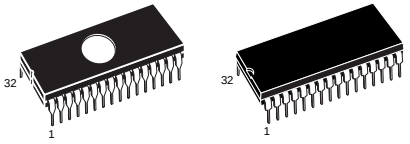
M27C2001

2 Mbit (256Kb x 8) UV EPROM and OTP EPROM

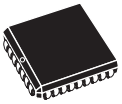
Features

- 5V ± 10% supply voltage in Read operation
- Access time: 55ns
- Low power consumption:
  - Active Current 30mA at 5MHz
  - Standby Current 100µA
- Programming voltage: 12.75V ± 0.25V
- Programming time: 100µs/word
- Electronic signature
  - Manufacturer Code: 20h
  - Device Code: 61h
- Packages
  - ECOPACK® packages available.



FDIP32W (F)

PDIP32 (B)



PLCC32 (C)

TSOP32 (N)
8 x 20 mm

Downloaded from Elcodis.com electronic components distributor

1 Summary description

The M27C2001 is a high speed 2 Mbit EPROM offered in the two ranges UV (ultra violet erase) and OTP (one time programmable). It is ideally suited for microprocessor systems requiring large programs and is organized as 262,144 by 8 bits.

The FDIP32W (window ceramic frit-seal package) has a transparent lids which allow the user to expose the chip to ultraviolet light to erase the bit pattern. A new pattern can then be written to the device by following the programming procedure.

For applications where the content is programmed only one time and erasure is not required, the M27C2001 is offered in PDIP32, PLCC32 and TSOP32 (8 x 20 mm) packages.

In order to meet environmental requirements, ST offers the M27C2001 in ECOPACK® packages.

ECOPACK packages are Lead-free. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label.

ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Figure 1. Logic Diagram

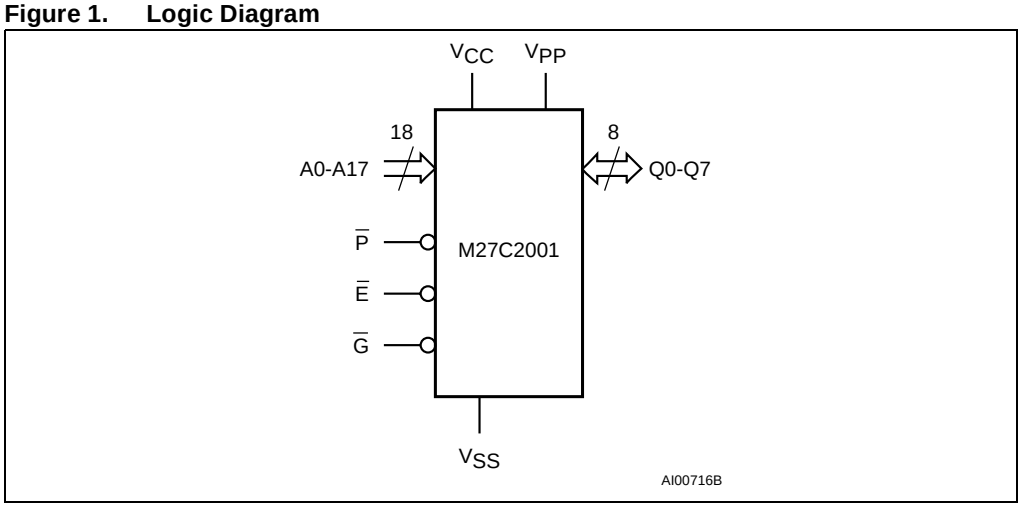


Table 1. Signal Names

A0-A17	Address Inputs
Q0-Q7	Data Outputs
$\overline{E}$	Chip Enable
$\overline{G}$	Output Enable
$\overline{P}$	Program
V_{PP}	Program Supply
V_{CC}	Supply Voltage
V_{SS}	Ground

Downloaded from Elcodis.com electronic components distributor

3 Maximum ratings

Except for the rating "Operating Temperature Range", stresses above those listed in the *Table 4* may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the STMicroelectronics SURE Program and other relevant quality documents.

