

## PART NUMBER

### 54LS356JB-ROCV

#### Rochester Electronics

#### Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer. (OCM)

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

#### Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
  - Class Q Military
  - Class V Space Level

#### Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

*The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.*

## 54LS356

### 8-Line to 1-Line Data Selectors/Multiplexers/Registers

These monolithic data selectors/multiplexers contain full on-chip binary decoding to select one of eight data sources. The data-select address is stored in transparent latches that are enabled by a low level on pin 11, SC.

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**FOR REFERENCE ONLY**

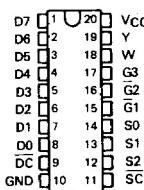
**TYPES SN54LS354, SN54LS355, SN54LS356, SN54LS357,  
SN74LS354, SN74LS355, SN74LS356, SN74LS357**  
**8-LINE TO 1-LINE DATA SELECTORS/MUXES/REGISTERS**

D2544, JULY 1979—REVISED APRIL 1985

**• Transparent Latches on Data Select Inputs**

**SN54LS354, SN54LS355 . . . J PACKAGE  
SN74LS354, SN74LS355 . . . DW, J OR N PACKAGE**

(TOP VIEW)



**• Choice of Data Registers:**

Transparent ('LS354, 'LS355)  
Edge-Triggered ('LS356, 'LS357)

**• Choice of Outputs:**

Three-State ('LS354, 'LS356)  
Open-Collector ('LS355, 'LS357)

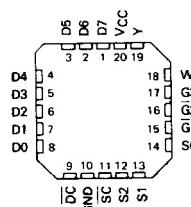
**• Complementary Outputs**

**• Easily Expandable**

**• High-Density 20-Pin Package**

**SN54LS354, SN54LS355 . . . FK PACKAGE  
SN74LS354, SN74LS355 . . . FN PACKAGE**

(TOP VIEW)



**description**

These monolithic data selectors/multiplexers contain full on-chip binary decoding to select one of eight data sources. The data-select address is stored in transparent latches that are enabled by a low level on pin 11, SC. On the 'LS354 and 'LS355 a similar enable for data is obtained by a low level on pin 9, DC. The edge-triggered data registers of the 'LS356 and 'LS357 are clocked by a low-to-high transition on pin 9, CLK. Complementary outputs are available in either three-state versions ('LS354 and 'LS356) or open-collector versions ('LS355 and 'LS357).

The SN54LS354 through SN54LS357 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ ; the SN74LS354 through SN74LS357 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

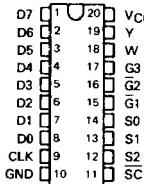
**3**

**TTL DEVICES**

**SN54LS356, SN54LS357 . . . J PACKAGE**

**SN74LS356, SN74LS357 . . . DW, J OR N PACKAGE**

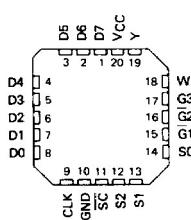
(TOP VIEW)



**SN54LS356, SN54LS357 . . . FK PACKAGE**

**SN74LS356, SN74LS357 . . . FN PACKAGE**

(TOP VIEW)



**PRODUCTION DATA**

This document contains information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
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3-1001

**TYPES SN54LS354, SN54LS355, SN54LS356, SN54LS357,  
SN74LS354, SN74LS355, SN74LS356, SN74LS357  
8-LINE TO 1-LINE DATA SELECTORS/MUXES/REGISTERS**

FUNCTION TABLE

SELECT			INPUTS			OUTPUTS				
S2	S1	S0	DATA CONTROL ('LS354, 'LS355)	CLOCK ('LS356, 'LS357)	OUTPUT ENABLES	G1	G2	G3	W	Y
X	X	X	X	X	X	H	X	X	Z	Z
X	X	X	X	X	X	X	H	X	Z	Z
X	X	X	X	X	X	X	X	L	Z	Z
L	L	L	L	L	L	L	L	H	D0	D0
L	L	L	H	H or L	L	L	L	H	D0n	D0n
L	L	H	L	L	L	L	L	H	D1	D1
L	L	H	H	H or L	L	L	L	H	D1n	D1n
L	H	L	L	L	L	L	L	H	D2	D2
L	H	L	H	H or L	L	L	L	H	D2n	D2n
L	H	H	L	L	L	L	L	H	D3	D3
L	H	H	H	H or L	L	L	L	H	D3n	D3n
H	L	L	L	L	L	L	L	H	D4	D4
H	L	L	H	H or L	L	L	L	H	D4n	D4n
H	L	H	L	L	L	L	L	H	D5	D5
H	L	H	H	H or L	L	L	L	H	D5n	D5n
H	H	L	L	L	L	L	L	H	D6	D6
H	H	L	H	H or L	L	L	L	H	D6n	D6n
H	H	H	L	L	L	L	L	H	D7	D7
H	H	H	H	H or L	L	LL	H		D7n	D7n

