

8-BIT SERIAL TO PARALLEL CONVERTER

■ GENERAL DESCRIPTION

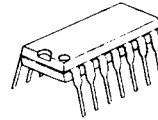
The NJU3711 is an 8-bit serial to parallel converter especially apply to MPU output expander.

The effective output assignment of MPU is available as the connection between NJU3711 and MPU is required only 4 lines.

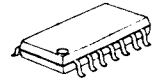
Up to 5MHz signal can be input to the serial data input terminal and the data is output from parallel output buffer through serial in parallel out shift register and parallel data latches.

The hysteresis input circuit realized wide noise margin and high driverbility output buffer ( 25mA ) can drive LED directly.

■ PACKAGE OUTLINE



NJU3711D



NJU3711N

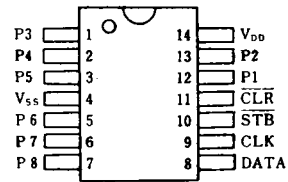


NJU3711V

■ FEATURES

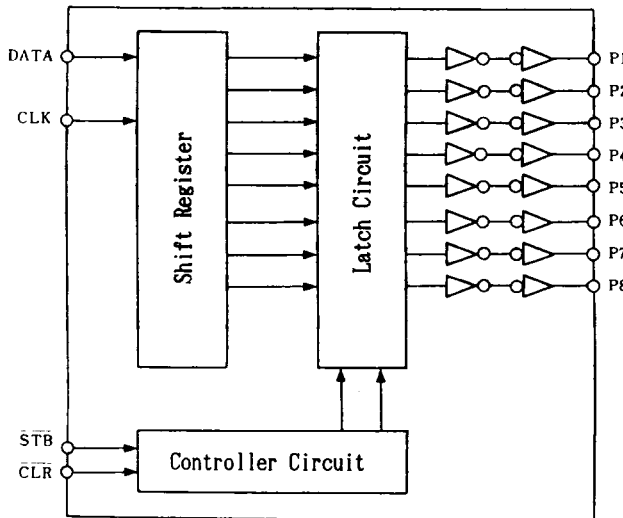
- 8-Bit Serial In Parallel Out
- Hysteresis Input — 0.5V typ
- Operating Voltage — 5V±10%
- Operating Frequency — 5MHz or more
- Output Current — 25mA
- C-MOS Technology
- Package Outline — DIP/DMP/SSOP 14

■ PIN CONFIGURATION



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■ BLOCK DIAGRAM



## ■ TERMINAL DESCRIPTION

NO.	SYMBOL	FUNCTION	NO.	SYMBOL	FUNCTION
1	P3	Parallel Converts Data Output Terminals	8	DATA	Serial Data Input Terminal
2	P4		9	CLK	Clock Signal Input Terminal
3	P5		10	$\overline{\text{STB}}$	Strobe Signal Input Terminal
4	V <sub>SS</sub>	GND	11	$\overline{\text{CLR}}$	Clear Signal Input Terminal
5	P6	Parallel Converts Data Output Terminals	12	P1	Parallel Converts Data Output Terminals
6	P7		13	P2	
7	P8		14	V <sub>DD</sub>	Power Supply Terminal

## ■ FUNCTIONAL DESCRIPTION

### (1) Reset

When the "L" level is input to the  $\overline{\text{CLR}}$  terminal, all latches are reset and all parallel conversion output are "L" level.

Normally, the  $\overline{\text{CLR}}$  terminal should be "H" level.



### (2) Data Transmission

In the  $\overline{\text{STB}}$  terminal is "H" level and input the clock signal to the CLK terminal, the serial data input from DATA terminal shift in the shift register by synchronizing at rising edge of the clock signal.

When the  $\overline{\text{STB}}$  terminal change to "L" level, the data in the shift register transfer to the latch.

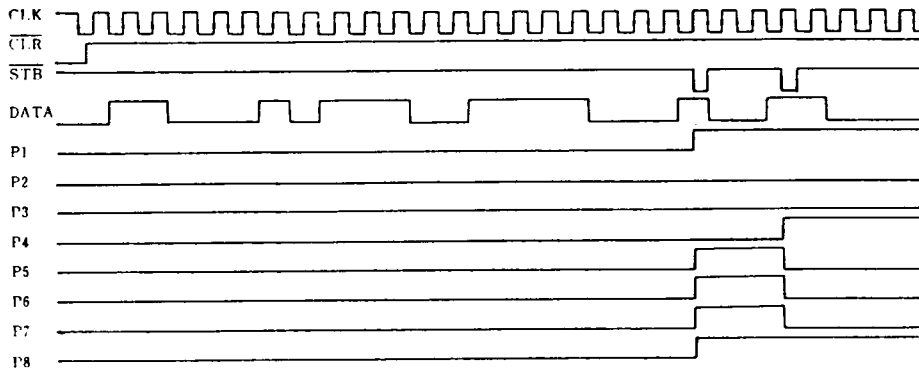
Even if the  $\overline{\text{STB}}$  terminal is "L" level, the input clock signal shift the data in the shift register, therefore, the clock signal control is needed.

Furthermore, the 4 input circuits have a hysteresis characteristics by using the schmitt trigger structure to protect the noise.

CLK	$\overline{\text{STB}}$	$\overline{\text{CLR}}$	OPERATION
X	X	L	All latch are reset (the data in the shift register is no change). All of Parallel convert output are "L".
	H	H	The serial data input from DATA terminal input to the shift register. In this stage, the data in the latch is no change.
L	L	H	The data in the shift register transfer to the latch. And the data in the latch output from parallel output.
H			The CLK input in the $\overline{\text{STB}}$ ="L" and $\overline{\text{CLR}}$ ="H" state, the data shift in the shift register and latched data also change in accordance with the shift register.
			