Table 4. Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
T_A	Ambient Operating Temperature (1)	–40 to 125	°C
T_{BIAS}	Temperature Under Bias	–50 to 125	°C
T_{STG}	Storage Temperature	–65 to 150	°C
V_{IO} (2)	Input or Output Voltage (except A9)	–2 to 7	V
V_{CC}	Supply Voltage	–2 to 7	V
V_{A9} (2)	A9 Voltage	–2 to 13.5	V
V_{PP}	Program Supply Voltage	–2 to 14	V

1. Depends on range.
2. Minimum DC voltage on Input or Output is –0.5V with possible undershoot to –2.0V for a period less than 20ns. Maximum DCvoltage on Output is V_{CC} +0.5V with possible overshoot to V_{CC} +2V for a period less than 20ns.

Downloaded from Elcodis.com electronic components distributor

4 DC and AC parameters

This section summarizes the operating measurement conditions, and the DC and AC characteristics of the device. The parameters in the DC and AC characteristics Tables that follow, are derived from tests performed under the Measurement Conditions summarized in *Table 5*, Operating and AC Measurement Conditions. Designers should check that the operating conditions in their circuit match the operating conditions when relying on the quoted parameters.

Table 5. AC Measurement conditions

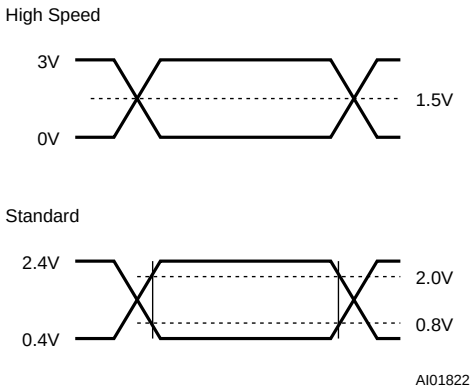
	High Speed	Standard
Input Rise and Fall Times	≤10ns	≤20ns
Input Pulse Voltages	0 to 3V	0.4V to 2.4V
Input and Output Timing Ref. Voltages	1.5V	0.8V and 2V

Table 6. Capacitance (1) (T_A = 25°C, f = 1 MHz)

Symbol	Parameter	Test Condition	Min	Max	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V		6	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V		12	pF

1. Sampled only, not 100% tested

Figure 6. AC Testing Input Output Waveform



Downloaded from Elcodis.com electronic components distributor

Figure 7. AC Testing Load Circuit

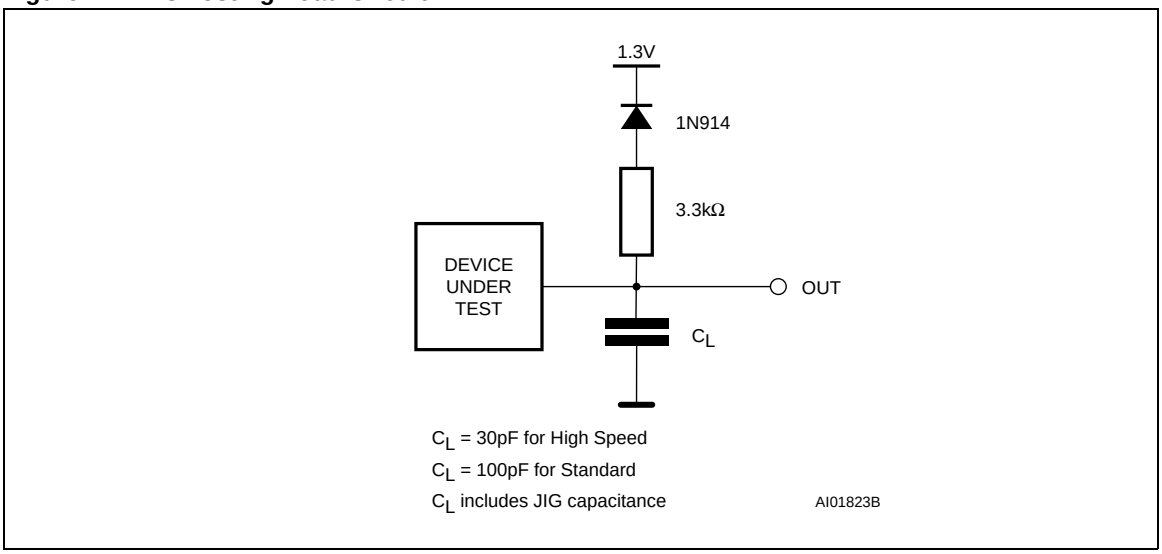


Table 7. Read Mode DC Characteristics (1)
(T_A = 0 to 70°C or –40 to 85°C; V_{CC} = 5V ± 5% or 5V ± 10%; V_{PP} = V_{CC})

