

Features

- ☐ High-speed access times
Com'l: 70, 85 and 100ns
- ☐ Low power operation (typical)
 - PDM31256LL
 - Active: 50 mW
 - Standby: 1μW
- ☐ Single +3.3V (±0.3V) power supply
- ☐ TTL-compatible inputs and outputs
- ☐ I/Os are 5V tolerant
- ☐ Low data retention voltage: 1.5V
- ☐ Packages
 - Plastic TSOP (I) - T

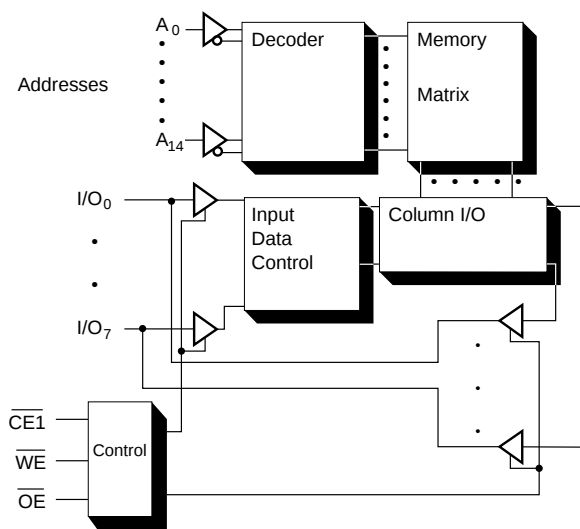
Description

The PDM31256LL is a very low power CMOS static RAM organized as 32,768 x 8 bits. Writing to this device is accomplished when the write enable ($\overline{WE}$) and the chip enable ($\overline{CE}$) inputs are both LOW. Reading is accomplished when $\overline{WE}$ remains HIGH and $\overline{CE}$ and $\overline{OE}$ are both LOW.

The PDM31256LL operates from a single +3.3V power supply and all the inputs and outputs are fully TTL- compatible. The device supports low data retention voltage for battery back-up operation with low current.

The PDM31256LL is available in a 28-pin plastic TSOP.

Functional Block Diagram



Pin Configurations

TSOP (I)

$\overline{OE}$	22	21	A10
A11	23	20	CE
A9	24	19	I/O7
A8	25	18	I/O6
A13	26	17	I/O5
$\overline{WE}$	27	16	I/O4
V _{CC}	28	15	I/O3
A14	1	14	V _{SS}
A12	2	13	I/O2
A7	3	12	I/O1
A6	4	11	I/O0
A5	5	10	A0
A4	6	9	A1
A3	7	8	A2

Pin Description

Name	Description
A14-A0	Address Inputs
I/O7-I/O0	Data Inputs/Outputs
$\overline{OE}$	Output Enable Input
$\overline{WE}$	Write Enable Input
$\overline{CE}$	Chip Enable Input
V _{CC}	Power (+3.3V)
V _{SS}	Ground

Truth Table

$\overline{OE}$	WE	$\overline{CE}$	I/O	MODE
X	X	H	Hi-Z	Standby
L	H	L	D _{OUT}	Read
X	L	L	D _{IN}	Write
H	H	L	Hi-Z	Output Disable

NOTE: 1. H = V_{IH}, L = V_{IL}, X = DON'T CARE

Absolute Maximum Ratings ⁽¹⁾

Symbol	Rating	Com'l.	Ind.	Unit
V _{TERM}	Terminal Voltage with Respect to V _{SS}	-0.5 to +4.6	-0.5 to +4.6	V
T _{BIAS}	Temperature Under Bias	-55 to +125	-65 to +135	°C
T _{STG}	Storage Temperature	-55 to +125	-65 to +150	°C
P _T	Power Dissipation	1.0	1.0	W
I _{OUT}	DC Output Current	20	20	mA
T _j	Maximum Junction Temperature ⁽²⁾	125	125	°C

- NOTE: 1. Stresses 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 above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
2. Appropriate thermal calculations should be performed in all cases and specifically for those where the chosen package has a large thermal resistance (e.g., TSOP). The calculation should be of the form: $T_j = T_a + P * \theta_{ja}$ where T_a is the ambient temperature, P is average operating power and θ_{ja} the thermal resistance of the package. For this product, use the following θ_{ja} values:

