XC7SET32

2-input OR gate

Rev. 01 — 3 September 2009

Product data sheet

1. General description

XC7SET32 is a high-speed Si-gate CMOS device. It provides a 2-input OR function.

2. Features

- Symmetrical output impedance
- High noise immunity
- ESD protection:
 - HBM JESD22-A114E: exceeds 2000 V
 MM JESD22-A115-A: exceeds 200 V
 - ◆ CDM JESD22-C101C: exceeds 1000 V
- Low power dissipation
- Balanced propagation delays
- SOT353-1 and SOT753 package options
- Specified from -40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

Type number	Package	Package								
	Temperature range	Name	Description	Version						
XC7SET32GW	–40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1						
XC7SET32GV	–40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753						



Nexperia XC7SET32
2-input OR gate

4. Marking

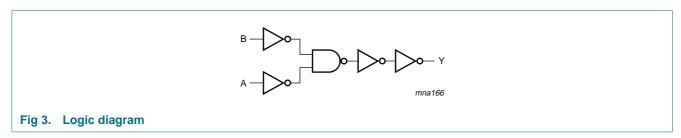
Table 2. Marking codes

Type number	Marking code ^[1]
XC7SET32GW	gG
XC7SET32GV	g32

^[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

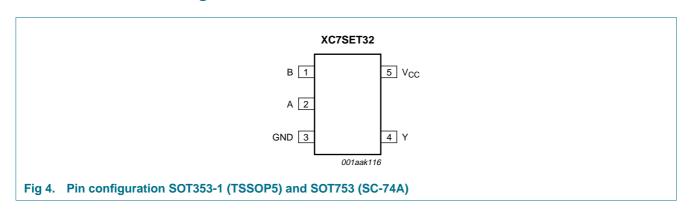
5. Functional diagram





6. Pinning information

6.1 Pinning



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6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
В	1	data input
Α	2	data input
GND	3	ground (0 V)
Υ	4	data output
V_{CC}	5	supply voltage

7. Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level

Inputs		Output
Α	В	Υ
L	L	L
L	Н	Н
Н	L	Н
Н	Н	Н

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		-0.5	+7.0	V
VI	input voltage		-0.5	+7.0	V
I _{IK}	input clamping current	$V_{I} < -0.5 \text{ V}$	-20	-	mA
I _{OK}	output clamping current	$V_O < -0.5 \text{ V or } V_O > V_{CC} + 0.5 \text{ V}$	<u>[1]</u> _	±20	mA
Io	output current	$-0.5 \text{ V} < \text{V}_{\text{O}} < \text{V}_{\text{CC}} + 0.5 \text{ V}$	-	±25	mA
I _{CC}	supply current		-	75	mA
I _{GND}	ground current		–75	-	mA
T _{stg}	storage temperature		-65	+150	°C
P _{tot}	total power dissipation	$T_{amb} = -40 ^{\circ}\text{C} \text{ to } +125 ^{\circ}\text{C}$	[2] _	250	mW

^[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

^[2] For both TSSOP5 and SC-74A packages: above 87.5 $^{\circ}$ C the value of P_{tot} derates linearly with 4.0 mW/K.

9. Recommended operating conditions

Table 6. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{CC}	supply voltage		4.5	5.0	5.5	V
V_{I}	input voltage		0	-	5.5	V
Vo	output voltage		0	-	V_{CC}	V
T _{amb}	ambient temperature		-40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate		-	-	20	ns/V

10. Static characteristics

Table 7. Static characteristics

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions		25 °C		-40 °C 1	to +85 °C	-40 °C to +125 °C		Unit
			Min	Тур	Max	Min	Max	Min	Max	
V_{IH}	HIGH-level input voltage	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	2.0	-	-	2.0	-	2.0	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	8.0	-	0.8	-	0.8	V
V_{OH}	HIGH-level	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 4.5 \text{ V}$								
output voltage	$I_O = -50 \mu A$	4.4	4.5	-	4.4	-	4.4	-	V	
		$I_{O} = -8.0 \text{ mA}$	3.94	-	-	3.8	-	3.70	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 4.5 \text{ V}$								
		I _O = 50 μA	-	0	0.1	-	0.1	-	0.1	V
		$I_{O} = 8.0 \text{ mA}$	-	-	0.36	-	0.44	-	0.55	V
I _I	input leakage current	$V_I = 5.5 \text{ V or GND};$ $V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	-	0.1	-	1.0	-	2.0	μΑ
I _{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	1.0	-	10	-	40	μΑ
ΔI_{CC}	additional supply current	per input pin; $V_I = 3.4 \text{ V}$; other inputs at V_{CC} or GND; $I_O = 0 \text{ A}$; $V_{CC} = 5.5 \text{ V}$	-	-	1.35	-	1.5	-	1.5	mA
Cı	input capacitance		-	1.5	10	-	10	-	10	pF

11. Dynamic characteristics

Table 8. Dynamic characteristics

GND = 0 V. For waveform see Figure 5. For test circuit see Figure 6.

Symbol	Parameter	Conditions		25 °C			-40 °C to +85 °C		o +125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
t _{pd}	propagation delay	A and B to Y; [1] see <u>Figure 5</u> ; [2] V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	3.3	6.9	1.0	8.0	1.0	9.0	ns
		$C_L = 50 \text{ pF}$	-	4.8	7.9	1.0	9.0	1.0	10	ns
C_{PD}	power dissipation capacitance	per buffer; $C_L = 50 \text{ pF}$; $f = 1 \text{ MHz}$; $V_I = \text{GND to } V_{CC}$		17	-	-	-	-	-	pF

^[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

 f_i = input frequency in MHz;

f_o = output frequency in MHz;

 C_L = output load capacitance in pF;

 V_{CC} = supply voltage in V.

