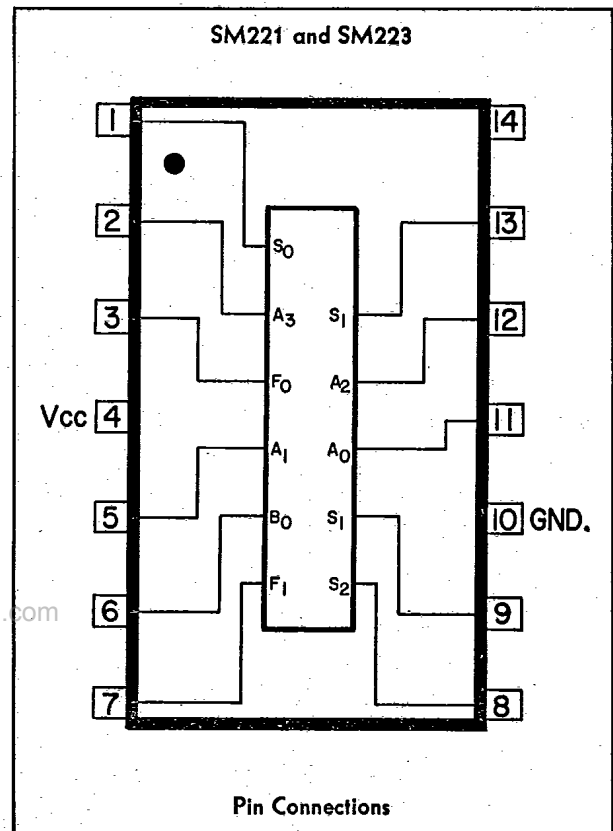
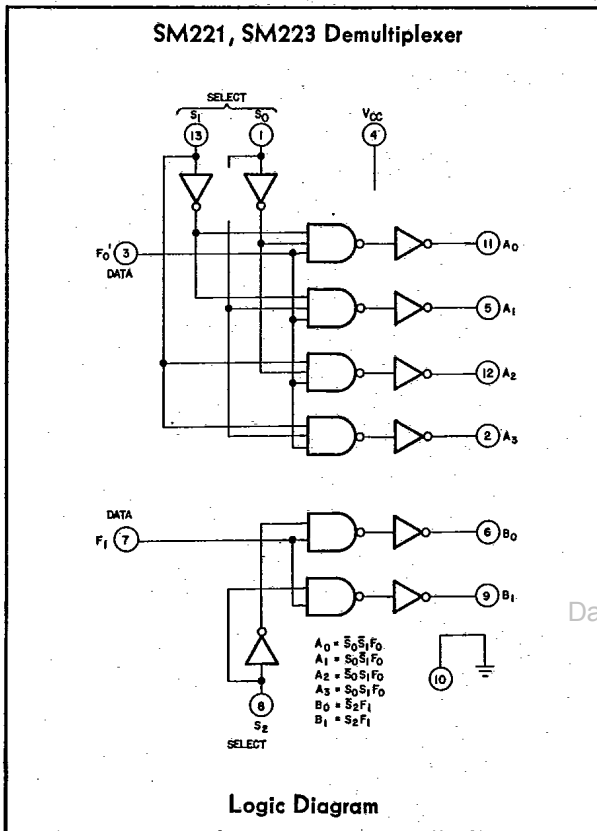


SYLVANIA
**Demultiplexer
SM221 and SM223**
Monolithic Digital Functional Arrays For Military Temp. Range -55°C to +125°C • Industrial 0°C to +75°C


The **SM221** and **SM223** Demultiplexers, described in this data sheet, are part of Sylvania's line of Monolithic Digital Functional Arrays.

These devices are high speed, silicon, integrated circuit arrays designed to perform the opposite function of their companion circuits, the **SM211** and **SM213**. That is, the **SM211** and **SM213** function as multiplexers or encoders, while the **SM221** and **SM223** function as demultiplexers or decoders.

