QNEP0001
QUALITY NOTE

Low Voltage UV EPROM and OTP EPROM
Vcc Range Improvement

During the 1999 the upgrade of the EPROM family from CMOS E6-U10 to CMOS E6-U30 was completed and all the E6-U30 product versions were passed to production.

The CMOS E6-U30 is a 0.4µm process, with more severe pholitographic rules than the previous CMOS E6-U10 0.55µm process, also including other structural improvements related to the nature and thickness of key layers in order to achieve better electrical performances; Particularly the 25% reduction in the gate oxide thickness implies a lowering in the EPROM cell threshold which finally results in better access times of the products at V_{CC} = 2.7 Volt, in the full temperature range –40°C to 85°C.

Thanks to the improved electrical performances, ST aims to supply the market with the best value products suggesting its Customers to replace the "V" class products (3.0 to 3.6 Volt V_{CC} range) with the more performant "W" class (2.7 to 3.6 Volt V_{CC} range).

This is possible because every "W" class device is submitted to a double Final Testing flow:

– in the 2.7 to 3.6 Volt V_{CC} range, where the access time reported on the front marking and on the datasheet is guaranteed;
– in the 3.0 to 3.6 Volt V_{CC} range, where the access time reported on the datasheet is guaranteed.

As additional information, the access time guaranteed in the 3.0 to 3.6 Volt V_{CC} range is always more performant than the one guaranteed in the 2.7 to 3.6 Volt V_{CC} range (see datasheet for more detail).

Concerning traceability, the marking of the devices indicates the speed in the "W" class. For instance, the marking of the 4 Mbit x8 configuration:

M27W401
-80K6
WATNN
YYWWC
SINGAPORE

shows that 80ns access time is guaranteed, in the –40°C to 85°C and 2.7 to 3.6 Volt V_{CC} ranges.

None information concerning the access time in the 3.0 to 3.6V Vcc range is reported on the marking. The information is included on the front page, on the ordering information scheme page and on the Read Mode AC Characteristics tables of the relevant datasheet, as in the following attachments for the 4 Mbit x8 example.

Table 1. Read Mode AC Characteristics (1)
(T_A = –40 to 85°C; V_{CC} = 2.7V to 3.6V; V_{PP} = V_{CC})

Symbol	Alt	Parameter	Test Condition	M27W401						Unit
				-80 (3)				-100 (-120/-150/-200)		
				V_{CC} = 3.0V to 3.6V		V_{CC} = 2.7V to 3.6V		V_{CC} = 2.7V to 3.6V		
				Min	Max	Min	Max	Min	Max	
t_{AVQV}	t_{ACC}	Address Valid to Output Valid	$\overline{E}$ = V_{IL}, $\overline{G}$ = V_{IL}		70		80		100	ns
t_{ELQV}	t_{CE}	Chip Enable Low to Output Valid	$\overline{G}$ = V_{IL}		70		80		100	ns
t_{GLQV}	t_{OE}	Output Enable Low to Output Valid	$\overline{E}$ = V_{IL}		40		50		60	ns
t_{EHQZ} (2)	t_{DF}	Chip Enable High to Output Hi-Z	$\overline{G}$ = V_{IL}	0	50	0	50	0	60	ns
t_{GHQZ} (2)	t_{DF}	Output Enable High to Output Hi-Z	$\overline{E}$ = V_{IL}	0	50	0	50	0	60	ns
t_{AXQX}	t_{OH}	Address Transition to Output Transition	$\overline{E}$ = V_{IL}, $\overline{G}$ = V_{IL}	0		0		0		ns

Note: 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.
3. Speed obtained with High Speed AC measurement conditions.

Figure 1. Read Mode AC Waveforms

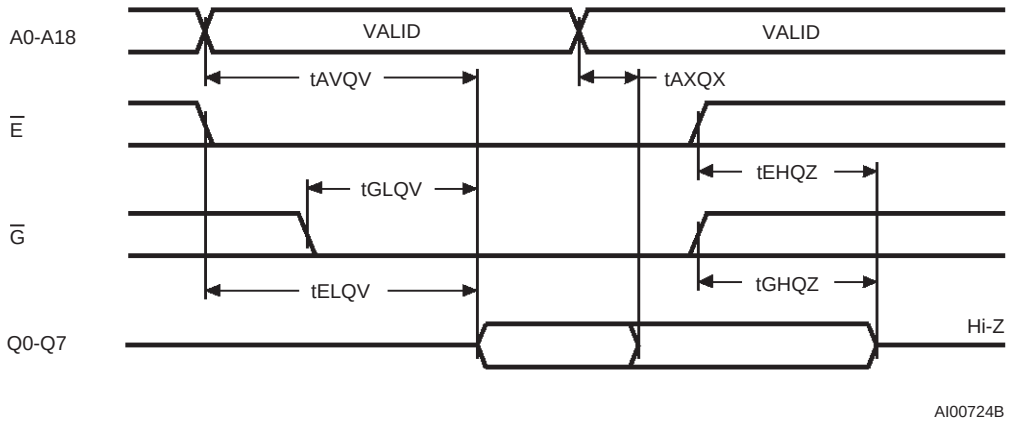

Table 2. Ordering Information Scheme

Example: M27W401 -80 K 6 TR

Device Type
M27

Supply Voltage
W = 2.7V to 3.6V

Device Function
401 = 4 Mbit (512Kb x 8)

Speed
-80 (1,2) = 80 ns
-100 = 100 ns

Not For New Design (3)
-120 = 120 ns
-150 = 150 ns
-200 = 200 ns

Package
F = FDIP32W (4)
B = PDIP32
K = PLCC32
N = TSOP32: 8 x 20 mm (4)

Temperature Range
6 = –40 to 85 °C

Options
TR = Tape & Reel Packing

Note: 1. High Speed, see AC Characteristics section for further information.
2. This speed also guarantees 70ns access time at V_{CC} = 3.0V to 3.6V.
3. These speeds are replaced by the 100ns.
4. Packages option available on request. Please contact STMicroelectronics local Sales Office.

If you have any questions or suggestions concerning the matters raised in this document, please send them to the following electronic mail address:

ask.memory@st.com (for general enquiries)

Please remember to include your name, company, location, telephone number and fax number.