Symbol	Parameter	Test Condition	Min	Max	Unit
I_{LI}	Input Leakage Current	0V ≤V_{IN} ≤V_{CC}		±10	µA
I_{LO}	Output Leakage Current	0V ≤V_{OUT} ≤V_{CC}		±10	µA
I_{CC}	Supply Current	$\overline{E}$ = V_{IL}, $\overline{G}$ = V_{IL}, I_{OUT} = 0mA, f = 5MHz		30	mA
I_{CC1}	Supply Current (Standby) TTL	$\overline{E}$ = V_{IH}		1	mA
I_{CC2}	Supply Current (Standby) CMOS	$\overline{E}$ > V_{CC} – 0.2V		100	µA
I_{PP}	Program Current	V_{PP} = V_{CC}		10	µA
V_{IL}	Input Low Voltage		–0.3	0.8	V
V_{IH} (2)	Input High Voltage		2	V_{CC} + 1	V
V_{OL}	Output Low Voltage	I_{OL} = 2.1mA		0.4	V
V_{OH}	Output High Voltage TTL	I_{OH} = –400µA	2.4		V
	Output High Voltage CMOS	I_{OH} = –100µA	V_{CC} – 0.7V		V

1. V_{CC} must be applied simultaneously with or before V_{PP} and removed simultaneously or after V_{PP}.
2. Maximum DC voltage on Output is V_{CC} +0.5V.

Downloaded from Elcodis.com electronic components distributor

Table 8. Programming Mode DC Characteristics (1)
(T_A = 25°C; V_{CC} = 6.25V ± 0.25V; V_{PP} = 12.75V ± 0.25V)

Symbol	Parameter	Test Condition	Min	Max	Unit
I_{LI}	Input Leakage Current	$0 \le V_{IN} \le V_{IH}$		±10	µA
I_{CC}	Supply Current			50	mA
I_{PP}	Program Current	$\overline{E} = V_{IL}$		50	mA
V_{IL}	Input Low Voltage		–0.3	0.8	V
V_{IH}	Input High Voltage		2	V_{CC} + 0.5	V
V_{OL}	Output Low Voltage	I_{OL} = 2.1mA		0.4	V
V_{OH}	Output High Voltage TTL	I_{OH} = –400µA	2.4		V
V_{ID}	A9 Voltage		11.5	12.5	V

1. V_{CC} must be applied simultaneously with or before V_{PP} and removed simultaneously or after V_{PP}.

Table 9. Read Mode AC Characteristics (1)
(T_A = 0 to 70°C or –40 to 85°C; V_{CC} = 5V ± 5% or 5V ± 10%; V_{PP} = V_{CC})

Symbol	Alt	Parameter	Test Condition	M27C2001								Unit
				-55 (2)		-70		-80		-90		
				Min	Max	Min	Max	Min	Max	Min	Max	
t_{AVQV}	t_{ACC}	Address Valid to Output Valid	$\overline{E} = V_{IL}$, $\overline{G} = V_{IL}$		55		70		80		90	ns
t_{ELQV}	t_{CE}	Chip Enable Low to Output Valid	$\overline{G} = V_{IL}$		55		70		80		90	ns
t_{GLQV}	t_{OE}	Output Enable Low to Output Valid	$\overline{E} = V_{IL}$		30		35		40		40	ns
t_{EHQZ} (3)	t_{DF}	Chip Enable High to Output Hi-Z	$\overline{G} = V_{IL}$	0	30	0	30	0	30	0	30	ns
t_{GHQZ} (3)	t_{DF}	Output Enable High to Output Hi-Z	$\overline{E} = V_{IL}$	0	30	0	30	0	30	0	30	ns
t_{AXQX}	t_{OH}	Address Transition to Output Transition	$\overline{E} = V_{IL}$, $\overline{G} = V_{IL}$	0		0		0		0		ns

1. V_{CC} must be applied simultaneously with or before V_{PP} and removed simultaneously or after V_{PP}.
2. In case of 55ns speed see High Speed AC measurement conditions.
3. Sampled only, not 100% tested.

