



INTERNATIONAL CMOS
TECHNOLOGY, INC.

27CX641/27CX642

8,192 x 8-bit CMOS High-Speed Erasable PROM

Features

- **Advanced CMOS EPROM Technology**
- **High Performance**
 - 27CX641/642-35 $t_{AA} = 35\text{ns}$ max
 - 27CX641/642-40 $t_{AA} = 40\text{ns}$ max
 - 27CX641/642-45 $t_{AA} = 45\text{ns}$ max
 - 27CX641/642-55 $t_{AA} = 55\text{ns}$ max
- **Low Power Consumption**
 - $I_{CC} = 80\text{mA}$ max (Commercial)
- **TTL-Compatible I/O**
- **Reprogrammability**
 - Adds convenience, reduces costs
 - Windowed package for UV erasure
 - Allows 100% factory testing
- **Bipolar PROM replacement**
 - Pin-compatible with Bipolar PROMs
 - Higher speed
 - Lower power consumption
 - 300-mil and 600-mil packages
- **Commercial and Industrial Versions**

General Description

The ICT 27CX641 and 27CX642 are 8,192 X 8-bit CMOS high-speed UV-erasable PROMs that provide a low-power reprogrammable alternative to bipolar fuse-link PROMs. Available in both 600mil (27CX641) and 300mil (27CX642) packages, these devices are pin/socket-compatible with many popular bipolar PROMs.

The 27CX641/642 are designed in an advanced CMOS EPROM technology and use differential

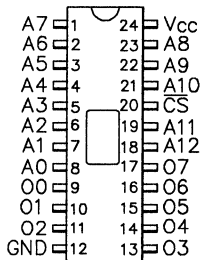
memory cell techniques to provide access times comparable to high-speed bipolar PROMs (as fast as 35ns) with a significant improvement in power consumption. The reprogrammability of the 27CX641/642 not only adds convenience and reduces development and field retrofit costs, but enhances factory testability, allowing for 100% field programmability and function.

Pin Diagrams

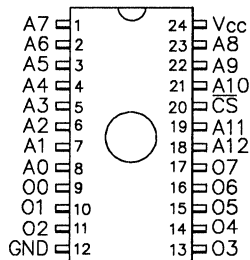
Pin Names

A0-A12 Address Inputs
O0-O7 Data Outputs
CS Chip Select
GND Ground
Vcc Power Supply

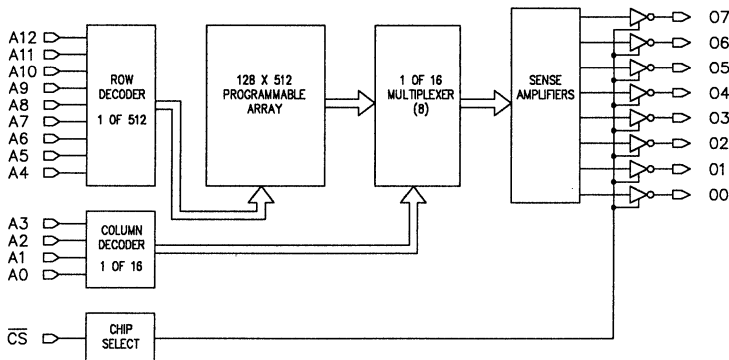
27CX642 (300mil)



27CX641 (600mil)



Block Diagram





Exposure to absolute maximum ratings over extended periods of time may affect device reliability. Exceeding absolute maximum ratings may cause permanent damage.

Absolute Maximum Ratings

Symbol	Parameter	Conditions	Rating	Unit
V _{CC}	Supply Voltage	Relative to GND	-0.6 to +7.0	V
V _{IO}	Voltage Applied to Any Pin	Relative to GND	-0.6 to V _{CC} +0.6	V
T _A	Ambient Temp., Power Applied		-10 to +85	°C
T _{ST}	Storage Temperature		-65 to +150	°C
T _{LT}	Lead Temperature	Soldering 10 seconds	+ 300	°C

Operating Ranges

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CC}	Supply Voltage	Commercial	4.75	5.25	V
V _{CC}	Supply Voltage	Industrial	4.50	5.50	V
T _A	Ambient Temperature	Commercial	0	70	°C
T _A	Ambient Temperature	Industrial	-40	85	°C

