- **Operating Range 2-V to 5.5-V V_{CC}**
- ***EPIC***™ **(Enhanced-Performance Implanted CMOS) Process**
- **Package Options Include Plastic Small-Outline (D), Shrink Small-Outline (DB), Thin Shrink Small-Outline (PW), and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs**
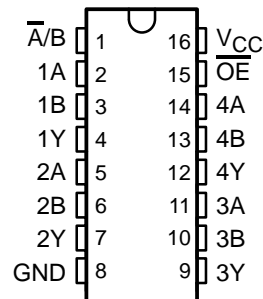
description

These quadruple 2-line to 1-line data selectors/multiplexers are designed for 2-V to 5.5-V V_{CC} operation.
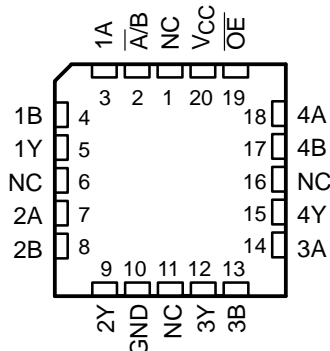
The 'AHC258 are designed to multiplex signals from 4-bit data sources to 4-output data lines in bus-organized systems. The 3-state outputs do not load the data lines when the output-enable ($\overline{OE}$) input is at a high logic level.

The SN54AHC258 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74AHC258 is characterized for operation from –40°C to 85°C.

SN54AHC258 . . . J OR W PACKAGE
SN74AHC258 . . . D, DB, N, OR PW PACKAGE
(TOP VIEW)

$\overline{A}/B$	1	16 V_{CC}
1A	2	15 $\overline{OE}$
1B	3	14 4A
1Y	4	13 4B
2A	5	12 4Y
2B	6	11 3A
2Y	7	10 3B
GND	8	9 3Y

SN54AHC258 . . . FK PACKAGE
(TOP VIEW)

1B	4	18 4A
1Y	5	17 4B
NC	6	16 NC
2A	7	15 4Y
2B	8	14 3A

Pins 3 2 1 20 19: 1A, $\overline{A}/B$, NC, V_{CC}, $\overline{OE}$
Pins 9 10 11 12 13: 2Y, GND, NC, 3Y, 3B

NC – No internal connection

FUNCTION TABLE

INPUTS				OUTPUT
$\overline{OE}$	$\overline{A}/B$	A	B	Y
H	X	X	X	Z
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

EPIC is a trademark of Texas Instruments Incorporated.

PRODUCT PREVIEW

![TEXAS INSTRUMENTS logo]

PRODUCT PREVIEW

logic symbol†

† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the D, DB, J, N, PW, and W packages.

logic diagram (positive logic)

Pin numbers shown are for the D, DB, J, N, PW, and W packages.

TEXAS INSTRUMENTS

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

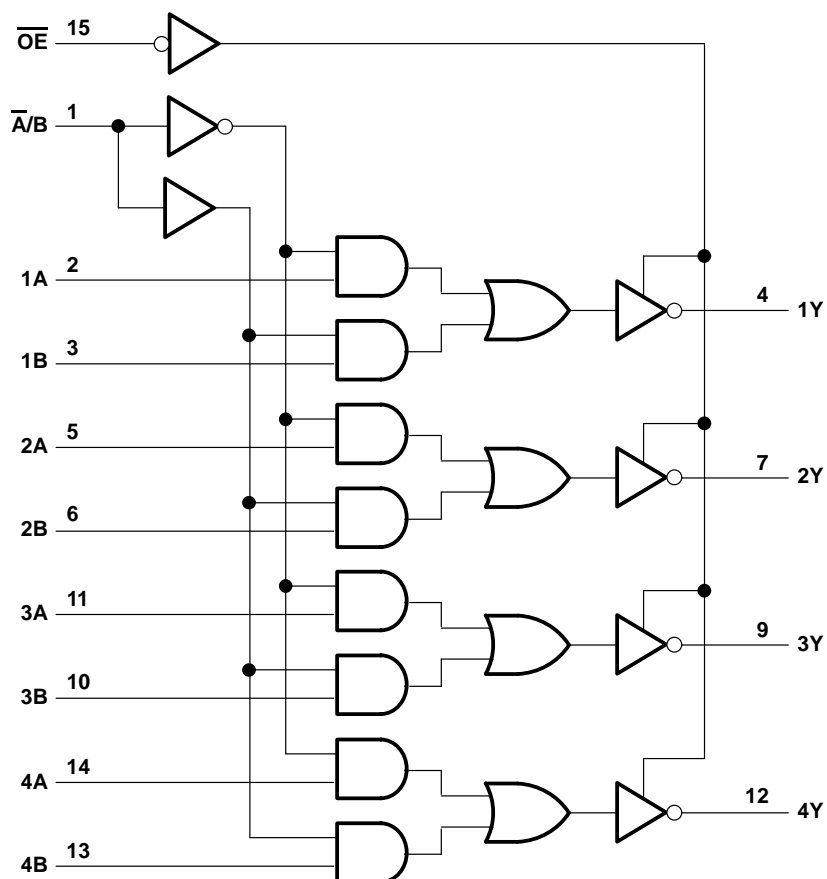Supply voltage range, V_{CC} .... −0.5 V to 7 V
Input voltage range, V_I (see Note 1) .... −0.5 V to 7 V
Output voltage range, V_O (see Note 1) .... −0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} (V_I < 0) .... −20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) .... ±20 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) .... ±25 mA
Continuous current through V_{CC} or GND .... ±50 mA
Package thermal impedance, θ_{JA} (see Note 2): D package .... 113°C/W
DB package .... 131°C/W
N package .... 78°C/W
PW package .... 149°C/W
Storage temperature range, T_{stg} .... −65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions (see Note 3)