H = high level (steady state)

L = low level (steady state)

X = irrelevant (any input, including transitions)

Z = high-impedance state (off state)

= transition from low to high level

D0 . . . D7 = the level of steady-state inputs at inputs D0 through D7, respectively, at the time of the low-to-high clock transition in the case of 'LS356 and 'LS357

D0n . . . D7n = the level of steady state inputs at inputs D0 through D7, respectively, before the most recent low-to-high transition of data control or clock

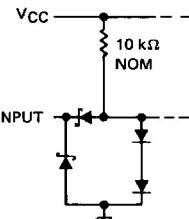
This column shows the input address setup with SC low.

3

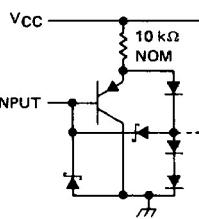
TTL DEVICES

schematics of inputs and outputs

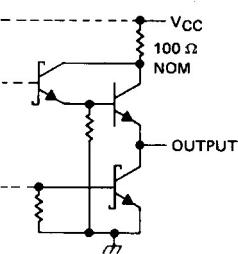
EQUIVALENT OF EACH DATA OR SELECT INPUT



EQUIVALENT OF ALL OTHER INPUTS



TYPICAL OF BOTH OUTPUTS ON 'LS354 AND 'LS356



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage (see Note 1) . . . . . 7 V

Input voltage . . . . . 7 V

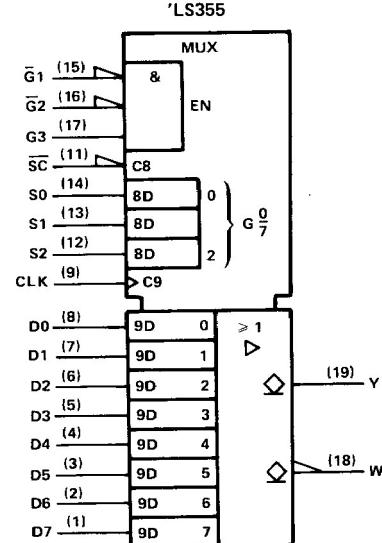
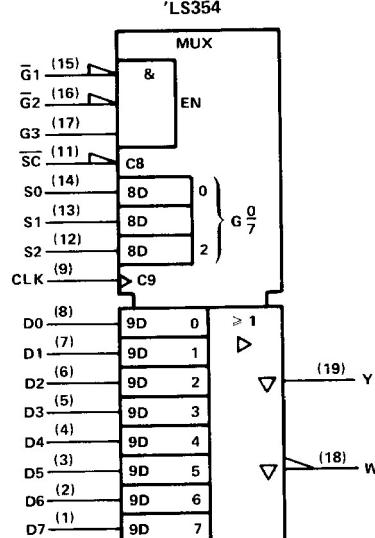
Operating free-air temperature range: SN54LS' . . . . . -55°C to 125°C  
SN74LS' . . . . . 0°C to 70°C

Storage temperature range . . . . . -65°C to 150°C

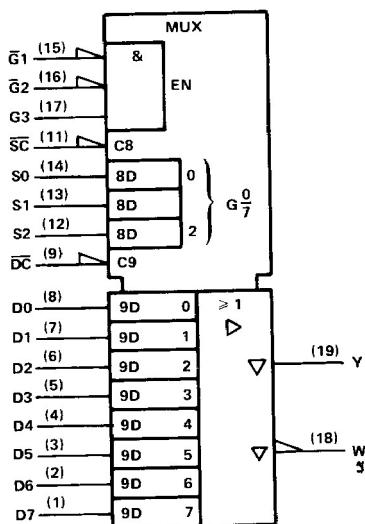
NOTE 1: Voltage values are with respect to network ground terminal.

