

8-bit shift register and latch driver

BU2114/BU2114F

The BU2114 and BU2114F are CMOS ICs with low power consumption, and are equipped with an 8-bit shift register latch. Data in the shift register can be latched asynchronously. The outputs (O1 to O8) are open drain outputs (because there is no protection diode, a maximum voltage above V_{DD} , of up to 7V, can be applied), and one output can drive 36mA. A total output of up to 150mA can be driven (when using static operation).

●Applications

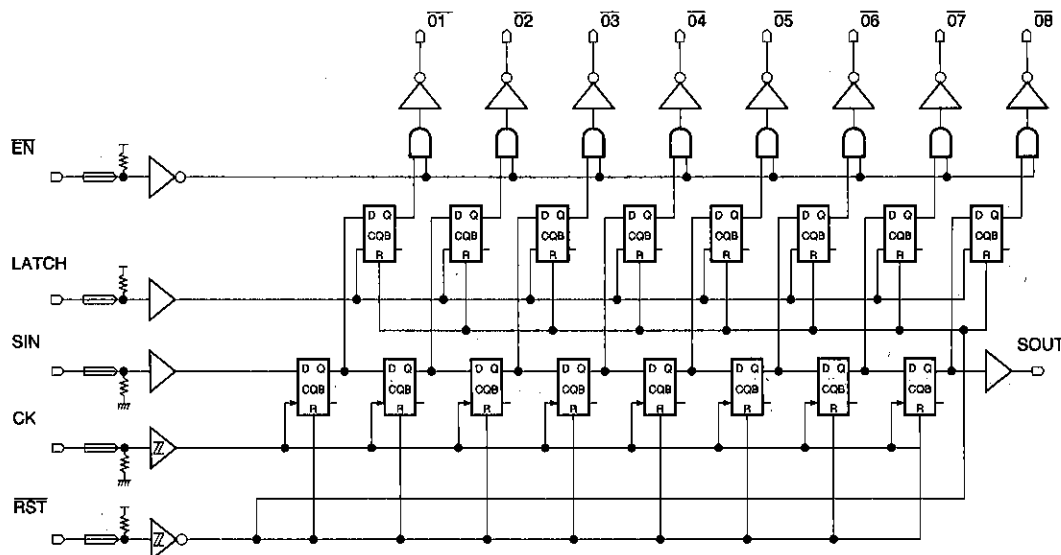
These are designed for a wide range of applications in microcomputer peripheral circuits, such as in industrial

equipment, office telephones, audio visual equipment, and expansion input and output boards.

●Features

- 1) The CMOS configuration enables low power consumption.
- 2) Open drain output.
- 3) Latch to 8-bit shift register provided, enabling drive of up to 150mA. ($I_{SINK} = 36mA$)
- 4) Cascade connections possible.

●Logic diagram



Serial IN/parallel OUT drivers

● Pin layout

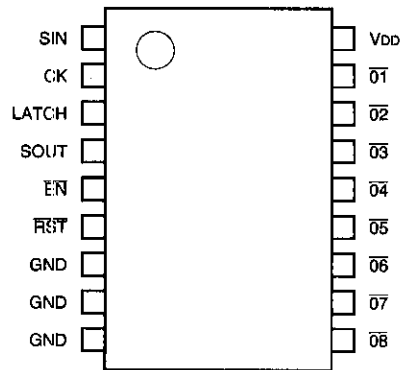


Fig.1

● Absolute maximum ratings (unless otherwise noted, Ta=25°C)

Parameter	Symbol	Limits	Unit
Applied voltage	V _{DD}	-0.3~7.0	V
Input voltage	V _{IN}	-0.3~V _{DD} 0.3	V
Operating temperature	T _{opr}	-25~75	°C
Storage temperature	T _{stg}	-55~150	°C
Input protection diode current	I _D	±20	mA
Power dissipation	BU2114	P _d	mW
	BU2114F		
		1100*1	
		400*2	

*1 Reduced by 8.8 mW for each increase in Ta of 1°C over 25°C.

*2 Reduced by 3.2 mW for each increase in Ta of 1°C over 25°C.