			SN54AHC258		SN74AHC258		UNIT
			MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage		2	5.5	2	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 2 V	1.5		1.5		V
		V_{CC} = 3 V	2.1		2.1		
		V_{CC} = 5.5 V	3.85		3.85		
V_{IL}	Low-level input voltage	V_{CC} = 2 V		0.5		0.5	V
		V_{CC} = 3 V		0.9		0.9	
		V_{CC} = 5.5 V		1.65		1.65	
V_I	Input voltage		0	5.5	0	5.5	V
V_O	Output voltage		0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 2 V		−50		−50	μA
		V_{CC} = 3.3 V ± 0.3 V		−4		−4	mA
		V_{CC} = 5 V ± 0.5 V		−8		−8	
I_{OL}	Low-level output current	V_{CC} = 2 V		50		50	μA
		V_{CC} = 3.3 V ± 0.3 V		4		4	mA
		V_{CC} = 5 V ± 0.5 V		8		8	
$\Delta t/\Delta v$	Input transition rise or fall rate	V_{CC} = 3.3 V ± 0.3 V		100		100	ns/V
		V_{CC} = 5 V ± 0.5 V		20		20	
T_A	Operating free-air temperature		−55	125	−40	85	°C

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

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

PARAMETER	TEST CONDITIONS	V_{CC}	$T_A = 25°C$			SN54AHC258		SN74AHC258		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	$I_{OH} = -50$ μA	2 V	1.9	2		1.9		1.9		V
		3 V	2.9	3		2.9		2.9		
		4.5 V	4.4	4.5		4.4		4.4		
	$I_{OH} = -4$ mA	3 V	2.58			2.48		2.48		
	$I_{OH} = -8$ mA	4.5 V	3.94			3.8		3.8		
V_{OL}	$I_{OL} = 50$ μA	2 V			0.1		0.1		0.1	V
		3 V			0.1		0.1		0.1	
		4.5 V			0.1		0.1		0.1	
	$I_{OL} = 4$ mA	3 V			0.36		0.5		0.44	
	$I_{OL} = 8$ mA	4.5 V			0.36		0.5		0.44	
I_I	$V_I = V_{CC}$ or GND	5.5 V			±0.1		±1		±1	μA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		40		40	μA
I_{OZ}	$V_O = V_{CC}$ or GND	5.5 V			±0.25		±2.5		±2.5	μA
C_i	$V_I = V_{CC}$ or GND	5 V		4	10				10	pF

TEXAS
INSTRUMENTS
POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

switching characteristics over recommended operating free-air temperature range,
V_{CC} **= 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	SN54AHC258 $T_A = 25°C$					UNIT
				MIN	TYP	MAX	MIN	MAX	
t_{PLH}*	A or B	Y	C_L = 15 pF		6.2	9.7	1	11.5	ns
t_{PHL}*					6.2	9.7	1	11.5	
t_{PLH}*	$\overline{A}$/B	Y	C_L = 15 pF		8.4	13.2	1	15.5	ns
t_{PHL}*					8.4	13.2	1	15.5	
t_{PZH}*	$\overline{OE}$	Y	C_L = 15 pF		8.7	13.6	1	16	ns
t_{PZL}*					8.7	13.6	1	16	
t_{PHZ}*	$\overline{OE}$	Y	C_L = 15 pF						ns
t_{PLZ}*									
t_{PLH}	A or B	Y	C_L = 50 pF		8.7	13.2	1	15	ns
t_{PHL}					8.7	13.2	1	15	
t_{PLH}	$\overline{A}$/B	Y	C_L = 50 pF		10.9	16.7	1	19	ns
t_{PHL}					10.9	16.7	1	19	
t_{PZH}	$\overline{OE}$	Y	C_L = 50 pF		11.2	17.1	1	19.5	ns
t_{PZL}					11.2	17.1	1	19.5	
t_{PHZ}	$\overline{OE}$	Y	C_L = 50 pF						ns
t_{PLZ}									

