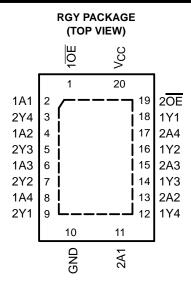
SCES432 - MARCH 2003

- Optimized for 1.8-V Operation and is 3.6-V I/O Tolerant to Support Mixed-Mode Signal Operation
- I_{off} Supports Partial-Power-Down Mode Operation
- Sub 1-V Operable
- Max t_{pd} of 1.9 ns at 1.8 V
- Low Power Consumption, 20-μA Max I_{CC}
- ±8-mA Output Drive at 1.8 V
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



description/ordering information

This octal buffer/driver is operational at 0.8-V to 2.7-V V_{CC} , but is designed specifically for 1.65-V to 1.95-V V_{CC} operation.

The SN74AUC244 is organized as two 4-bit line drivers with separate output-enable (OE) inputs. When OE is low, the device passes data from the A inputs to the Y outputs. When \overline{OE} is high, the outputs are in the high-impedance state.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

ORDERING INFORMATION

TA	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RGY	Tape and reel	SN74AUC244RGYR	MS244

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE (each 4-bit buffer/driver)

INP	JTS	OUTPUT
OE	Α	Y
L	Н	Н
L	L	L
Н	X	Z

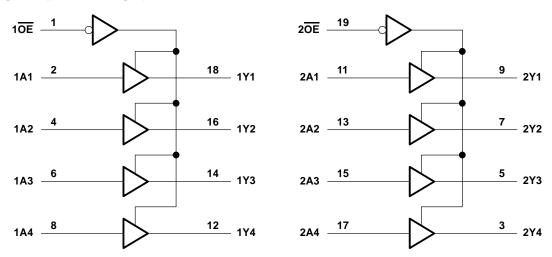


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SCES432 - MARCH 2003

logic diagram (positive logic)



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

Supply voltage range, V _{CC}	
Voltage range applied to any output in the high-impedance or power-off state, V _O	
(see Note 1)	–0.5 V to 3.6 V
Output voltage range, V _O (see Note 1)	–0.5 V to V _{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$)	–50 mA
Output clamp current, I _{OK} (V _O < 0)	–50 mA
Continuous output current, I _O	±20 mA
Continuous current through V _{CC} or GND	±100 mA
Package thermal impedance, θ _{JA} (see Note 2):	37°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 negative-voltage 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 51-5.

recommended operating conditions (see Note 3)

			MIN	MAX	UNIT
VCC	Supply voltage		0.8	2.7	V
		V _{CC} = 0.8 V	Vcc		
V_{IH}	High-level input voltage	V _{CC} = 1.1 V to 1.95 V	0.65 × V _{CC}		V
		V _{CC} = 2.3 V to 2.7 V	1.7		
		V _{CC} = 0.8 V		0	
V_{IL}	Low-level input voltage	V _{CC} = 1.1 V to 1.95 V		0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V		0.7	
٧ _I	Input voltage		0	3.6	V
\/ -	Output valtage	Active state	0	VCC	V
۷O	O Output voltage	3-state	0	3.6	l ^v
		V _{CC} = 0.8 V		-0.7	
		V _{CC} = 1.1 V		-3	
loH	High-level output current	V _{CC} = 1.4 V		- 5	mA
		V _{CC} = 1.65 V		-8	
		V _{CC} = 2.3 V		-9	
		V _{CC} = 0.8 V		0.7	
		V _{CC} = 1.1 V		3	
loL	Low-level output current	V _{CC} = 1.4 V		5	mA
		V _{CC} = 1.65 V		8	
		V _{CC} = 2.3 V		9	
Δt/Δν	Input transition rise or fall rate	•		20	ns/V
TA	Operating free-air temperature		-40	85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.