● Recommended operating conditions (unless otherwise noted, Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Recommend voltage	V _{DD}	4.5	5.0	5.5	V	
Input voltage	V _{IN}	0	—	V _{DD}	V	SIN, CK, LATCH, EN, RST
Output voltage	V _{OUT}	0	—	V _{DD}	V	SOUT

⊙ Not designed for radiation resistance.

●Electrical characteristics (unless otherwise noted, $T_a=25^\circ\text{C}$, $V_{DD}=5.0\text{ V}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
"L" input voltage	V_{IL}	0	—	1.5	V	SIN, LATCH, EN
"H" input voltage	V_{IH}	3.5	—	5.0	V	SIN, LATCH, EN
"L" output current	I_{sL}	—	—	6	mA	SOUT ($V_L=0.4$)
"H" output current	I_{sH}	—	—	-6	mA	SOUT ($V_L=V_{DD}-0.4$)
Schmitt trigger "H" threshold value	V_P	2.31	—	3.28	V	CK, RST
Schmitt trigger "L" threshold value	V_N	1.5	—	2.58	V	CK, RST
Schmitt trigger hysteresis width	V_H	0.35	0.75	—	V	CK, RST
"L" output voltage	V_{OL} V_{OL}	—	—	0.15 0.4	V V	O1~O8 $I_b=12\text{mA}$ O1~O8 $I_b=36\text{mA}$
Output leakage current	I_L	—	—	± 10	μA	
Current consumption	I_{DD}	—	1	100	μA	V_{DD} or GND
Pull-up resistance	R_{UP}	35	50	68	$\text{K}\Omega$	
Pull-down resistance	R_{DN}	35	50	68	$\text{K}\Omega$	

● Pins descriptions

Pin No.	Symbol	I/O	Function
1	SIN	In	Serial data input pin
2	CK	In	Shift clock for shift register
3	LATCH	In	Setting this pin to "L" holds the latch output. While it is "H", latch output changes simultaneously when the shift register output changes.
4	SOUT	Out	This is the output for the final-stage shift register.
5	EN	In	This is the Enable pin for O1 to O8. When this pin is "L", the latch output appears as is. When the output is "H", however, output QN is "L", and when the latch output is "L", Qn becomes "High-Z"
6	RST	In	Resets the shift register and latch.
7	GND	—	0 V power supply
8	GND	—	0 V power supply
9	GND	—	0 V power supply
10	O8	Out	Latch output for 8th stage of shift register
11	O7	Out	Latch output for 7th stage of shift register
12	O6	Out	Latch output for 6th stage of shift register
13	O5	Out	Latch output for 5th stage of shift register
14	O4	Out	Latch output for 4th stage of shift register
15	O3	Out	Latch output for 3rd stage of shift register
16	O2	Out	Latch output for 2nd stage of shift register
17	O1	Out	Latch output for 1st stage of shift register
18	V _{DD}	—	+V _{DD} power supply

Note 1) O1 to O8 are open drain output, and when the shift register output is "H", the output level goes "L".

● Timing chart (unless otherwise noted, $T_a=25^{\circ}\text{C}$, $V_{DD}=5.0\text{V}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Clock frequency	f	Input duty 50%			5	MHz
Clock pulse width	t_{cw}		100	—	—	nsec
Latch pulse width	t_{lw}		100	—	—	nsec
Data setup time	t_{su}	CK → SIN	100	—	—	nsec
Data hold time	t_h	CK → SIN	100	—	—	nsec
Clock latch time	t_{dl}		100	—	—	nsec

