

# Am2954 • Am2955

## Octal Registers with Three-State Outputs

### DISTINCTIVE CHARACTERISTICS

- Eight-bit, high-speed parallel registers
- Am2954 has non-inverting inputs
- Am2955 has inverting inputs
- Positive, edge-triggered, D-type flip-flops
- Buffered common clock and buffered common three-state control
- $V_{OL} = 0.5V$  (max) at  $I_{OL} = 32mA$
- High-speed - Clock to output 11ns typical

### FUNCTIONAL DESCRIPTION

The Am2954 and Am2955 are 8-bit registers built using high-speed Schottky technology. The registers consist of eight D-type flip-flops with a buffered common clock and a buffered 3-state output control. When the output enable ( $\overline{OE}$ ) input is LOW, the eight outputs are enabled. When the  $\overline{OE}$  input is HIGH, the outputs are in the 3-state condition.

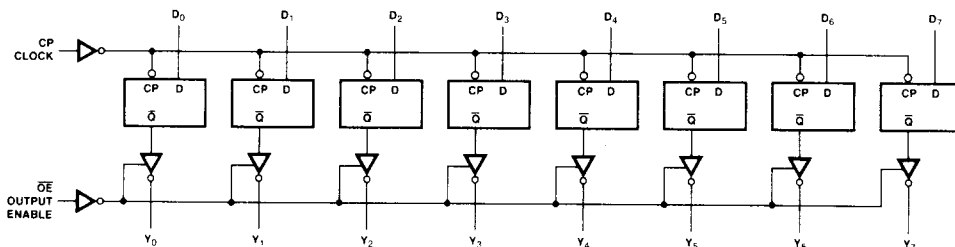
Input data meeting the set-up and hold time requirements of the D inputs is transferred to the Y outputs on the LOW-to-HIGH transition of the clock input.

The devices are packaged in a space-saving (0.3-inch row spacing) 20-pin package.

### RELATED PRODUCTS

Part No.	Description
Am29821-26	8, 9, 10-Bit Registers
Am2918	Quad D-Register
Am2920	Quad D-Type Flip-Flop

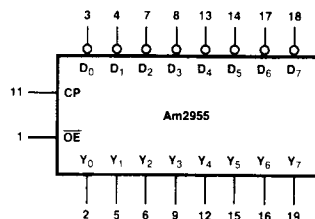
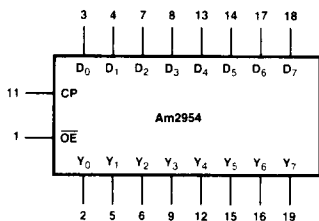
### LOGIC DIAGRAM Am2954



Inputs  $D_0$  through  $D_7$  are inverted on the Am2955.

BLI-110

### LOGIC SYMBOLS



BLI-112

$V_{CC}$  = Pin 20  
GND = Pin 10



## Am2954/2955

### ELECTRICAL CHARACTERISTICS

The Following Conditions Apply Unless Otherwise Specified:

Am2954XC, DC, PC	Am2955XC, DC, PC	$T_A = 0 \text{ to } 70^\circ\text{C}$	$V_{CC} = 4.75 \text{ to } 5.25\text{V}$
Am2954XM, DM, FM	Am2955XM, DM, FM	$T_C = -55 \text{ to } +125^\circ\text{C}$	$V_{CC} = 4.50 \text{ to } 5.50\text{V}$

### DC CHARACTERISTICS OVER OPERATING RANGE

Parameters	Description	Test Conditions (Note 1)	Min	Typ (Note 2)	Max	Units
$V_{OH}$	Output HIGH Voltage	$V_{CC} = \text{MIN}$ $V_{IN} = V_{IH} \text{ or } V_{IL}$	MIL, $I_{OH} = -2.0\text{mA}$	2.4	3.4	Volts
			COM'L, $I_{OH} = -6.5\text{mA}$	2.4	3.1	
$V_{OL}$	Output LOW Voltage	$V_{CC} = \text{MIN}$ $V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20\text{mA}$		.45	Volts
			$I_{OL} = 32\text{mA}$		.5	
$V_{IH}$	Input HIGH Level	Guaranteed input logical HIGH voltage for all inputs	2.0			Volts
$V_{IL}$	Input LOW Level	Guaranteed input logical LOW voltage for all inputs			0.8	Volts
$V_I$	Input Clamp Voltage	$V_{CC} = \text{MIN}$ , $I_{IN} = -18\text{mA}$			-1.2	Volts
$I_{IL}$	Input LOW Current	$V_{CC} = \text{MAX}$ , $V_{IN} = 0.5\text{V}$			-250	$\mu\text{A}$
$I_{IH}$	Input HIGH Current	$V_{CC} = \text{MAX}$ , $V_{IN} = 2.7\text{V}$			50	$\mu\text{A}$
$I_I$	Input HIGH Current	$V_{CC} = \text{MAX}$ , $V_{IN} = 5.5\text{V}$			1.0	$\text{mA}$
$I_{OZ}$	Off-State (High-Impedance) Output Current	$V_{CC} = \text{MAX}$	$V_O = 0.5\text{V}$		-50	$\mu\text{A}$
			$V_O = 2.4\text{V}$		50	
$I_{SC}$	Output Short Circuit Current (Note 3)	$V_{CC} = \text{MAX}$	-40		-100	$\text{mA}$
$I_{CC}$	Power Supply Current (Note 4)	$V_{CC} = \text{MAX}$		90	140	$\text{mA}$