* On products compliant to MIL-PRF-38535, this parameter is ensured but not production tested.

switching characteristics over recommended operating free-air temperature range,
V_{CC} **= 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	SN74AHC258 $T_A = 25°C$					UNIT
				MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A or B	Y	C_L = 15 pF		6.2	9.7	1	11.5	ns
t_{PHL}					6.2	9.7	1	11.5	
t_{PLH}	$\overline{A}$/B	Y	C_L = 15 pF		8.4	13.2	1	15.5	ns
t_{PHL}					8.4	13.2	1	15.5	
t_{PZH}	$\overline{OE}$	Y	C_L = 15 pF		8.7	13.6	1	16	ns
t_{PZL}					8.7	13.6	1	16	
t_{PHZ}	$\overline{OE}$	Y	C_L = 15 pF						ns
t_{PLZ}									
t_{PLH}	A or B	Y	C_L = 50 pF		8.7	13.2	1	15	ns
t_{PHL}					8.7	13.2	1	15	
t_{PLH}	$\overline{A}$/B	Y	C_L = 50 pF		10.9	16.7	1	19	ns
t_{PHL}					10.9	16.7	1	19	
t_{PZH}	$\overline{OE}$	Y	C_L = 50 pF		11.2	17.1	1	19.5	ns
t_{PZL}					11.2	17.1	1	19.5	
t_{PHZ}	$\overline{OE}$	Y	C_L = 50 pF						ns
t_{PLZ}									

PRODUCT PREVIEW

TEXAS
INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

switching characteristics over recommended operating free-air temperature range,
$V_{CC} = 5\ V \pm 0.5\ V$ **(unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	SN54AHC258 $T_A = 25°C$ MIN	TYP	MAX	MIN	MAX	UNIT
t_{PLH}*	A or B	Y	$C_L = 15$ pF		4.1	6.4	1	7.5	ns
t_{PHL}*					4.1	6.4	1	7.5	
t_{PLH}*	$\overline{A}$/B	Y	$C_L = 15$ pF		5.3	8.1	1	9.5	ns
t_{PHL}*					5.3	8.1	1	9.5	
t_{PZH}*	$\overline{OE}$	Y	$C_L = 15$ pF		5.6	8.6	1	10	ns
t_{PZL}*					5.6	8.6	1	10	
t_{PHZ}*	$\overline{OE}$	Y	$C_L = 15$ pF						ns
t_{PLZ}*									
t_{PLH}	A or B	Y	$C_L = 50$ pF		5.6	8.4	1	9.5	ns
t_{PHL}					5.6	8.4	1	9.5	
t_{PLH}	$\overline{A}$/B	Y	$C_L = 50$ pF		6.8	10.1	1	11.5	ns
t_{PHL}					6.8	10.1	1	11.5	
t_{PZH}	$\overline{OE}$	Y	$C_L = 50$ pF		7.1	10.6	1	12	ns
t_{PZL}					7.1	10.6	1	12	
t_{PHZ}	$\overline{OE}$	Y	$C_L = 50$ pF						ns
t_{PLZ}									

* On products compliant to MIL-PRF-38535, this parameter is ensured but not production tested.

switching characteristics over recommended operating free-air temperature range,
$V_{CC} = 5\ V \pm 0.5\ V$ **(unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	SN74AHC258 $T_A = 25°C$ MIN	TYP	MAX	MIN	MAX	UNIT
t_{PLH}	A or B	Y	$C_L = 15$ pF		4.1	6.4	1	7.5	ns
t_{PHL}					4.1	6.4	1	7.5	
t_{PLH}	$\overline{A}$/B	Y	$C_L = 15$ pF		5.3	8.1	1	9.5	ns
t_{PHL}					5.3	8.1	1	9.5	
t_{PZH}	$\overline{OE}$	Y	$C_L = 15$ pF		5.6	8.6	1	10	ns
t_{PZL}					5.6	8.6	1	10	
t_{PHZ}	$\overline{OE}$	Y	$C_L = 15$ pF						ns
t_{PLZ}									
t_{PLH}	A or B	Y	$C_L = 50$ pF		5.6	8.4	1	9.5	ns
t_{PHL}					5.6	8.4	1	9.5	
t_{PLH}	$\overline{A}$/B	Y	$C_L = 50$ pF		6.8	10.1	1	11.5	ns
t_{PHL}					6.8	10.1	1	11.5	
t_{PZH}	$\overline{OE}$	Y	$C_L = 50$ pF		7.1	10.6	1	12	ns
t_{PZL}					7.1	10.6	1	12	
t_{PHZ}	$\overline{OE}$	Y	$C_L = 50$ pF						ns
t_{PLZ}									

noise characteristics V_{CC} = 5 V, C_L = 50 pF, T_A = 25°C (see Note 4)