The **SM221** and **SM223** arrays are offered in 14-lead flat pack (TO-85) or Sylvania's ceramic 14-lead dual-in-line plug-in package.

FUNCTIONAL DESCRIPTION

The Demultiplexer Arrays consist of two decoding sections. In one section, the data input may be steered to any one of four identical outputs under control of two selection variables. In the other section, another data input may be routed to either of two identical outputs depending on the state of one selection line. The output inverter/drivers provide the "true" states of the input data allowing direct entry into subsequent systems without extra gate inversion. An obvious application for this type of device is as a demultiplexer operating on a serial data line and converting to parallel data. The original parallel data would have been multiplexed into serial form by a Sylvania **SM211** or **SM213** array. Thus, the **SM210** and **SM220** series devices make an ideal pair in systems where it is desired to multiplex many data lines, transmit on one or two lines, and convert back to the original data form at the receiving end for processing.

1. Each package decodes one data line into four outputs and another data line into two outputs.
2. High speed: Typically less than 12 nanoseconds delay from data input to any output.
3. Complete compatibility with all SUHL* I and II devices and other Sylvania arrays.
4. High fanout: 7 SUHL I loads.
5. High capacitance drive.
6. High noise immunity: ± 400 milliwatts over the temperature range.
7. Wide logic swing: Typical logic "0" = 0.25 volts, logic "1" = 3.25 volts.
8. Low output impedance in "0" and "1" state reduces noise pickup.
9. Buffered outputs.
10. Single 5-volt power supply.
11. Each input is protected by a clamp diode.

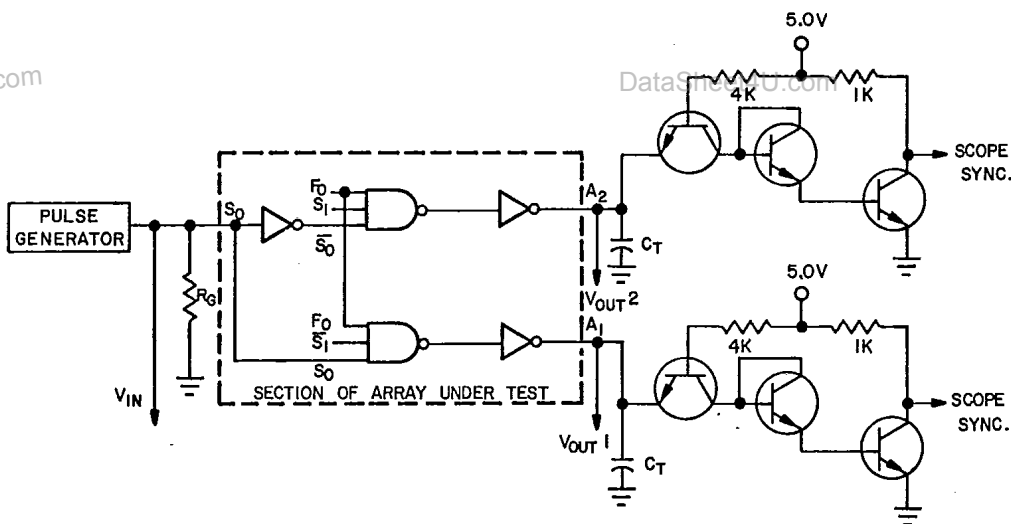
*Sylvania Universal High-Level Logic

RATINGS

VOLTAGE	Min.	Typ.	Max.	TEMPERATURE	Min.	Typ.	Max.
Supply Voltage (10-millisecond pulse, 50% duty cycle)			7 Vdc	Operating Temperature: SM221 (Military) SM223 (Industrial) Storage Temperature	-55°C		+125°C
Supply Voltage (Operating): SM221 (Military)	4.5V	5.0V	5.5 Vdc		0°C		+75°C
SM223 (Industrial)	4.75V	5.0V	5.25 Vdc		-65°C		+200°C
Input Voltage			5.5 Vdc				
Output Voltage			5.5 Vdc				