- Notes: 1. For conditions shown as MIN or MAX use the appropriate value specified under Electrical Characteristics for the applicable device type.  
 2. Typical limits are at  $V_{CC} = 5.0\text{V}$ ,  $25^\circ\text{C}$  ambient and maximum loading.  
 3. Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.  
 4. Am2954 measured at CLK = LOW-to-HIGH,  $\overline{OE} = \text{HIGH}$ , and all data inputs are LOW.  
 Am2955 measured at CLK = LOW-to-HIGH,  $\overline{OE} = \text{HIGH}$ , and all data inputs are LOW.

### MAXIMUM RATINGS (Above which the useful life may be impaired)

Storage Temperature	-65 to +150°C
Temperature (Ambient) Under Bias	-55 to +125°C
Supply Voltage to Ground Potential (Pin 16 to Pin 8) Continuous	-0.5 to +7.0V
DC Voltage Applied to Outputs for HIGH Output State	-0.5V to + $V_{CC}$ max
DC Input Voltage	-0.5 to +5.5V
DC Output Current, Into Outputs	30mA
DC Input Current	-30 to +5.0mA

### DEFINITION OF FUNCTIONAL TERMS

$D_i$  The D flip-flop data inputs (Am2954, non-inverting).

$\overline{D}_i$  The D flip-flop data inputs (Am2955, inverting).

**CP** Clock Pulse for the register. Enters data on the LOW-to-HIGH transition.

$Y_i$  The register three-state outputs (Am2954, non-inverting).

$\overline{OE}$  Output Control. An active-LOW three-state control used to enable the outputs. A HIGH level input forces the outputs to the high impedance (off) state.

### FUNCTION TABLE

Function	Inputs				Internal	Outputs
	$\overline{OE}$	Clock	Am2954 $D_i$	Am2955 $\overline{D}_i$	$Q_i$	$Y_i$
Hi-Z	H	L	X	X	NC	Z
	H	H	X	X	NC	Z
LOAD REGISTER	L	↑	L	H	L	L
	L	↑	H	L	H	H
	H	↑	L	H	L	Z
	H	↑	H	L	H	Z

H = HIGH

L = LOW

X = Don't Care

NC = No Change

Z = High Impedance

↑ = LOW-to-HIGH transition

## SWITCHING CHARACTERISTICS

 $(T_A = 25^\circ\text{C}, V_{CC} = 5.0\text{V})$ 

Parameters	Description	Am2954 • Am2955			Units	Test Conditions
		Min	Typ	Max		
$t_{PLH}$	Clock to Output, $Y_i$		8	15	ns	$C_L = 15\text{pF}$ $R_L = 280\Omega$
$t_{PHL}$			11	17	ns	
$t_{ZH}$	$\overline{OE}$ to $Y_i$		8	15	ns	
$t_{ZL}$			11	18	ns	
$t_{HZ}$	$\overline{OE}$ to $Y_i$		5	9	ns	$C_L = 5\text{pF}$ $R_L = 280\Omega$
$t_{LZ}$			7	12	ns	
$t_{pw}$	Clock Pulse Width	HIGH	6		ns	$C_L = 15\text{pF}$ $R_L = 280\Omega$
		LOW	7.3		ns	
$t_S$	Data to Clock		5		ns	
$t_H$			2		ns	
$f_{max}$	Maximum Clock Frequency (Note 1)	75	100		MHz	