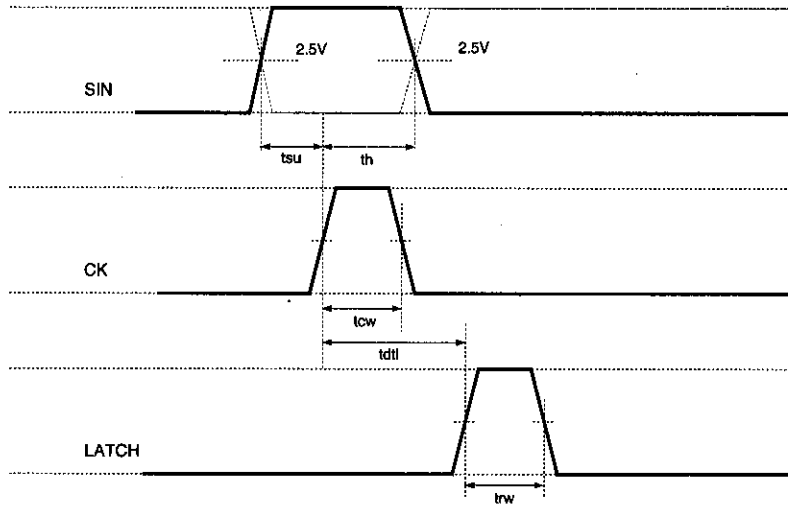
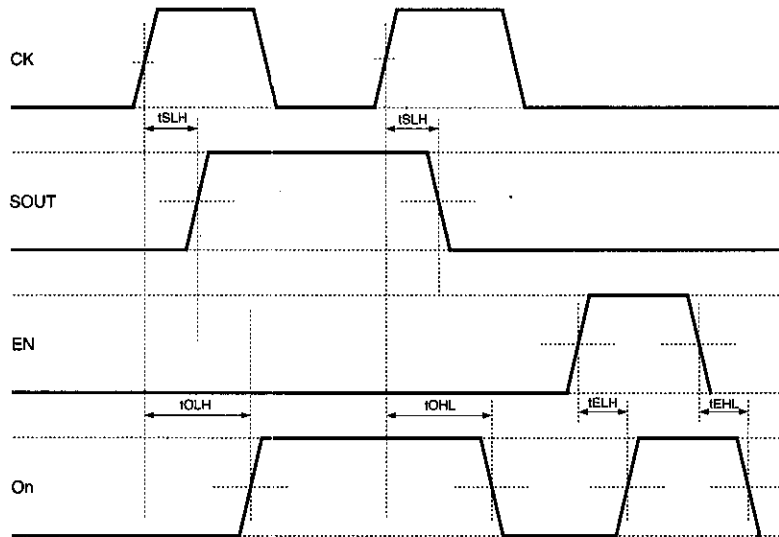


Fig.2 Timing conditions

● Switching characteristics (unless otherwise noted, $T_a=25^\circ\text{C}$, $V_{DD}=5.0\text{V}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output "L - H" propagation time Input CK to output SOUT	t_{SLH}	$V_{IH}=5\text{V}$ $V_{IL}=0\text{V}$	—	—	100	nsec
Output "H - L" propagation time Input CK to output SOUT	t_{SPLH}		—	—	100	nsec
Output "L - H" propagation time Input CK to output ON	t_{OLH}		—	—	200	nsec
Output "H - L" propagation time Input CK to output ON	t_{OHL}		—	—	200	nsec
Output "L - H" propagation time Input EN to output ON	t_{ELH}		—	—	100	nsec
Output "H - L" propagation time Input EN to output ON	t_{EHL}		—	—	100	nsec



Note) Measured with pull-up resistance of 1.0 k Ω and load of 20 pF applied to terminals O1 to O8.

