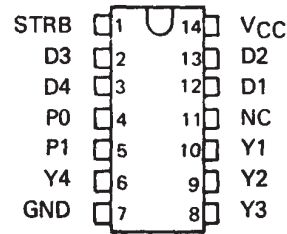


# SN54278, SN74278 4-BIT CASCADEABLE PRIORITY REGISTERS

SDLS092 – NOVEMBER 1971 – REVISED MARCH 1988

- Latched Data Inputs Serve as Buffer Register and Can also:  
Synchronize Data Acquisition  
"Debounce" Mechanical Switch Input
- Cascading Input P0 and Output P1  
Provides "Busy" Signal Inhibiting All  
Lower-Order Bits
- Full TTL Compatibility
- Use for:  
Priority Interrupt  
Synchronous Priority Line Selection

SN54278 . . . J OR W PACKAGE  
SN74278 . . . N PACKAGE  
(TOP VIEW)



NC—No internal connection

## description

The SN54278 and SN74278 each consist of four data latches, full priority output gating, and a cascading gate. The highest-order data applied at a D latch input is transferred to the appropriate Y output while the strobe input is high, and when the strobe goes low all data is latched. The cascading input P0 is fully overriding and on the highest-order package this input must be held at a low logic level. The P1 output is intended for connection to the P0 input of the next lower-order package and will provide a "busy" (high-level) signal to inhibit all subsequent lower-order packages.

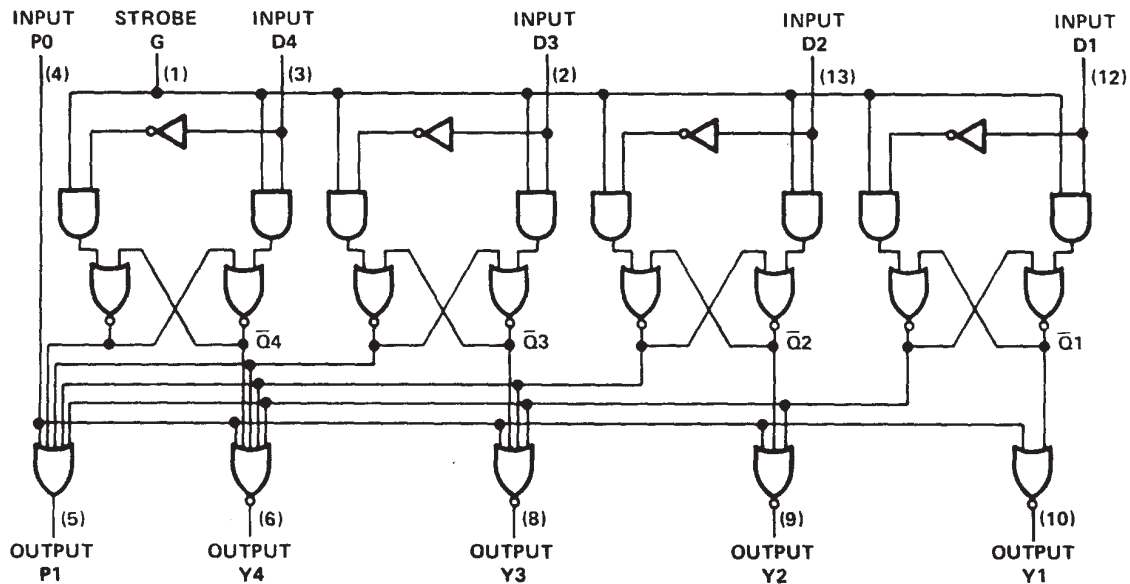
After the overriding P0 input, the order of priority is D1, D2, D3, and D4, respectively, within the package.

FUNCTION TABLE

INPUTS						INTERNAL LATCH NODES				OUTPUTS					
P0	G	D1	D2	D3	D4	$\bar{Q}1$	$\bar{Q}2$	$\bar{Q}3$	$\bar{Q}4$	Y1	Y2	Y3	Y4	P1	
L	H	H	X	X	X	L	X	X	X	H	L	L	L	H	
L	H	L	H	X	X	H	L	X	X	L	H	L	L	H	
L	H	L	L	H	X	H	H	L	X	L	L	H	L	H	
L	H	L	L	L	H	H	H	H	L	L	L	L	H	H	
L	H	L	L	L	L	H	H	H	H	L	L	L	L	L	
L	L	X	X	X	X	Latched when G goes low				Same function of $\bar{Q}$ nodes as on 1st 5 lines					
H	L	X	X	X	X					L	L	L	L	H	
H	H	Internal $\bar{Q}$ levels are same function of D inputs as on first 5 lines								L	L	L	L	H	

H = high level, L = low level, X = irrelevant

## logic diagram (positive logic)



PRODUCTION DATA information is 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  
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1988, Texas Instruments Incorporated

# SN54278, SN74278

## 4-BIT CASCADEABLE PRIORITY REGISTERS

SDLS092 – NOVEMBER 1971 – REVISED MARCH 1988

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	5.5 V
Interemitter voltage (see Note 2)	5.5 V
Operating free-air temperature range: SN54278 Circuits	–55°C to 125°C
SN74278 Circuits	0°C to 70°C
Storage temperature range	–65°C to 150°C

NOTES: 1. Voltage values, except interemitter voltage, are with respect to network ground terminal.