SN74AUC244 OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

SCES432 - MARCH 2003

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

P.	ARAMETER	TEST CONDITI	ons	vcc	MIN	TYP†	MAX	UNIT
		I _{OH} = -100 μA		0.8 V to 2.7 V	V _{CC} -0.	1		
		$I_{OH} = -0.7 \text{ mA}$		0.8 V		0.55		
\ \/ a		$I_{OH} = -3 \text{ mA}$		1.1 V	0.8			V
VOH		$I_{OH} = -5 \text{ mA}$		1.4 V	1			V
		$I_{OH} = -8 \text{ mA}$		1.65 V	1.2			
		$I_{OH} = -9 \text{ mA}$		2.3 V	1.8			
		$I_{OL} = 100 \mu\text{A}$		0.8 V to 2.7 V			0.2	
		$I_{OL} = 0.7 \text{ mA}$		0.8 V		0.25		
\ \/a:		$I_{OL} = 3 \text{ mA}$		1.1 V			0.3	V
VOL		$I_{OL} = 5 \text{ mA}$		1.4 V			0.4	V
		I _{OL} = 8 mA		1.65 V			0.45	
		I _{OL} = 9 mA		2.3 V			0.6	
IĮ	A and OE inputs	$V_I = V_{CC}$ or GND		0 to 2.7 V			±5	μΑ
l _{off}		V_I or $V_O = 2.7 V$		0			±10	μΑ
loz		$V_O = V_{CC}$ or GND		2.7 V			±10	μΑ
Icc		$V_I = V_{CC}$ or GND,	IO = 0	0.8 V to 2.7 V			20	μΑ
Ci		$V_I = V_{CC}$ or GND	_	2.5 V		2	3	pF
Co		$V_O = V_{CC}$ or GND		2.5 V		5.5	6	pF

[†] All typical values are at $T_A = 25$ °C.

switching characteristics over recommended operating free-air temperature range, C_L = 15 pF (unless otherwise noted) (see Figure 1)

F	PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 0.8 V	V _{CC} =	: 1.2 V 1 V	V _{CC} =			c = 1.8 0.15 V		V _{CC} =		UNIT
		(INFO1)	(001F01)	TYP	MIN	MAX	MIN	MAX	MIN	TYP	MAX	MIN	MAX	
	^t pd	А	Y	6.5	1.1	3.7	0.6	2.3	0.5	1.1	1.9	0.4	1.5	ns
	t _{en}	OE	Y	8	1.2	4.5	0.7	2.8	0.6	1.2	2.3	0.5	1.7	ns
	t _{dis}	ŌĒ	Υ	10.4	1.7	6	1.1	4	1.7	2.4	4.2	0.6	3.8	ns

switching characteristics over recommended operating free-air temperature range, C_L = 30 pF (unless otherwise noted) (see Figure 1)

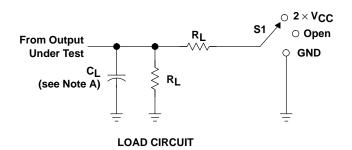
PARAMETER	FROM (INPUT)	TO (OUTPUT)		c = 1.8 0.15 V	٧	V _{CC} =		UNIT
	(INFOT)	(001701)	MIN	TYP	MAX	MIN	MAX	
^t pd	А	Υ	0.8	1.5	2.5	0.7	1.9	ns
t _{en}	ŌĒ	Υ	0.8	1.7	3.1	0.7	2.3	ns
^t dis	ŌĒ	Υ	1.7	2.4	4.2	0.5	2.3	ns