**TYPES SN54LS354, SN54LS355, SN54LS356, SN54LS357,  
SN74LS354, SN74LS355, SN74LS356, SN74LS357**  
**8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS/REGISTERS**

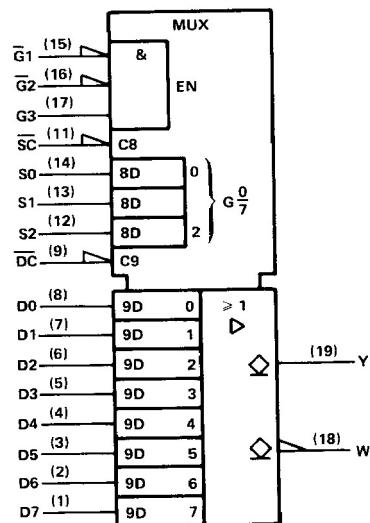
## logic symbols



'LS356



'LS357



Pin numbers shown on logic notation are for DW, J or N packages.

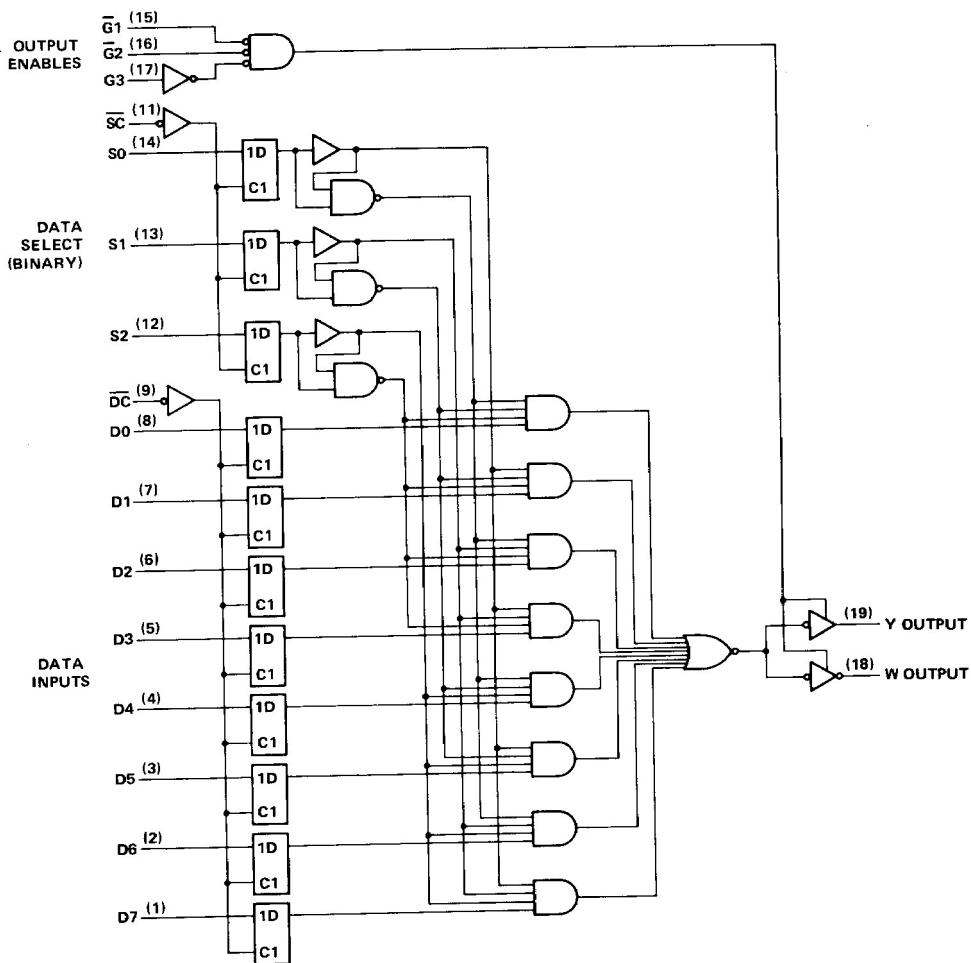
3

## TTL DEVICES

**TYPES SN54LS354, SN54LS355, SN74LS354, SN74LS355  
8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS/REGISTERS**