2. This is the voltage between two emitters of a multiple-emitter transistor. For this circuit, this rating applies between the strobe input and any of the four data inputs.

### recommended operating conditions

	SN54278			SN74278			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
High-level output current, $I_{OH}$			–800			–800	$\mu$ A
Low-level output current, $I_{OL}$			16			16	mA
Data setup time, $t_{SU}$ (see Figure 1)	20			20			ns
Data hold time, $t_H$ (see Figure 1)	5			5			ns
Strobe pulse width, $t_W$ (see Figure 1)	20			20			ns
Operating free-air temperature, $T_A$	–55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS†	MIN	TYP	MAX	UNIT
$V_{IH}$	High-level input voltage		2			V
$V_{IL}$	Low-level input voltage				0.8	V
$V_{IK}$	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$			–1.5	V
$V_{OH}$	High-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = -800 \mu\text{A}$	2.4	3.4		V
$V_{OL}$	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = 16 \text{ mA}$		0.2	0.4	V
$I_I$	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1	mA
$I_{IH}$	High-level input current	Any D input			80	$\mu$ A
		P0 input			200	
		G input			320	
$I_{IL}$	Low-level input current	Any D input			–3.2	mA
		P0 input			–8	
		G input			–12.8	
$I_{OS}$	Short-circuit output current‡	$V_{CC} = \text{MAX}$				mA
		SN54278	–18		–55	
		SN74278	–18		–57	
$I_{CC}$	Supply current	$V_{CC} = \text{MAX},$ See Note 3		55	80	mA

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

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

§ Not more than one output should be shorted at a time.

NOTE 3:  $I_{CC}$  is measured with the P0 input grounded, all other inputs at 4.5 V, and outputs open.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

# SN54278, SN74278 4-BIT CASCADEABLE PRIORITY REGISTERS

SDLS092 – NOVEMBER 1971 – REVISED MARCH 1988

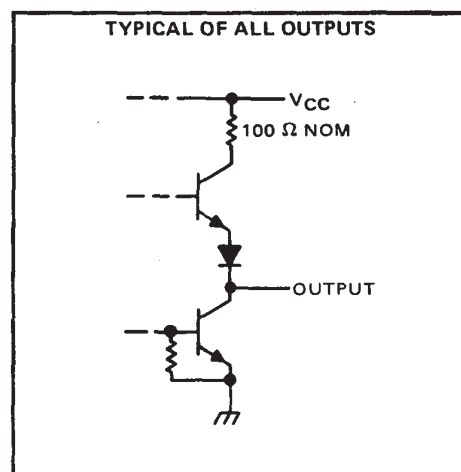
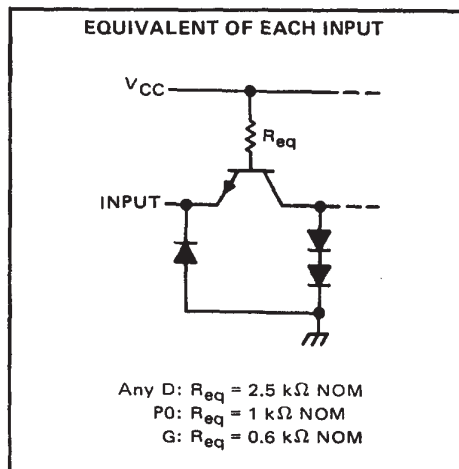
switching characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	WAVEFORMS	TEST CONDITIONS	MIN	TYP	MAX	UNIT
tPLH	Data	Y	A and C (with strobe high)	CL = 15 pF, RL = 400 Ω, See Figure 1			30	ns
tPHL							39	
tPLH	Data	Y	A and D (with strobe high)				38	ns
tPHL							31	
tPLH	Data	P1	A and E (with strobe high)				46	ns
tPHL							39	
tPLH	Strobe	Any Y	B and C or B and D				30	ns
tPHL							31	
tPLH	Strobe	P1	B and E				38	ns
tPHL							42	
tPLH	P0	P1	F and G				23	ns
tPHL							30	

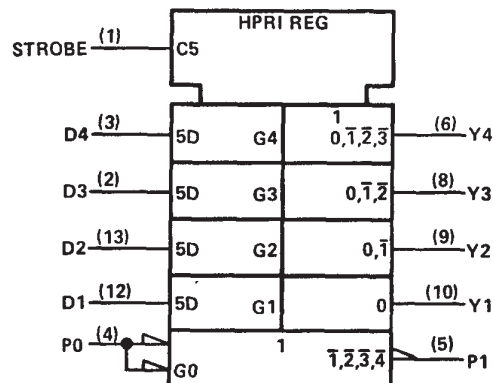
†  $t_{PLH}$  = propagation delay time, low-to-high-level output