Downloaded from Elcodis.com electronic components distributor

Table 10. Read Mode AC Characteristics (1)

(T_A = 0 to 70°C or –40 to 85°C; V_{CC} = 5V ± 5% or 5V ± 10%; V_{PP} = V_{CC})

Symbol	Alt	Parameter	Test Condition	M27C2001						Unit
				-10		-12		-15/-20/-25		
				Min	Max	Min	Max	Min	Max	
t_{AVQV}	t_{ACC}	Address Valid to Output Valid	$\overline{E}$ = V_{IL}, $\overline{G}$ = V_{IL}		100		120		150	ns
t_{ELQV}	t_{CE}	Chip Enable Low to Output Valid	$\overline{G}$ = V_{IL}		100		120		150	ns
t_{GLQV}	t_{OE}	Output Enable Low to Output Valid	$\overline{E}$ = V_{IL}		50		50		60	ns
t_{EHQZ} (2)	t_{DF}	Chip Enable High to Output Hi-Z	$\overline{G}$ = V_{IL}	0	30	0	40	0	50	ns
t_{GHQZ} (2)	t_{DF}	Output Enable High to Output Hi-Z	$\overline{E}$ = V_{IL}	0	30	0	40	0	50	ns
t_{AXQX}	t_{OH}	Address Transition to Output Transition	$\overline{E}$ = V_{IL}, $\overline{G}$ = V_{IL}	0		0		0		ns

1. V_{CC} must be applied simultaneously with or before V_{PP} and removed simultaneously or after V_{PP}.
2. Sampled only, not 100% tested.

Downloaded from Elcodis.com electronic components distributor

Figure 8. Read Mode AC Waveforms

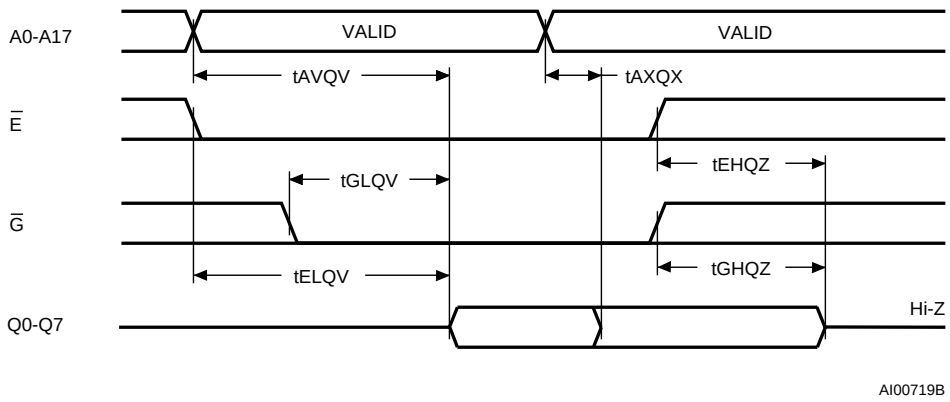


Table 11. Programming Mode AC Characteristics(1)
(T_A = 25°C; V_{CC} = 6.25 ± 0.25V; V_{PP} = 12.75 ± 0.25V)