^[2] Typical values are measured at $V_{CC} = 5.0 \text{ V}$.

^[3] C_{PD} is used to determine the dynamic power dissipation P_D (μW).

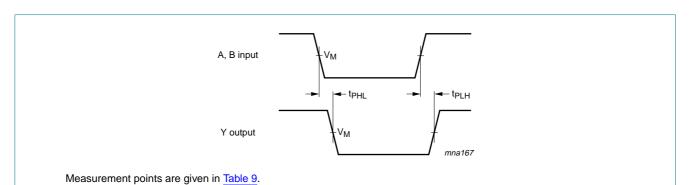


Fig 5. The input (A and B) to output (Y) propagation delays

Table 9. Measurement points

12. Waveforms

Type number	Input	Output	
	V _I	V _M	V _M
XC7SET32	GND to 3.0 V	1.5 V	$0.5 \times V_{CC}$

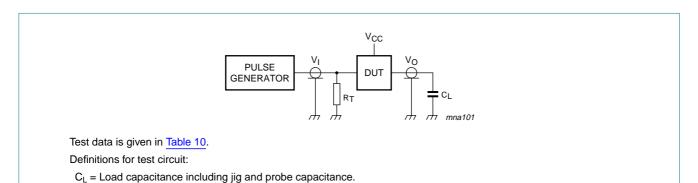


Fig 6. Load circuitry for switching times

Table 10. Test data

Туре	Input		Load	Test
	VI	t _r , t _f	CL	
XC7SET32	3.0 V	≤ 3.0 ns	15 pF, 50 pF	t _{PLH} , t _{PHL}

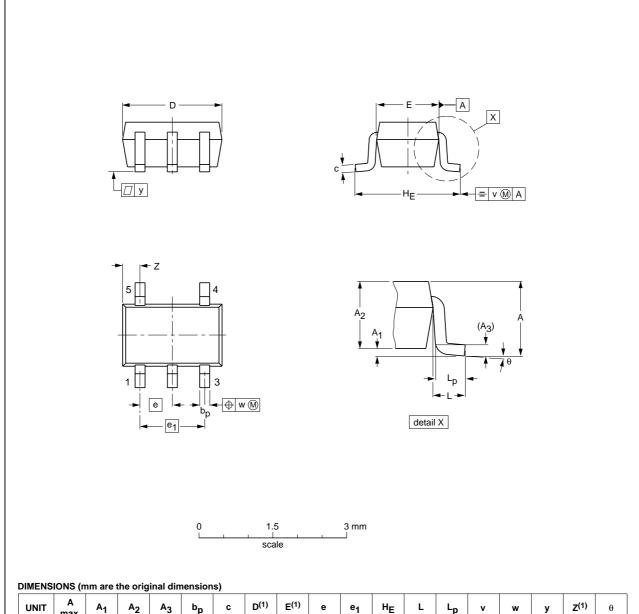
 R_T = Termination resistance should be equal to output impedance Z_0 of the pulse generator.

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13. Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1



UNIT	A max.	A ₁	A ₂	А3	bp	С	D ⁽¹⁾	E ⁽¹⁾	е	e ₁	HE	L	Lp	v	w	у	Z ⁽¹⁾	θ
mm	1.1	0.1 0	1.0 0.8	0.15	0.30 0.15	0.25 0.08	2.25 1.85	1.35 1.15	0.65	1.3	2.25 2.0	0.425	0.46 0.21	0.3	0.1	0.1	0.60 0.15	7° 0°

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE		REFER	ENCES	EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE	
SOT353-1		MO-203	SC-88A		-00-09-01- 03-02-19	

Fig 7. Package outline SOT353-1 (TSSOP5)

XC7SET32_1

Plastic surface-mounted package; 5 leads

SOT753

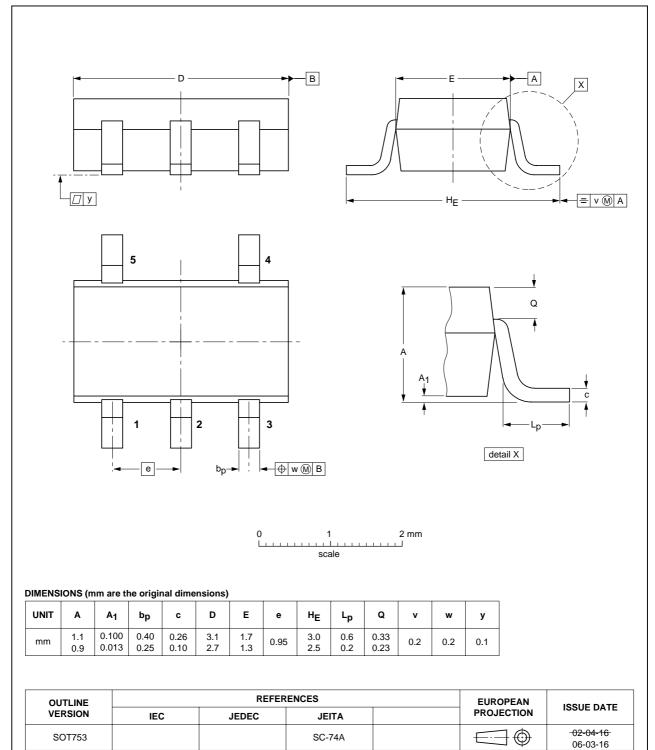


Fig 8. Package outline SOT753 (SC-74A)

14. Abbreviations

Table 11. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
XC7SET32_1	20090903	Product data sheet	-	-

16. Legal information

16.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions"
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2-input OR gate

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