SOJ: 78 °C/W
TSOP: 112 °C/W

Recommended DC Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
V _{CC}	Supply Voltage	3.0	3.3	3.6	V
V _{SS}	Supply Voltage	0	0	0	V
Commercial	Ambient Temperature	0	25	70	°C

DC Electrical Characteristics (V_{CC} = 3.3V ± 0.3V)

Symbol	Parameter	Test Conditions	Min.	Typ. ⁽²⁾	Max.	Unit
I _{LI}	Input Leakage Current	V _{CC} = MAX., V _{IN} = V _{SS} to V _{CC}	-1	—	1	μA
I _{LO}	Output Leakage Current	V _{CC} = MAX., CE = V _{IH} , V _{OUT} = V _{SS} to V _{CC}	-1	—	1	μA
V _{IL}	Input Low Voltage		-0.3 ⁽¹⁾	—	0.8	V
V _{IH}	Input High Voltage		2.2	—	V _{CC} +0.3	V
V _{OL}	Output Low Voltage	I _{OL} = 2mA, V _{CC} = Min.	—	—	0.4	V
V _{OH}	Output High Voltage	I _{OH} = -1 mA, V _{CC} = Min.	2.4	—	—	V
I _{CC}	Operating Power Supply Current	V _{CC} = MAX CE = V _{IL} I _{OUT} = 0 mA f = f _{MAX}	—	—	30	mA
I _{SB}	Standby Current (TTL)	V _{CC} = MAX CE = V _{IH}	—	—	1	mA
I _{SB1}	Full Standby Current (CMOS)	V _{CC} = MAX CE ≥ V _{CC} - 0.2V V _{IN} ≥ V _{CC} - 0.2V or ≤ 0.2V	—	0.3	10	μA

NOTE: 1. V_{IL}(min) = -3.0V for pulse width less than 20 ns. 2. V_{CC} = 3.3V, 25°C.

Data Retention Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ. ⁽¹⁾	Max.	Unit
V _{DR}	V _{CC} for data retention	$\overline{CE} \geq V_{CC} - 0.2V$ $V_{IN} \geq V_{CC} - 0.2V$ or $\leq 0.2V$	1.5	—	—	V
I _{CC DR}	Data retention current	$\overline{CE} \geq V_{CC} - 0.2V$ $V_{IN} \geq V_{CC} - 0.2V$ or $\leq 0.2V$	—	0.2	6	μA
t _{CDR}	Chip deselect to data retention time	See waveform	0	—	—	ns
t _R	Recovery time	See waveform	t _{RC}	—	—	ns

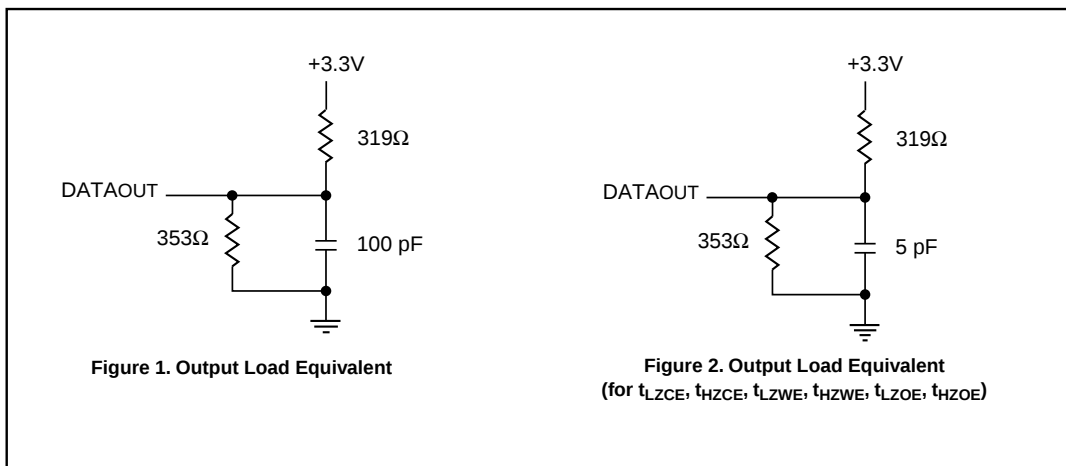
NOTE: 1. V_{CC} = 3.3V, 25°C.**Capacitance⁽¹⁾** (T_A = +25°C, f = 1.0 MHz)