**logic diagram (positive logic)**

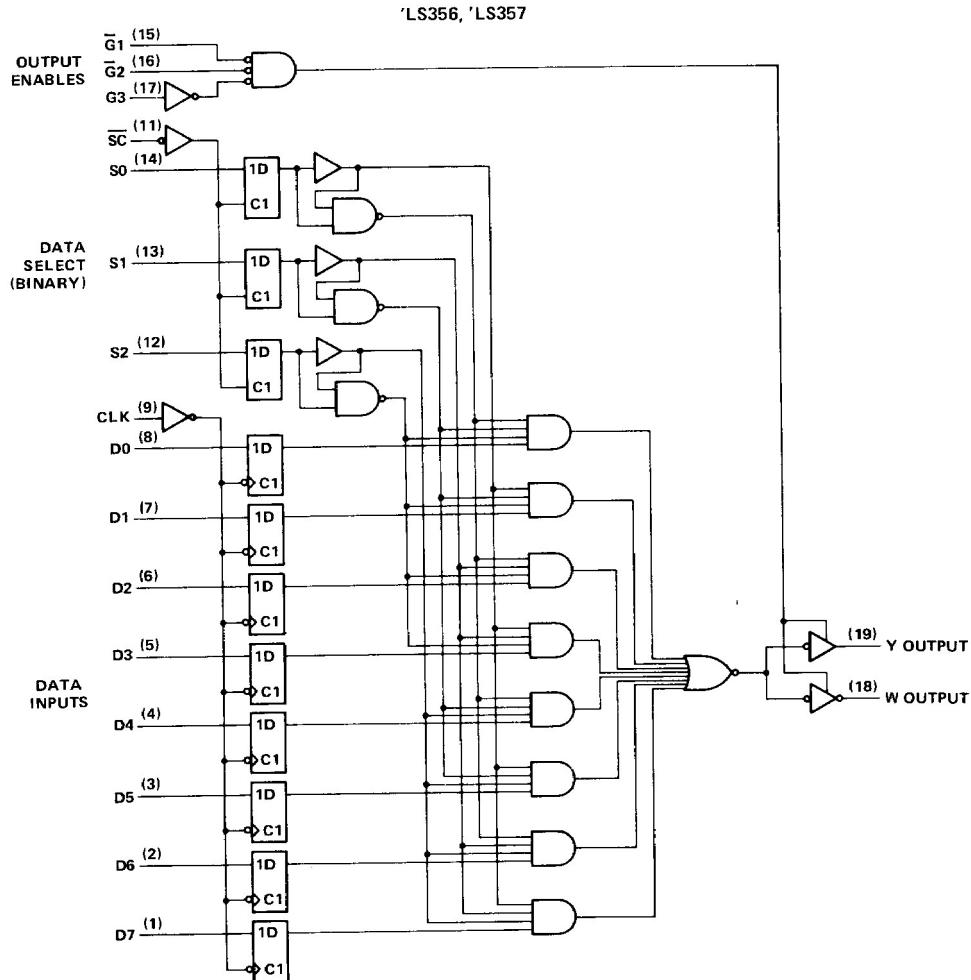
'LS354, 'LS355



Pin numbers shown on logic notation are for DW, J or N packages.

**TYPES SN54LS356, SN54LS357, SN74LS356, SN74LS357  
8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS/REGISTERS**

logic diagram (positive logic)



Pin numbers shown on logic notation are for DW, J or N packages.

