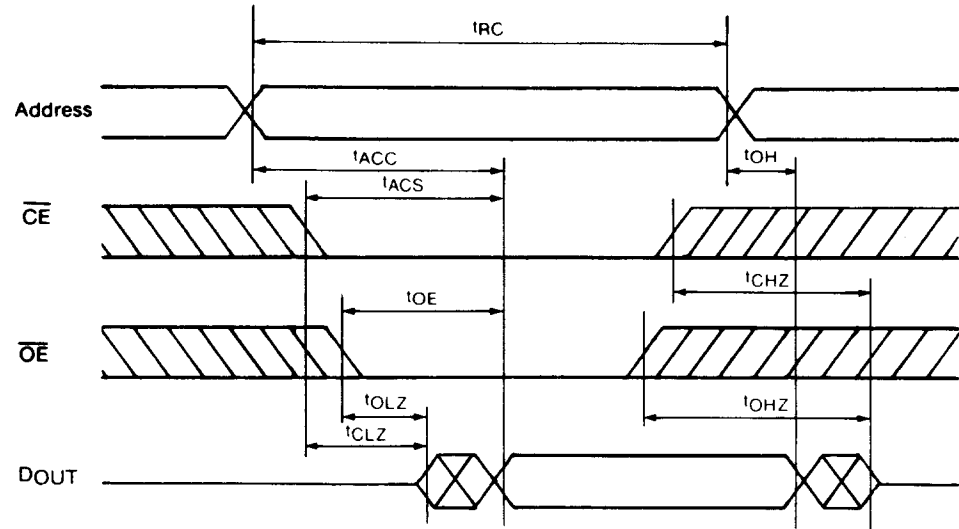
Pin	Function
AO-A10	Address I/Ps
DO-D7	Data in/out
\overline{OE}	Output Enable
\overline{CE}	Chip Enable
\overline{WR}	Write Input
Vdd	+5V power
GND	Ground

PIN CONNECTIONS

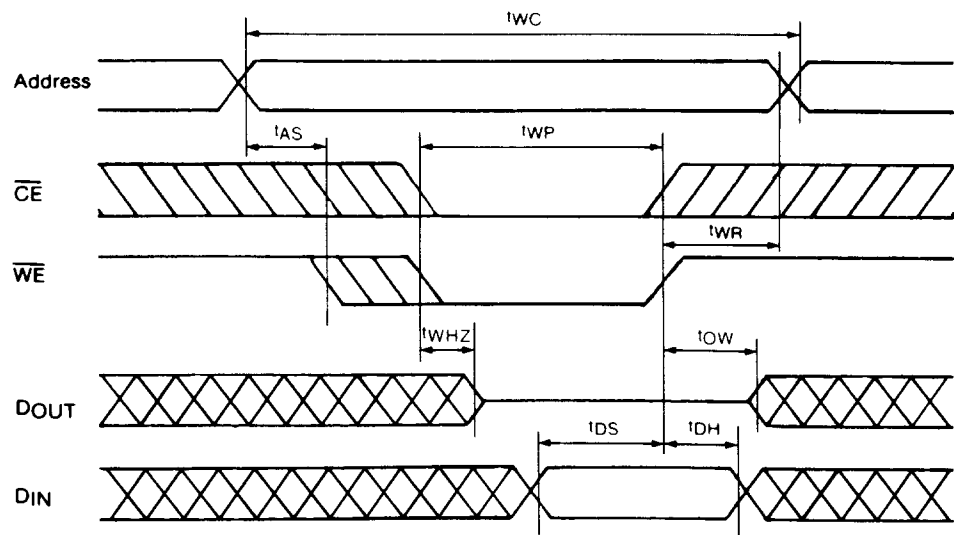
A7	1	24	Vdd
A6	2	23	A8
A5	3	22	$\overline{A9}$
A4	4	21	\overline{WR}
A3	5	20	\overline{OE}
A2	6	19	$\overline{A10}$
A1	7	18	\overline{CE}
A0	8	17	D7
D0	9	16	D6
D1	10	15	D5
D2	11	14	D4
GND	12	13	D3

TIMING DIAGRAMS

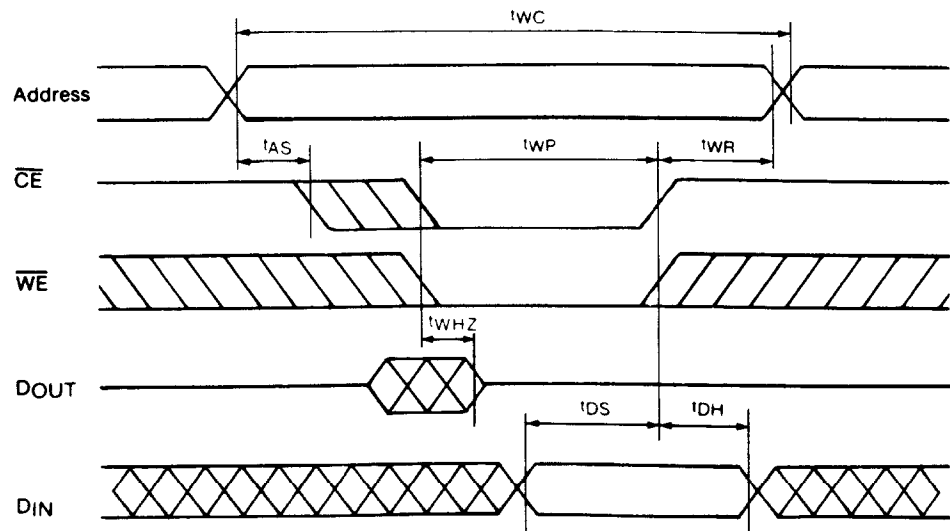
READ CYCLE



WRITE CYCLE 1



WRITE CYCLE 2



TIMING DIAGRAMS (units - nano-seconds)