Symbol	Parameter	Max.	Unit
C _{IN}	Input Capacitance	6	pF
C _{OUT}	Output Capacitance	8	pF

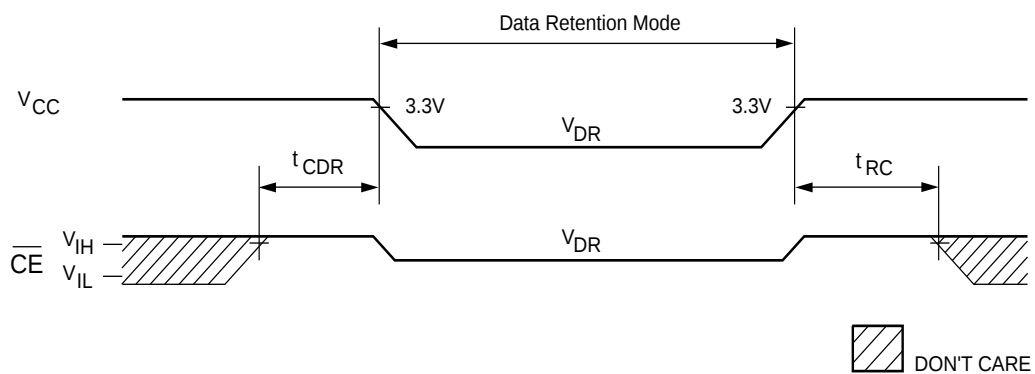
NOTE: 1. This parameter is determined by device characterization but is not production tested.

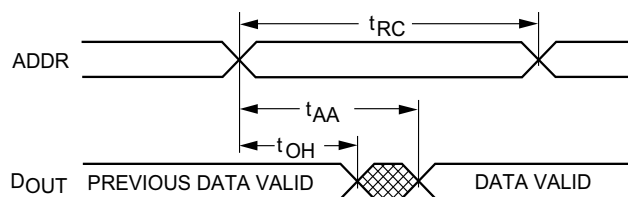
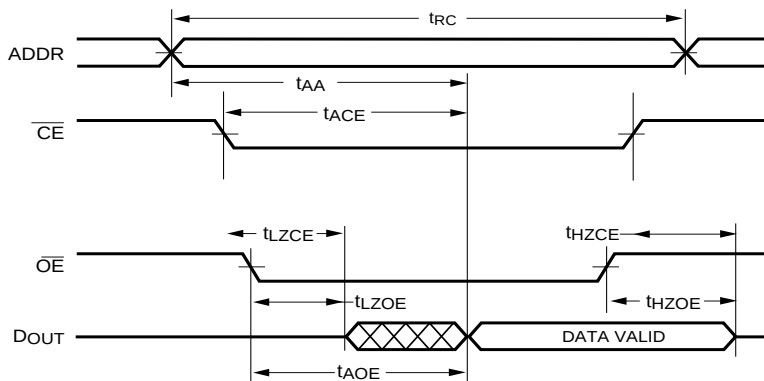
AC Test Conditions

Input pulse levels	V _{SS} to 3.0V
Input rise and fall times	5 ns
Input timing reference levels	1.5V
Output reference levels	1.5V
Output load	See Figures 1 and 2