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TTL DEVICES

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3-1005

**TYPES SN54LS354, SN54LS356, SN74LS354, SN74LS356**  
**8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS/REGISTERS**  
**WITH 3-STATE OUTPUTS**

**recommended operating conditions**

		SN54LS354 SN54LS356			SN74LS354 SN74LS356			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage				0.7		0.8	V
I <sub>OH</sub>	High-level output current				-1		-2.6	mA
I <sub>OL</sub>	Low-level output current				12		24	mA
t <sub>su</sub>	Setup times, high-or-low-level data (with respect to t at pin 9)	'LS354	15		15			ns
		'LS356	15		15			
t <sub>h</sub>	Hold times, high-or-low-level data (with respect to t at pin 9)	'LS354	15		15			ns
		'LS356	0		0			
T <sub>A</sub>	Operating free-air temperature		-55		125	0	70	°C

**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

PARAMETER	TEST CONDITIONS <sup>†</sup>	SN54LS354 SN54LS356			SN74LS354 SN74LS356			UNIT
		MIN	TYP <sup>‡</sup>	MAX	MIN	TYP <sup>‡</sup>	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA				-1.5		-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OH</sub> = MAX,	2.4			2.4			V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX	0.25	0.4		0.25	0.4		V
		I <sub>OL</sub> = 12 mA			0.35	0.5		
		I <sub>OL</sub> = 24 mA						
I <sub>OZ</sub>	V <sub>CC</sub> = MAX	V <sub>O</sub> = 2.7 V			20		20	μA
		V <sub>O</sub> = 0.4 V			-20		-20	
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V				0.1		0.1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V				20		20	μA
I <sub>IL</sub>	D <sub>C</sub> or CLK, G <sub>1</sub> , G <sub>2</sub> , G <sub>3</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-0.2		-0.2	mA
	All others				-0.4		-0.4	
I <sub>OS</sub> <sup>§</sup>	V <sub>CC</sub> = MAX		-30		-130	-30	-130	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, See Note 2		29	46		29	46	mA

<sup>†</sup> For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.

<sup>‡</sup> All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

<sup>§</sup> Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTE 2: I<sub>CC</sub> is measured with the inputs grounded and the outputs open.

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TTL DEVICES

3-1006

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**TYPES SN54LS354, SN54LS356, SN74LS354, SN74LS356  
8-LINE TO 1-LINE DATA SELECTORS/MUXES/REGISTERS  
WITH 3-STATE OUTPUTS**

switching characteristics,  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $R_L = 667 \Omega$

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS354			'LS356			UNIT	
				MIN	Typ	MAX	MIN	Typ	MAX		
$t_{PLH}$	D0-D7	Y	$C_L = 45 \text{ pF}$ , See Note 3	24	36					ns	
$t_{PHL}$				23	35						
$t_{PLH}$		W		18	27						
$t_{PHL}$				29	44						
$t_{PLH}$		$\overline{DC}$ or CLK		28	42	18	27				
$t_{PHL}$				26	39	33	50				
$t_{PLH}$		W		22	33	24	36				
$t_{PHL}$				33	50	18	27				
$t_{PLH}$	S0, S1 S2	Y		29	44	30	45			ns	
$t_{PHL}$				24	45	28	48				
$t_{PLH}$		W		28	42	36	54				
$t_{PHL}$				34	51	30	45				
$t_{PLH}$		$\overline{SC}$		34	51	36	54				
$t_{PHL}$				31	47	40	60				
$t_{PLH}$		W		27	41	32	48				
$t_{PHL}$				40	60	36	54				
$t_{PZH}$	$\overline{G}_1, \overline{G}_2$	Y	$C_L = 5 \text{ pF}$ , See Note 3	14	27	14	25			ns	
$t_{PZL}$				18	27	17	25				
$t_{PHZ}$				15	25	16	24				
$t_{PLZ}$				15	25	16	24				
$t_{PZH}$		W		12	24	14	23				
$t_{PZL}$				16	24	16	23				
$t_{PHZ}$				15	25	16	23				
$t_{PLZ}$				15	25	16	23				
$t_{PZH}$				15	29	15	27				
$t_{PZL}$	G3	Y	$C_L = 45 \text{ pF}$ , See Note 3	19	29	18	27			ns	
$t_{PHZ}$				15	25	16	25				
$t_{PLZ}$				15	25	16	25				
$t_{PZH}$		W		13	25	14	25				
$t_{PZL}$				17	25	16	25				
$t_{PHZ}$				15	25	16	25				
$t_{PLZ}$				15	25	16	25				

NOTE 3: See General Information Section for load circuits and voltage waveforms.