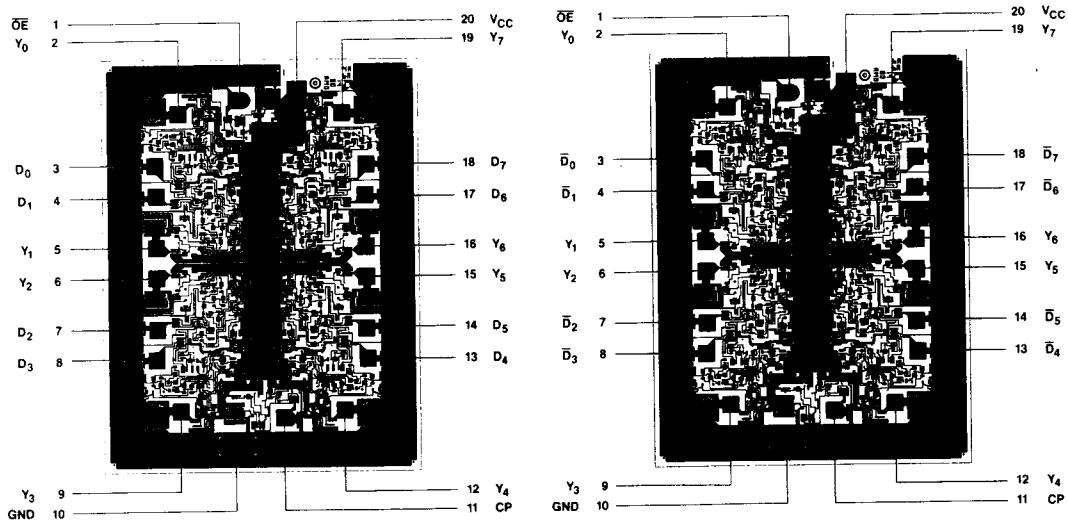
Note: 1. Per industry convention,  $f_{max}$  is the worst case value of the maximum device operating frequency with no constraints on  $t_r$ ,  $t_f$ , pulse width or duty cycle.

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## METALLIZATION AND PAD LAYOUTS

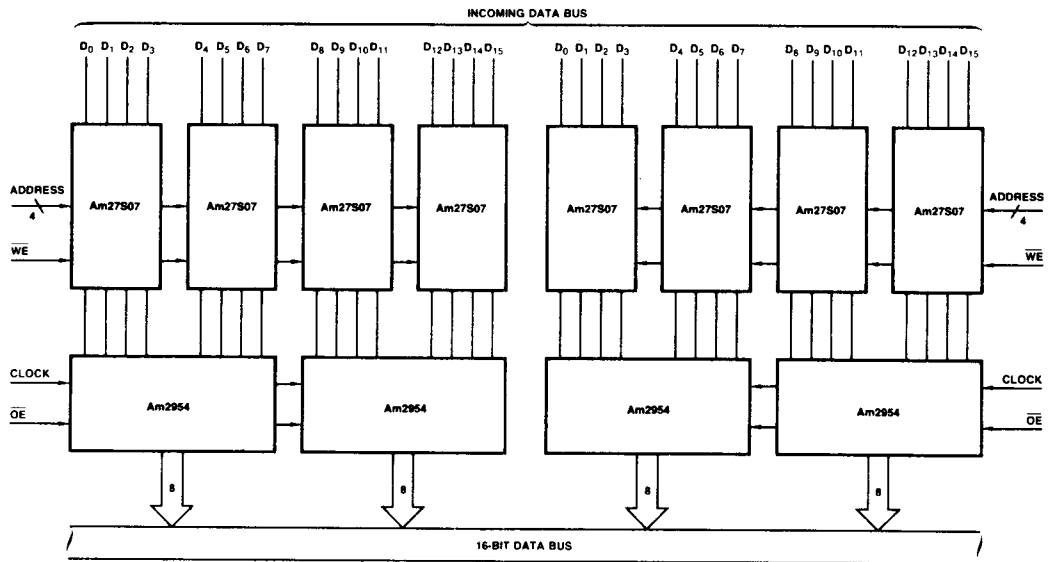
Am2954

Am2955



DIE SIZE 0.085" X 0.110"

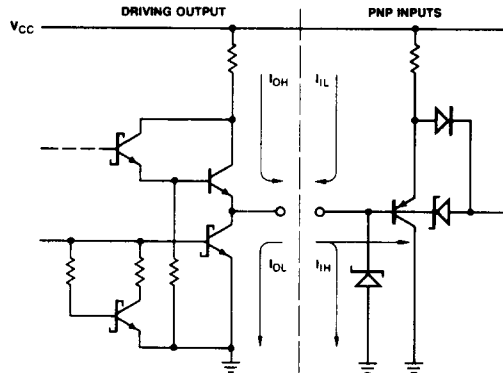
APPLICATION



Dual 16-word by 16-bit non-inverting high-speed data buffer.

BLI-113

SCHOTTKY INPUT/OUTPUT  
CURRENT INTERFACE CONDITIONS



Note: Actual current flow direction shown.

BLI-114