operating characteristics, $T_A = 25^{\circ}C$

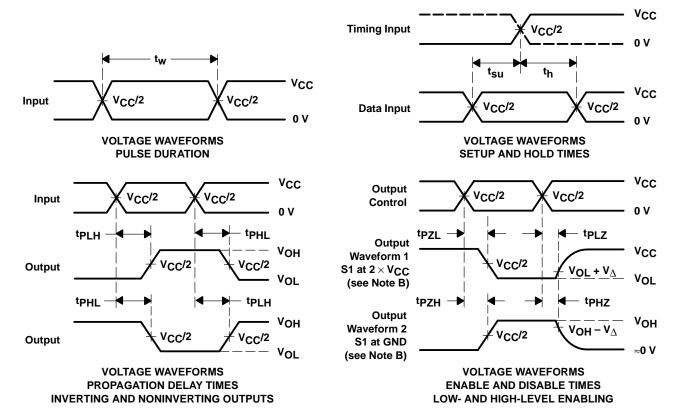
	PARAMETE	R	TEST					V _{CC} = 2.5 V	UNIT
			CONDITIONS	TYP	TYP	TYP	TYP	TYP	
C _{pd}	Power dissipation	Outputs enabled	f = 10 MHz	21	21	22	23	30	pF
) Opa	capacitance	Outputs disabled	1 = 10 WIHZ	3	3	3	3.5	4.5	рΓ

PARAMETER MEASUREMENT INFORMATION



TEST	S1
tPLH/tPHL	Open
t _{PLZ} /t _{PZL}	2×V _{CC}
tPHZ/tPZH	GND

VCC	CL	RL	$v_{\scriptscriptstyle\Delta}$
0.8 V	15 pF	2 k Ω	0.1 V
1.2 V ± 0.1 V	15 pF	2 k Ω	0.1 V
1.5 V ± 0.1 V	15 pF	2 k Ω	0.1 V
1.8 V \pm 0.15 V	15 pF	2 k Ω	0.15 V
2.5 V \pm 0.2 V	15 pF	2 k Ω	0.15 V
1.8 V \pm 0.15 V	30 pF	1 k Ω	0.15 V
2.5 V \pm 0.2 V	30 pF	500 Ω	0.15 V



- 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 \leq 10 MHz, $Z_O = 50 \Omega$, slew rate \geq 1 V/ns.
 - D. The outputs are measured one at a time with one transition per measurement.
 - E. tpLz and tpHz are the same as tdis.
 - F. tpzL and tpzH are the same as ten.
 - G. tplH and tpHL are the same as tpd.
 - H. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms



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PACKAGING INFORMATION

Orderable part number	Status	Material type	Package Pins	Package qty Carrier	RoHS	Lead finish/ Ball material	MSL rating/ Peak reflow	Op temp (°C)	Part marking (6)
						(4)	(5)		
SN74AUC244RGYR	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	MS244
SN74AUC244RGYR.B	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	MS244
SN74AUC244RGYRG4	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	MS244
SN74AUC244RGYRG4.B	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	MS244

⁽¹⁾ Status: For more details on status, see our product life cycle.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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⁽²⁾ Material type: When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ RoHS values: Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

⁽⁴⁾ Lead finish/Ball material: Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ MSL rating/Peak reflow: The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

PACKAGE MATERIALS INFORMATION

www.ti.com 24-Jul-2025

TAPE AND REEL INFORMATION





A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AUC244RGYR	VQFN	RGY	20	3000	330.0	12.4	3.71	4.71	1.1	8.0	12.0	Q1
SN74AUC244RGYRG4	VQFN	RGY	20	3000	330.0	12.4	3.71	4.71	1.1	8.0	12.0	Q1

PACKAGE MATERIALS INFORMATION

www.ti.com 24-Jul-2025



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AUC244RGYR	VQFN	RGY	20	3000	353.0	353.0	32.0
SN74AUC244RGYRG4	VQFN	RGY	20	3000	353.0	353.0	32.0

3.5 x 4.5, 0.5 mm pitch

PLASTIC QUAD FGLATPACK - NO LEAD

This image is a representation of the package family, actual package may vary. Refer to the product data sheet for package details.





PLASTIC QUAD FLATPACK - NO LEAD



NOTES:

- 1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
 2. This drawing is subject to change without notice.
- 3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.



PLASTIC QUAD FLATPACK - NO LEAD



NOTES: (continued)

- 4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
- Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.



PLASTIC QUAD FLATPACK - NO LEAD



NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.



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