D.C. Electrical Characteristics

Over the operating range

Symbol	Parameter	Conditions	Min	Max	Unit
V _{IH}	Input HIGH Level		2.0 ¹		V
V _{IL}	Input LOW Level			0.8	V
V _{OH}	Output HIGH Voltage ²	V _{CC} = Min, I _{OH} = -4.0mA	2.4		V
V _{OL}	Output LOW Voltage ²	V _{CC} = Min, I _{OL} = 12mA		0.45	V
I _L	Input Leakage Current	V _{CC} = Max, GND ≤ V _I ≤ V _{CC}		10	μA
I _{OS}	Output Short Circuit Current ³	V _{CC} = Max, V _O = GND, CS = V _{IL}	-15	-90	mA
I _{OZ}	Output Leakage Current	V _{CC} = Max, V _O = V _{CC} or GND, CS = V _{IH}		10	μA
I _{CC}	Power Supply Current	All inputs =(GND or V _{CC}) ± 0.3V @ f = 15MHz		80 ¹	mA
V _{IC}	Input Clamp Voltage	V _{CC} = Min, I _{IN} = -18mA		-1.2	V

Capacitance

These measurements are periodically sample tested..

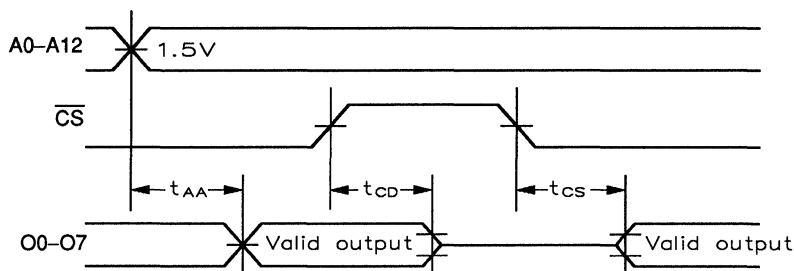
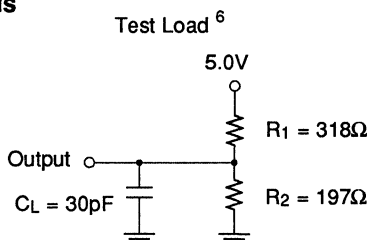
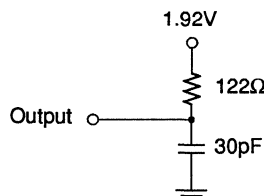
Symbol	Parameter	Conditions	Min	Max	Unit
C _{IN}	Input Capacitance	T _A = 25°C V _{CC} = 5.0V @ f = 1MHz		6	pF
C _{OUT}	Output Capacitance			12	pF
C _{CS}	CS Pin Capacitance			15	pF

Notes:

1. Industrial specification: V_{IH} = 2.4V, I_{CC} = 120mA. Commercial -35 specification: I_{CC} = 90mA.
2. The 27CX641/27CX642 provide true CMOS output interface levels; the specifications shown are for TTL interface.
3. No more than one output should be shorted at a time. Duration of short circuit should not be more than one second.

**A.C. Electrical Characteristics**Over the Operating Range ⁴

Symbol	Parameter	27CX641-35		27CX641-40		27CX641-45		27CX641-55		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
t _{AA}	Access Time From Address To Output		35		40		45		55	ns
t _{CS}	Access Time From Chip Select to Output ⁵		20		20		25		35	ns
t _{CD}	Chip Disable to High-Z ^{5,6}		20		20		20		35	ns

Switching Waveforms**Test Loads****Thevenin Equivalent****Notes:**

4. Test conditions assume: signal transition times of 5 nS or less from the 10% and 90% points; timing reference levels of 1.5V (unless otherwise specified); and test loads shown.

5. t_{CS} is measured from the input transition to V_{REF} (1.92V) ± 0.1V. t_{CD} is measured from the input transition to V_{OH} - 0.1V or V_{OL} + 0.1V.

6. C_L includes scope and jig capacitance. t_{CD} is tested with C_L = 5pF.

Erasure Characteristics

The 27CX641/27CX642 are erased by exposure to ultraviolet light. For complete erasure, the recommended minimum integrated dose (UV intensity X exposure time) is 15 Watt-second/cm² of ultraviolet light with a wavelength of 2537Å. For an ultraviolet lamp with a 12mW/cm² power rating, the exposure time would be approximately 20 minutes. The 27CX641/27CX642 should be placed within one inch of the lamp during erasure. Exposing the CMOS EPROM to high-intensity UV light for extended periods may cause permanent damage to the device.

Programming the 27CX641/642

The 27CX641/27CX642 employ a dual-transistor differential memory cell design. Initially, and after erasure, all bits of the 27CX641/27CX642 are in an undefined state. Verifying a blank device will yield erroneous results. The desired state ("1" or "0") of each bit must be programmed into the device to ensure proper operation.

Programming support is available from ICT and third-party vendors including DATA I/O (model no. 29B with Unipak 2 or 2B - firmware version V14 - family/pinout code=82/67). For more information on programming support and programming specifications, please contact ICT.