TYPICAL SWITCHING CHARACTERISTICS

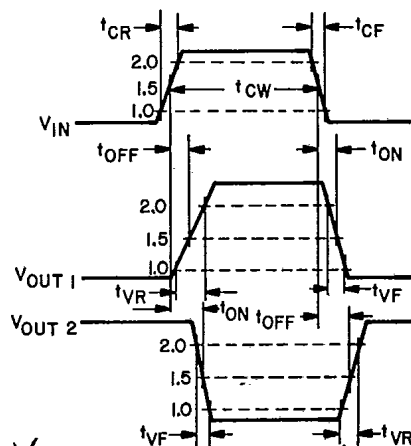
Parameters @ $V_{CC} = 5.0$ Volts, $T_A = +25^\circ\text{C}$, $C_T = 15$ pF, $FO = 1$					
Signal Path	t_{ON}	t_{OFF}	t_{VR}	t_{VF}	Units
Any input to any output	20	20	4	2.5	nsec Max.



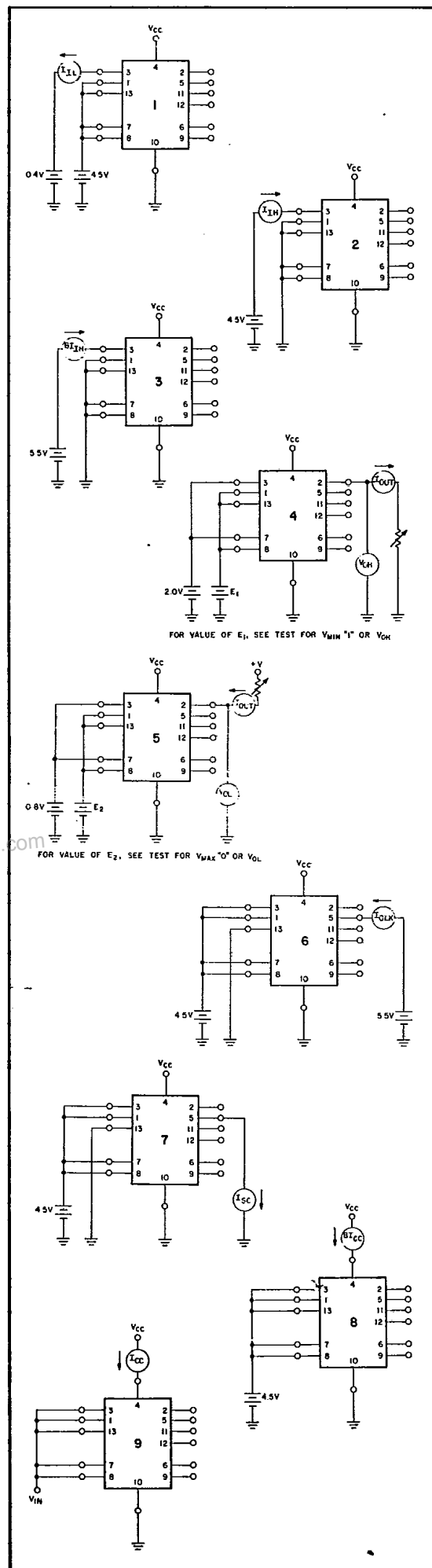
Illustrating a two-gate path from a control input to one output and a three-gate path from the same control input to another output. When $\bar{S}_1 F_0 = 1$, output A_1 follows the input and appears after two gate delays. When $\bar{S}_1 F_0 = 1$, output A_2 is the inverse of the input and appears after three gate delays.