Fig.3 Switching characteristic

●Timing chart

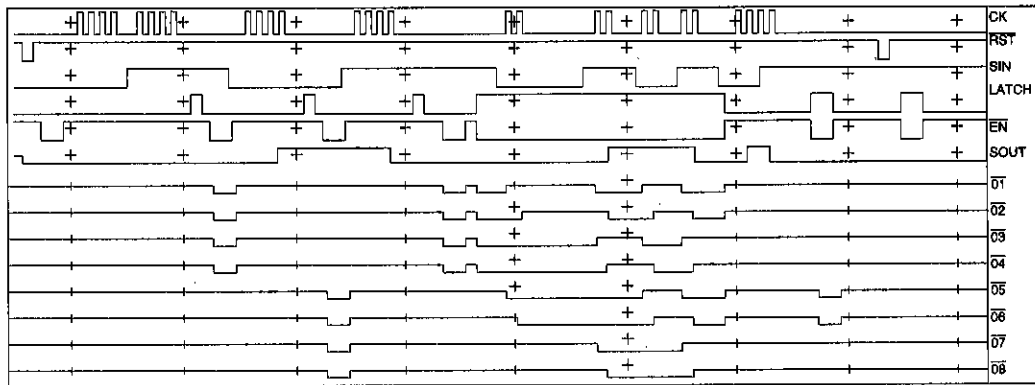


Fig.4

●I/O circuit diagram

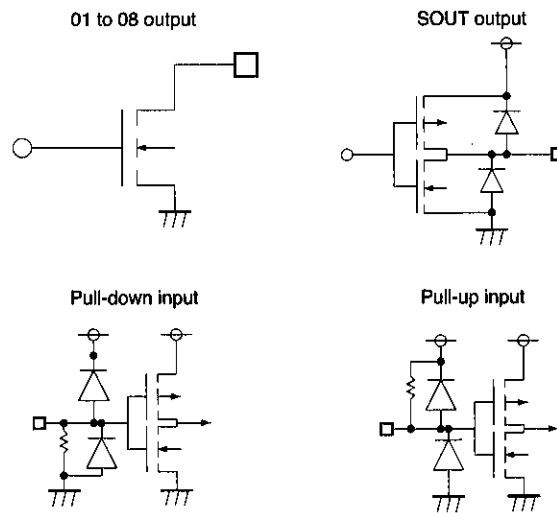


Fig.5

●Application example

Expansion port

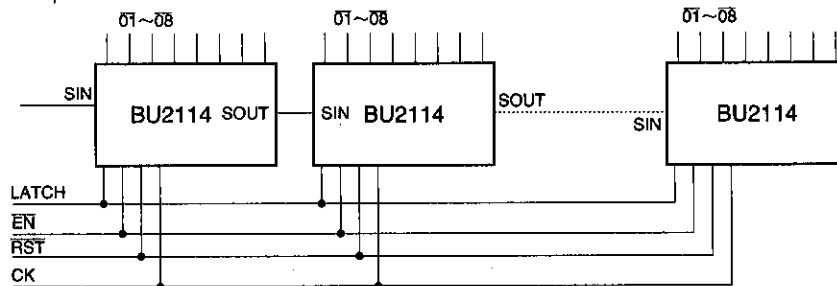
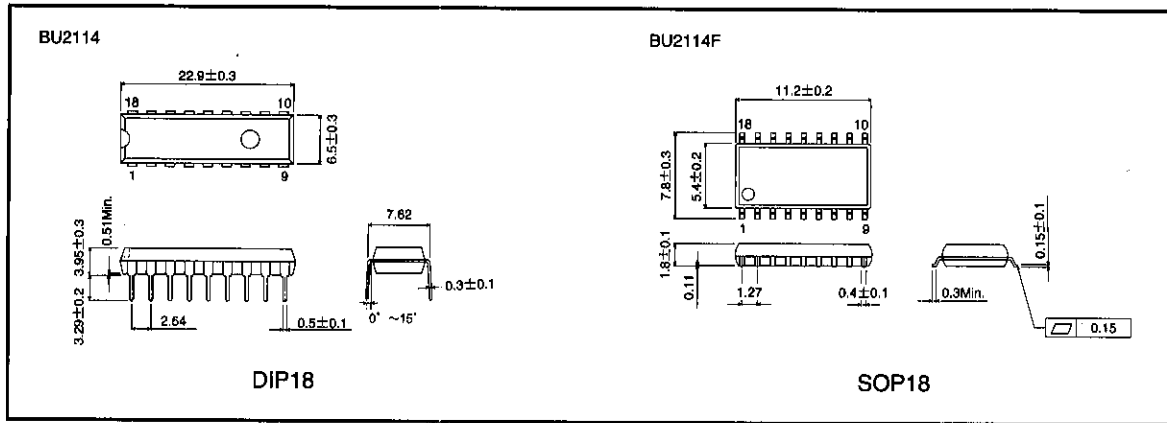


Fig.6

●External dimensions (Units: mm)



Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
 - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
 - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.