PARAMETER		SN74AHC258			UNIT
		MIN	TYP	MAX	
$V_{OL(P)}$	Quiet output, maximum dynamic V_{OL}			0.8	V
$V_{OL(V)}$	Quiet output, minimum dynamic V_{OL}			−0.8	V
$V_{OH(V)}$	Quiet output, minimum dynamic V_{OH}				V
$V_{IH(D)}$	High-level dynamic input voltage	3.5			V
$V_{IL(D)}$	Low-level dynamic input voltage			1.5	V

NOTE 4: Characteristics are determined during product characterization and ensured by design for surface-mount packages only.

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	No load, f = 1 MHz	20	pF

PARAMETER MEASUREMENT INFORMATION

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{CC}
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT

VOLTAGE WAVEFORMS
DELAY TIMES

VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
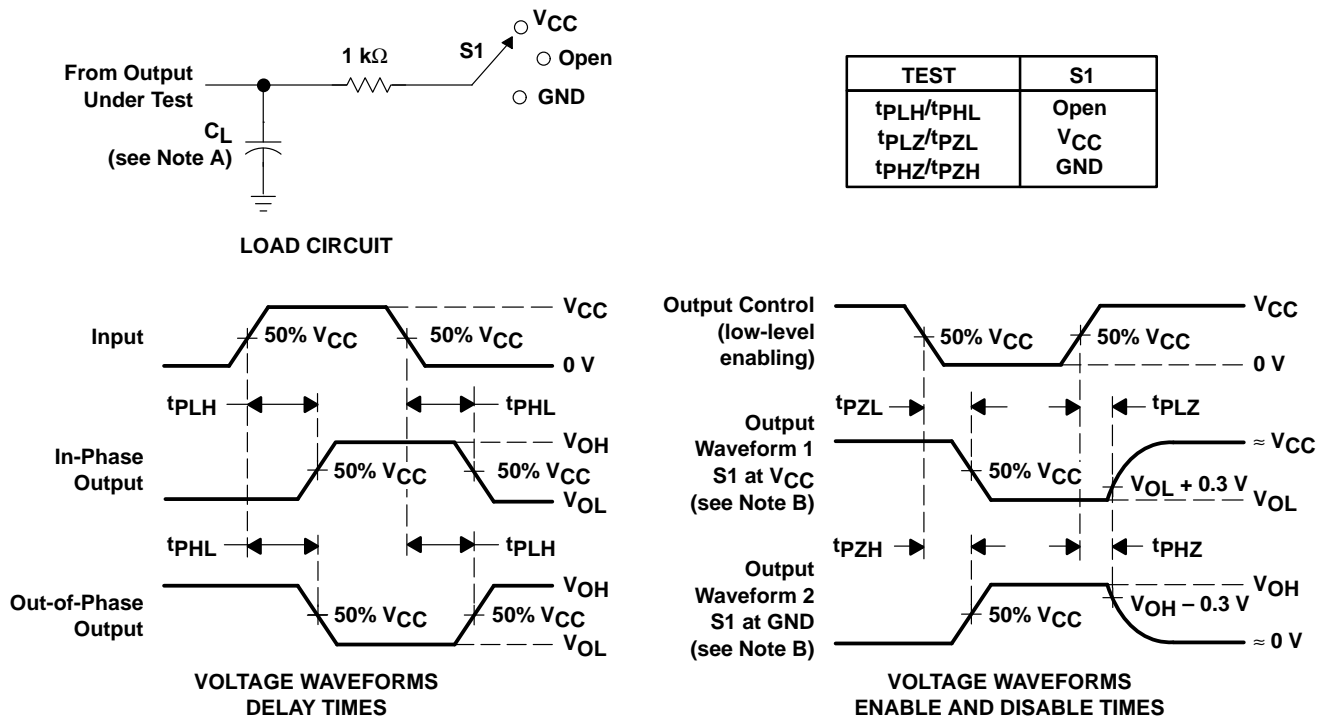
NOTES: A. C_L includes probe and jig capacitance.
      B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
         Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
      C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
      D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software 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, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

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

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI 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.