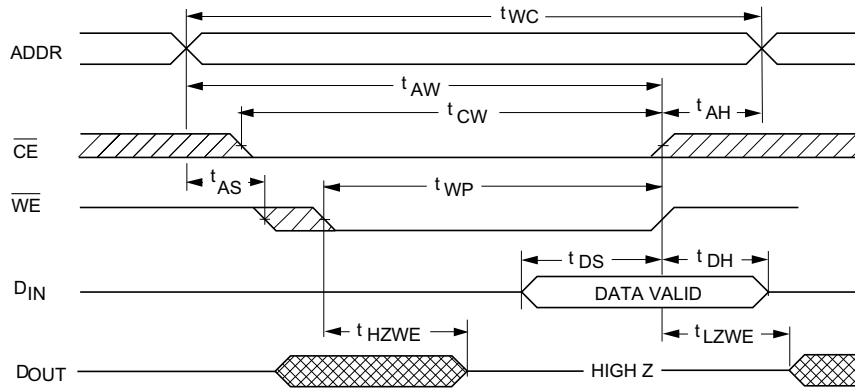
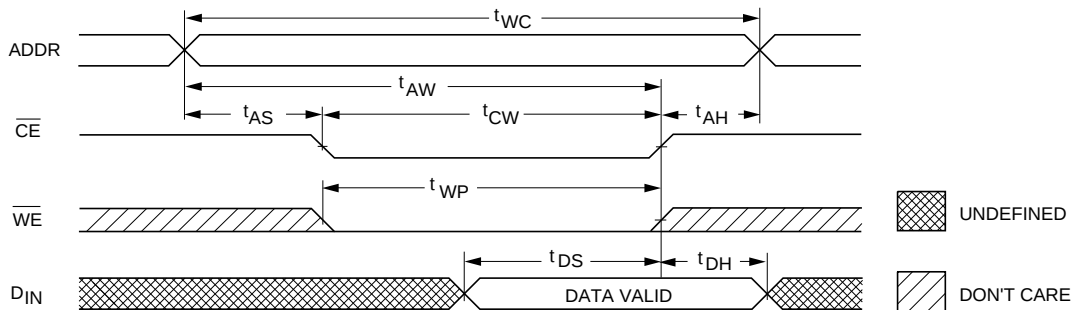
Low V_{CC} Data Retention Waveform



Read Cycle No. 1⁽¹⁾Read Cycle No. 2⁽²⁾

AC Electrical Characteristics

Description		-70		-85		-100		
READ Cycle	Sym	Min.	Max.	Min.	Max.	Min	Max	Units
READ cycle time	t_{RC}	70		85		100		ns
Address access time	t_{AA}		70		85		100	ns
Chip enable access time	t_{ACE}		70		85		100	ns
Output hold from address change	t_{OH}	10		10		10		ns
Chip enable to output in low $Z^{(3,4,5)}$	t_{LZCE}	10		10		10		ns
Chip disable to output in high $Z^{(3,4,5)}$	t_{HZCE}		35		35		35	ns
Output enable access time	t_{AOE}		50		50		50	ns
Output enable to output in low $Z^{(4,5)}$	t_{LZOE}	10		10		10		ns
Output disable to output in high $Z^{(4,5)}$	t_{HZOE}		30		30		30	ns

Write Cycle No. 1 (Write Enable Controlled)**Write Cycle No. 2 (Chip Enable Controlled)****AC Electrical Characteristics**

Description		-70		-85		-100		
WRITE Cycle	Sym	Min.	Max.	Min.	Max.	Min.	Max.	Units
WRITE cycle time	t_{WC}	70		85		100		ns
Chip enable to end of write	t_{CW}	70		85		100		ns
Address valid to end of write	t_{AW}	70		85		100		ns
Address setup time	t_{AS}	0		0		0		ns
Address hold from end of write	t_{AH}	0		0		0		ns
Write pulse width	t_{WP}	50		50		50		ns
Data setup time	t_{DS}	40		40		40		ns
Data hold time	t_{DH}	0		0		0		ns
Write disable to output in low $Z^{(4,5)}$	t_{LZWE}	5		5		5		ns
Write enable to output in high $Z^{(4,5)}$	t_{HZWE}		30		30		30	ns

NOTES: (For two previous Electrical Characteristics tables)

1. The device is continuously selected. Chip Enable is held in its active state.
2. The address is valid prior to or coincident with the latest occurring Chip Enable.
3. At any given temperature and voltage condition, t_{HZCE} is less than t_{LZCE} .
4. This parameter is sampled.
5. The parameter is tested with $CL = 5$ pF as shown in Figure 2. Transition is measured ± 500 mV from steady state voltage.

Ordering Information

XXXXX	X	XX	X	X	X		
Device Type	Power	Speed	Package Type	Process Temp. Range	Preferred Shipping Container		
					Blank	Blank	Tubes
						TR	Tape & Reel
						TY	Tray
					Blank	Blank	Commercial (0 to +70°C)
						T	28-pin Plastic TSOP
						70	
						85	
						100	
						LL	Low Power
						PDM31256 - 256K (32Kx8) Static RAM	

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