$t_{PHL}$  = propagation delay time, high-to-low-level output

## schematics of inputs and outputs



## logic symbol†

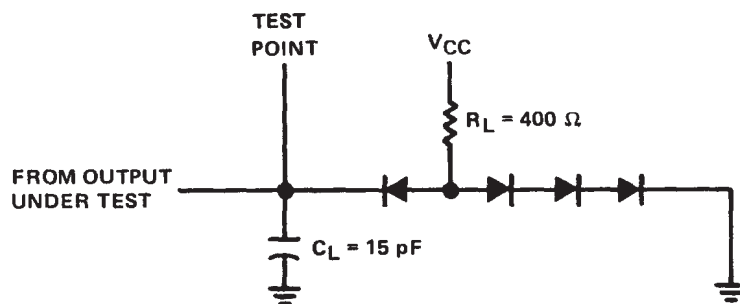


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

# SN54278, SN74278 4-BIT CASCADEABLE PRIORITY REGISTERS

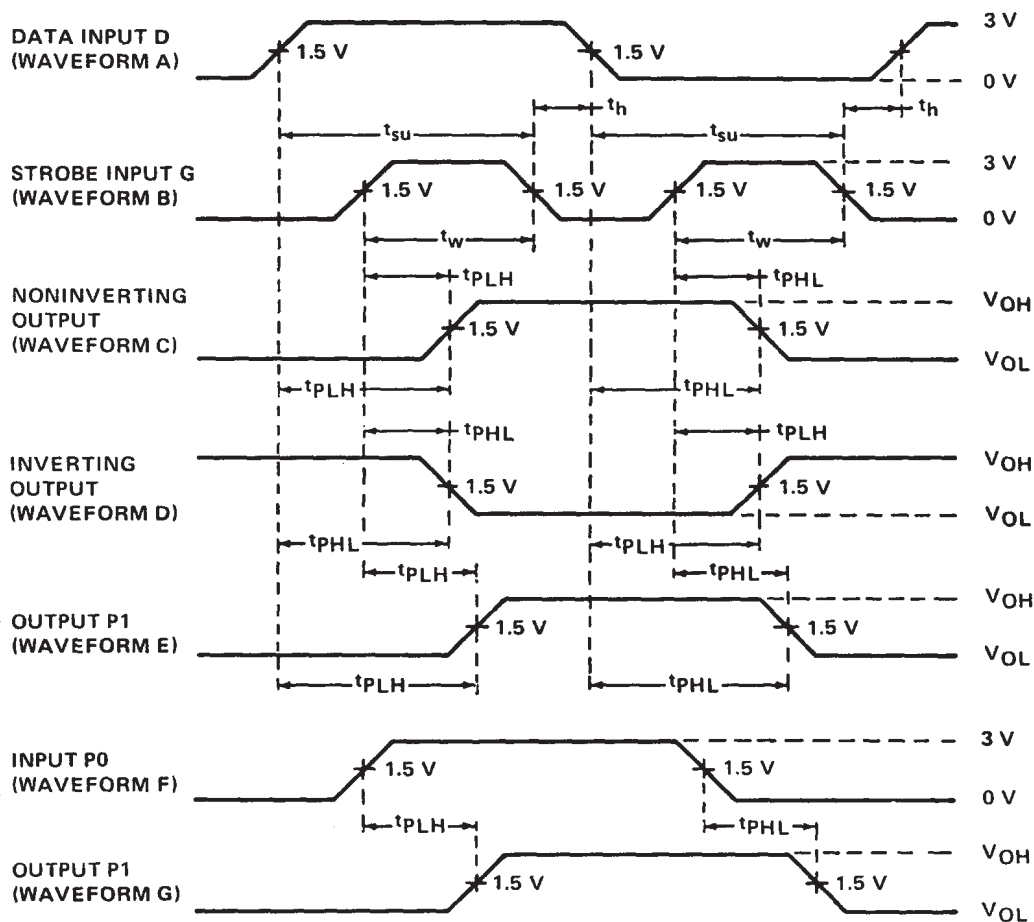
SDLS092 – NOVEMBER 1971 – REVISED MARCH 1988

## PARAMETER MEASUREMENT INFORMATION



$C_L$  includes probe and jig capacitance.  
All diodes are 1N3064.

## LOAD CIRCUIT



## VOLTAGE WAVEFORMS

NOTE: Input pulses are supplied by a generator having the following characteristics:  $t_r \leq 7 \text{ ns}$ ,  $t_f \leq 7 \text{ ns}$ ,  $PRR \leq \text{MHz}$ ,  $Z_{out} \approx 50 \Omega$ .

FIGURE 1—SWITCHING TIMES



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

## **IMPORTANT NOTICE**

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.