Notes:

1. PRR = 2 MHz
2. $t_{CW} = 200$ nsec
3. $V_{CA} = 3.0$ Volts
4. $t_{CR}, t_{CF} \leq 10$ nsec
5. $R_G =$ Output Impedance of Pulse Generator, Typ. 50Ω
6. Transistors 2N2784 or Equivalent.
7. $C_T =$ Total Output Capacitance Including Probe, Wiring and Load



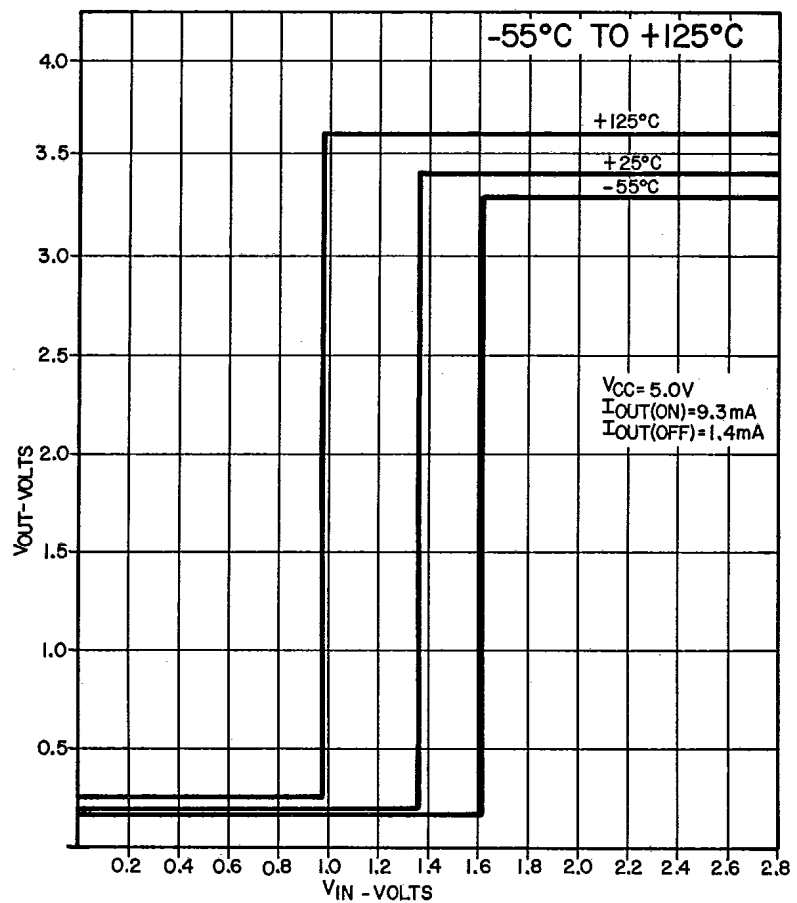
SM-00221-2X



Parameters	Symbol	SM221 @ -55°C to +125°C Units	SM223 @ 0°C to +75°C Units	Test Fig. No.
INPUT Input Load Current, S_0 and S_1 S_2 F_0 F_1 @ $V_{IN} =$ Other Inputs V_{CC}	I_{IL} I_{IL} I_{IL} I_{IL} I_{IL}	4.0 mA Max. 2.66 mA Max. 5.33 mA Max. 2.66 mA Max. 0.4 Volts 4.5 Volts 5.5 Volts	4.5 mA Max. 3.0 mA Max. 6.0 mA Max. 3.0 mA Max. 0.4 Volts 4.5 Volts 5.25 Volts	1
Input Leakage Current, S_0 and S_1 S_2 F_0 F_1 @ $V_{IN} =$ Other Inputs V_{CC}	I_{IH} I_{IH} I_{IH} I_{IH}	0.3 mA Max. 0.2 mA Max. 0.4 mA Max. 0.2 mA Max. 4.5 Volts 0 Volts 5.5 Volts	0.3 mA Max. 0.2 mA Max. 0.4 mA Max. 0.2 mA Max. 4.5 Volts 0 Volts 5.25 Volts	2
Input Breakdown Current, S_0 and S_1 S_2 F_0 F_1 @ $V_{IN} =$ Other Inputs V_{CC}	B_{IH} B_{IH} B_{IH} B_{IH}	3 mA Max. 2 mA Max. 4 mA Max. 2 mA Max. 5.5 Volts 0 Volts 5.5 Volts	3 mA Max. 2 mA Max. 4 mA Max. 2 mA Max. 5.5 Volts 0 Volts 5.25 Volts	3
Logic "1" Threshold Voltage Minimum input voltage which will function as a logic "1" Other Inputs V_{CC}	V_{MIN} "1"	2.0 Volts 4.5 Volts 4.5 Volts	2.0 Volts 4.5 Volts 4.75 Volts	4
Logic "0" Threshold Voltage Maximum input voltage which will function as a logic "0" Other Inputs V_{CC}	V_{MAX} "0"	0.8 Volts 4.5 Volts 4.5 Volts	0.8 Volts 4.5 Volts 5.25 Volts	5
OUTPUT Output Leakage Current @ $V_{OUT} =$ Inputs F_0 and F_1 Inputs S_0, S_1, S_2 adjusted to set output under test to logic "1" V_{CC}	I_{OLK}	0.25 mA Max. 5.5 Volts 4.5 Volts 5.5 Volts	0.25 mA Max. 5.5 Volts 4.5 Volts 5.25 Volts	6