Symbol	Alt	Parameter	Test Condition	Min	Max	Unit
t_{AVPL}	t_{AS}	Address Valid to Program Low		2		µs
t_{QVPL}	t_{DS}	Input Valid to Program Low		2		µs
t_{VPHPL}	t_{VPS}	V_{PP} High to Program Low		2		µs
t_{VCHPL}	t_{VCS}	V_{CC} High to Program Low		2		µs
t_{ELPL}	t_{CES}	Chip Enable Low to Program Low		2		µs
t_{PLPH}	t_{PW}	Program Pulse Width		95	105	µs
t_{PHQX}	t_{DH}	Program High to Input Transition		2		µs
t_{QXGL}	t_{OES}	Input Transition to Output Enable Low		2		µs
t_{GLQV}	t_{OE}	Output Enable Low to Output Valid			100	ns
t_{GHQZ} (2)	t_{DFP}	Output Enable High to Output Hi-Z		0	130	ns
t_{GHAX}	t_{AH}	Output Enable High to Address Transition		0		ns

1. V_{CC} must be applied simultaneously with or before V_{PP} and removed simultaneously or after V_{PP}.
2. Sampled only, not 100% tested.

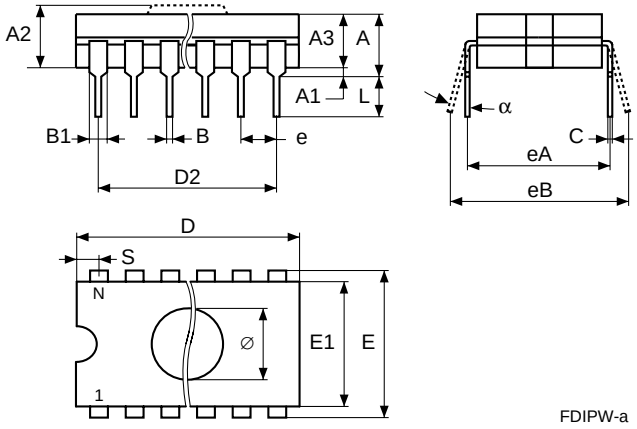
Downloaded from Elcodis.com electronic components distributor

5 Package mechanical data

Table 12. FDIP32W - 32 pin Ceramic Frit-seal DIP, with window, Package Mechanical Data

Symbol	mm			inches		
	Typ	Min	Max	Typ	Min	Max
A			5.72			0.225
A1		0.51	1.40		0.020	0.055
A2		3.91	4.57		0.154	0.180
A3		3.89	4.50		0.153	0.177
B		0.41	0.56		0.016	0.022
B1	1.45	—	—	0.057	—	—
C		0.23	0.30		0.009	0.012
D		41.73	42.04		1.643	1.655
D2	38.10	—	—	1.500	—	—
E	15.24	—	—	0.600	—	—
E1		13.06	13.36		0.514	0.526
e	2.54	—	—	0.100	—	—
eA	14.99	—	—	0.590	—	—
eB		16.18	18.03		0.637	0.710
L		3.18			0.125	
S		1.52	2.49		0.060	0.098
∅	7.11	—	—	0.280	—	—
α		4°	11°		4°	11°
N	32			32		

Figure 10. FDIP32W - 32 pin Ceramic Frit-seal DIP, with window, Package Outline



1. Drawing is not to scale.

Downloaded from Elcodis.com electronic components distributor

6 Part numbering scheme

Table 16. Ordering Information Scheme

Example: M27C2001 -55 X C 1 TR

Device Type
M27

Supply Voltage
C = 5V

Device Function
2001 = 2 Mbit (256Kb x 8)

Speed
– 55 (1) = 55 ns
– 70 = 70 ns
– 80 = 80 ns
– 90 = 90 ns
– 10 = 100 ns

Not For New Design (2)
– 12 = 120 ns
– 15 = 150 ns
– 20 = 200 ns
– 25 = 250 ns

V_{CC} Tolerance
X = ± 5%
blank = ± 10%

Package
F = FDIP32W
B = PDIP32
C = PLCC32
N = TSOP32: 8 x 20 mm

Temperature Range
1 = 0 to 70°C
6 = –40 to 85°C

Options
TR = Tape & Reel Packing

1. High Speed, see AC Characteristics section for further information.
2. These speeds are replaced by the 100ns.

For a list of available options (Speed, Package, etc....) or for further information on any aspect of this de-vice, please contact the STMicroelectronics Sales Office nearest to you.

Downloaded from Elcodis.com electronic components distributor