**3**  
**TTL DEVICES**

**TYPES SN54LS355, SN54LS357, SN74LS355, SN74LS357  
8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS/REGISTERS  
WITH OPEN-COLLECTOR OUTPUTS**

**recommended operating conditions**

		SN54LS355			SN74LS355			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
$V_{IH}$	High-level input voltage	2			2			V
$V_{IL}$	Low-level input voltage			0.7			0.8	V
$V_{OH}$	High-level output voltage			5.5			5.5	V
$I_{OL}$	Low-level output current			12			24	mA
$t_{su}$	Setup times, high-or-low-level data, (with respect to $t$ at pin 9)	'LS355	15		15			ns
		'LS357	15		15			
$t_h$	Hold times, high-or low-level data (with respect to $t$ at pin 9)	'LS355	15		15			ns
		'LS357	0		0			
$T_A$	Operating free-air temperature	– 55		125	0		70	°C

**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

PARAMETER	TEST CONDITIONS <sup>†</sup>	SN54LS355			SN74LS355			UNIT
		MIN	TYP <sup>‡</sup>	MAX	MIN	TYP <sup>‡</sup>	MAX	
$V_{IK}$	$V_{CC} = \text{MIN}$ , $I_I = -18 \text{ mA}$				– 1.5		– 1.5	V
$I_{OH}$	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = \text{MAX}$ $V_{OH} = 5.5 \text{ V}$		0.1			0.1		mA
$V_{OL}$	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $I_{OL} = 12 \text{ mA}$ $V_{IL} = \text{MAX}$ , $I_{OL} = 24 \text{ mA}$	0.25	0.4		0.25	0.4		V
$I_I$	$V_{CC} = \text{MAX}$ , $V_I = 7 \text{ V}$				0.1		0.1	mA
$I_{IH}$	$V_{CC} = \text{MAX}$ , $V_I = 2.7 \text{ V}$				20		20	$\mu\text{A}$
$I_{IL}$	$\bar{D}_C$ or CLK, $\bar{G}_1, \bar{G}_2, \bar{G}_3$ All others	$V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$			– 0.2		– 0.2	mA
					– 0.4		– 0.4	
$I_{CC}$	$V_{CC} = \text{MAX}$ , See Note 2		29	46		29	46	mA

<sup>†</sup> For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.

<sup>‡</sup> All typical values are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

NOTE 2:  $I_{CC}$  is measured with the inputs grounded and the outputs open.

**TYPES SN54LS355, SN54LS357, SN74LS355, SN74LS357  
8-LINE TO 1-LINE DATA SELECTORS/MUXES/REGISTERS  
WITH OPEN-COLLECTOR OUTPUTS**

switching characteristics,  $V_{CC} = 5$  V,  $T_A = 25^\circ C$ ,  $R_L = 667 \Omega$

PARAMETER <sup>1</sup>	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS355			'LS357			UNIT
				MIN	Typ	MAX	MIN	Typ	MAX	
tPLH		Y		34	41					ns
tPHL		Y		26	39					ns
tPLH		W		30	45					ns
tPHL		W		33	50					ns
tPLH		Y		38	57		27	41		
tPHL		Y		31	47		34	51		ns
tPLH		W		33	50		32	48		ns
tPHL		W		39	59		23	35		
tPLH		Y		39	59		38	57		ns
tPHL		Y		36	49		40	60		
tPLH		W		32	48		38	57		ns
tPHL		W		39	58		35	53		
tPLH		Y		45	68		44	66		ns
tPHL		Y		42	63		41	62		
tPLH		W		44	66		41	62		ns
tPHL		W		45	68		41	62		
tPLH		Y		21	32		18	27		ns
tPHL		Y		22	33		18	27		
tPLH		W		18	27		20	30		
tPHL		W		19	29		21	32		ns
tPLH		Y		24	36		24	36		ns
tPHL		Y		25	40		24	36		
tPLH		W		19	31		19	31		ns
tPHL		W		19	29		19	29		

$C_L = 45 \text{ pF}$ ,  
See Note 3

NOTE 3: See General Information Section for load circuits and voltage waveforms.

**3**

**TTL DEVICES**