Output Short Circuit Current @ $V_{OUT} =$ Inputs F_0 and F_1 Inputs S_0, S_1, S_2 adjusted to set output under test to logic "1" V_{CC}	I_{SC}	25 mA Min. 100 mA Max. 0 Volts 4.5 Volts 5.0 Volts	25 mA Min. 100 mA Max. 0 Volts 4.5 Volts 5.0 Volts	7
Logic "0" Level @ $I_{OUT} =$ Inputs F_0 and F_1 Other Inputs V_{CC}	V_{OL}	0.4 Volts Max. 9.3 mA 0.8 Volts 2.0 Volts 4.5 Volts	0.4 Volts Max. 11.6 mA 0.8 Volts 2.0 Volts 4.75 Volts	5
Logic "1" Level @ $I_{OUT} =$ Inputs F_0 and F_1 Inputs S_0, S_1, S_2 adjusted to appropriate threshold condition which will set output under test to logic "1" V_{CC}	V_{OH}	2.4 Volts Min. 1.4 mA 2.0 Volts 4.5 Volts	2.4 Volts Min. 1.4 mA 2.0 Volts 4.75 Volts	4
POWER REQUIREMENTS Breakdown Current Inputs V_{CC} (10 millisecond pulse, 50% duty cycle) 25°C only	B_{lcc}	92 mA Max. 4.5 Volts 7.0 Volts	108 mA Max. 4.5 Volts 7.0 Volts	8
Current Drain, "ON" State Inputs V_{CC}	I_{CC} "0"	66 mA Max. 0 Volts 5.0 Volts	75 mA Max. 0 Volts 5.0 Volts	9
Current Drain, "OFF" State* Inputs V_{CC}	I_{CC} "1"	58 mA Max. 4.5 Volts 5.0 Volts	67 mA Max. 4.5 Volts 5.0 Volts	9

*There is no true "OFF" State (all outputs at logic "1"). Only one output in each section may be at logic "1" at one time.

SM221 AND SM223 TYPICAL TRANSFER CHARACTERISTICS



ORDERING INFORMATION

DataSheet4U.com

SM221 and SM223 arrays are currently offered for operation over the Military temperature range of $-55^{\circ}C$ to $+125^{\circ}C$ and Industrial/Commercial temperature range of $0^{\circ}C$ to $+75^{\circ}C$. A two-digit suffix is used to denote choice of package. Thus, orders should be placed as follows:

14-lead hermetic flat pack. SM221-02 or SM223-02

14-lead hermetic plug-in package. SM221-03 or SM223-03

The nearest Sylvania sales office or distributor will be happy to accept your order or provide further information.