Note ) X: Don't care

■ TIMING CHART



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■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	V <sub>DD</sub>	-0.5 ~ 7.0	V
Input Voltage Range	V <sub>i</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Output Voltage Range	V <sub>o</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Output Current	I <sub>o</sub>	±25	mA
Power Dissipation	P <sub>D</sub>	700 (DIP) 300 (DMP/SSOP)	mW
Operating Temperature Range	T <sub>opr</sub>	-25 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	-65 ~ +150	°C

## DC ELECTRICAL CHARACTERISTICS

( $V_{DD}=4.5\sim 5.5V$ ,  $V_{SS}=0V$ ,  $T_a=25^\circ C$ )

PARAMETER	SYMBOL	CONDITION		MIN	TYP	MAX	UNIT
Operating Current	$I_{DD5}$	$V_{IH}=V_{DD}$ , $V_{IL}=V_{SS}$				0.1	mA
Input Voltage	High-Level	$V_{IH}$		0.7 $V_{DD}$		$V_{DD}$	V
	Low-Level	$V_{IL}$		$V_{SS}$	0.3 $V_{DD}$		
Input Leakage Current	$I_{LI}$	$V_i=0\sim V_{DD}$		-10		10	$\mu A$
High-Level Output Voltage	$V_{OHD}$	$I_{OH}=-25mA$	P1~P8 Terminals (Note 1)	$V_{DD}-1.5$		$V_{DD}$	V
		$I_{OH}=-15mA$		$V_{DD}-1.0$		$V_{DD}$	
		$I_{OH}=-10mA$		$V_{DD}-0.5$		$V_{DD}$	
Low-Level Output Voltage	$V_{OLD}$	$I_{OL}=+25mA$		$V_{SS}$		1.5	V
		$I_{OL}=+15mA$		$V_{SS}$		0.8	
		$I_{OL}=+10mA$		$V_{SS}$		0.4	
Output Short Current	$I_{OSD}$	$V_o=7V$ , $V_i=0V$	P1~P8 Terminals (Note 2)			20	mA
		$V_o=0V$ , $V_i=7V$				-20	

Note 1) Specified value represent output current per pin. When use, total current consideration and less than power dissipation rating operation should be required.

Note 2)  $V_{DD}=7V$ ,  $V_{SS}=0V$ , 1 second per pin.

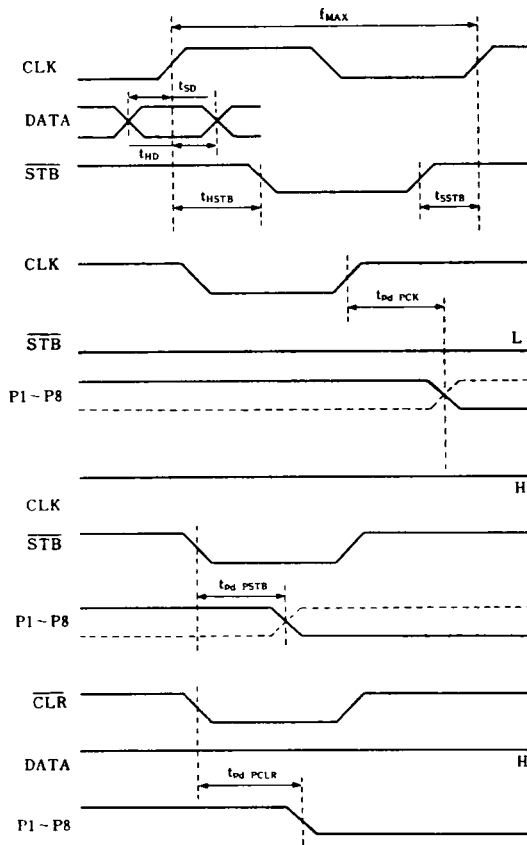
## SWITCHING CHARACTERISTICS

( $V_{DD}=4.5V\sim 5.5V$ ,  $V_{SS}=0V$ ,  $T_a=-20\sim 75^\circ C$ )

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Set-Up Time	$t_{SD}$	DATA - CLK	20			ns
Hold Time	$t_{HD}$	CLK - DATA	20			ns
Set-Up Time	$t_{SSTB}$	STB - CLK	30			ns
Hold Time	$t_{HSTB}$	CLK - $\overline{STB}$	30			ns
Output Delay Time	$t_{pd\ PCK}$	CLK - P1~P8			100	ns
	$t_{pd\ PSTB}$	$\overline{STB}$ - P1~P8			80	ns
	$t_{pd\ PCLR}$	$\overline{CLR}$ - P1~P8			80	ns
Max. Operating Frequency	$f_{MAX}$		5			MHz

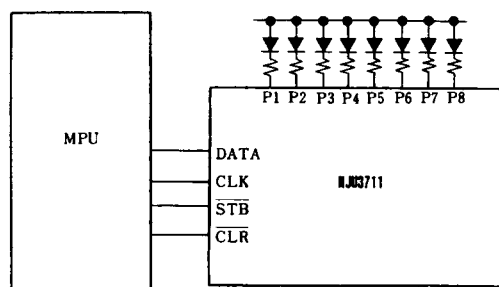
\* )  $C_{OUT}=50pF$

■ SWITCHING CHARACTERISTICS TEST WAVEFORM



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■ APPLICATION CIRCUIT



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# MEMO

**[CAUTION]**

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