READ CYCLE

100nS

SYMBOL	PARAMETER	MIN	MAX
t_{RC}	Read cycle time	100	
t_{ACC}	Access time		100
t_{ACS}	\overline{CE} to output valid		100
t_{OE}	\overline{OE} to output valid		40
t_{CLZ}	\overline{CE} to output active	10	
t_{OLZ}	\overline{OE} to output active	10	
t_{OH}	Output hold time	10	
t_{CHZ}	\overline{CE} to output disable		40
t_{OHZ}	\overline{OE} to output disable		40

WRITE CYCLE

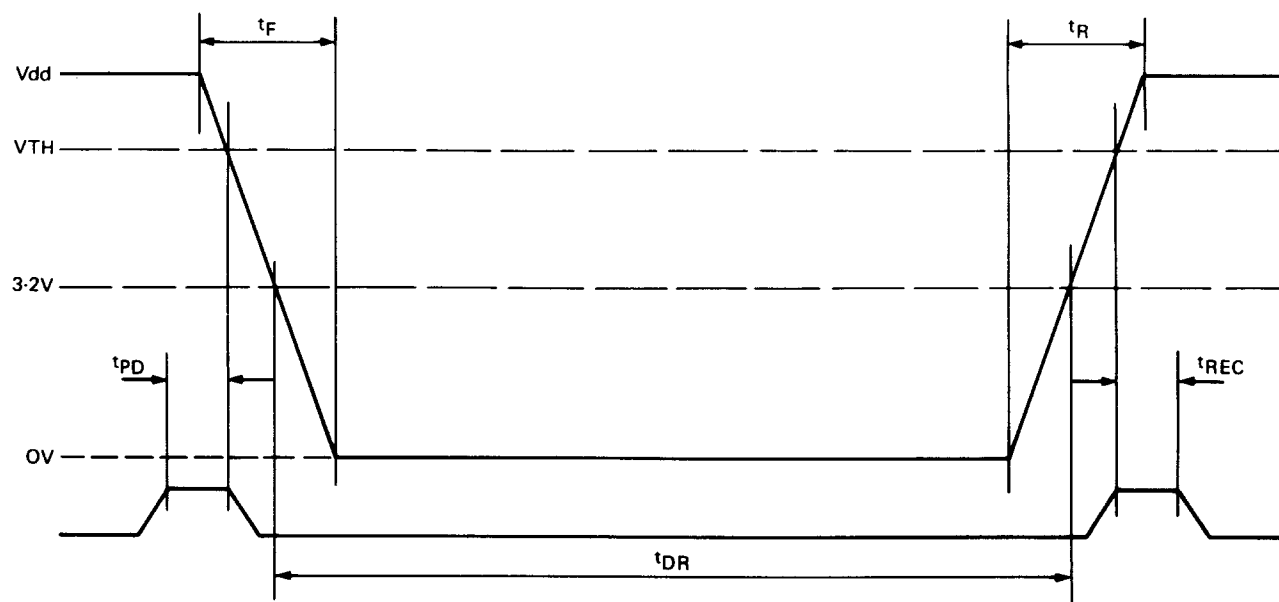
100nS

SYMBOL	PARAMETER	MIN	MAX
t_{WC}	Write cycle time	100	
t_{WP}	Write pulse width	60	
t_{AS}	Address setup time	0	
t_{WR}	Write recovery time	10	
t_{WHZ}	\overline{WR} to output disable		30
t_{OW}	Output active from \overline{WR}	10	
t_{DS}	Data setup time	30	
t_{DH}	Data HOLD TIME	10	

Notes

- \overline{WE} must be high during address transitions.
- A Write occurs during the overlap of a low \overline{CE} and a low \overline{WE} .
- \overline{WE} is high for read cycle.

DATA RETENTION OPERATING CONDITIONS



SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS
V_{dd}	Operating supply voltage	4.75	5.0	5.50	V
V_{TH}	Data retention voltage		4.5		V
t_F	V_{dd} slew to 0v	15			μS
t_R	V_{dd} slew 0V to 5.0v	15			μS
t_{REC}	\overline{CE} to O/P valid from power up			15	μS
t_{Dr}	Data retention time		10		YRS
t_{PD}	\overline{CE} at V_{in} (1) before power down	0			μS

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 standard 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 $15\mu\text{S}$ (15microseconds) to power down from 5 volts to 0 volts. This is much faster than system power failure conditions. Therefore there are no special considerations 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.

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 look-up tables, etc.

Dimensions (mm):

