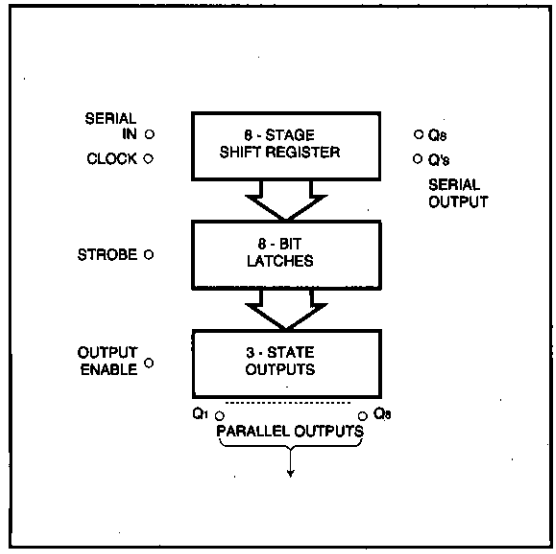
8-bit compatible shift/store register

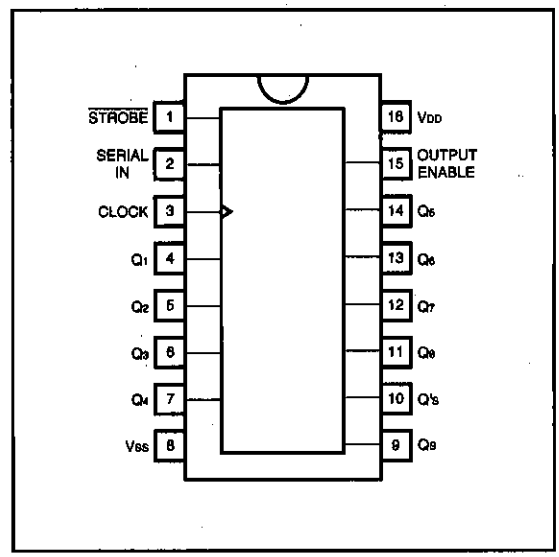
BU4094BC/BU4094BCF/BU4094BCFV

The BU4094BC, BU4094BCF, and BU4094BCFV are shift/store registers, each consisting of an 8-bit register and an 8-bit latch.
As the data in the shift register can be latched by an asynchronous strobe input, it is possible to hold the output in the data transfer mode.
The tri-state parallel output can be connected directly with an 8-bit bus line.
These registers are suitable for in-line/parallel data conversion, data receivers and other similar applications.

●Logic diagram



●Block diagram



●Truth table

CLOCK	OUTPUT ENABLE	$\overline{\text{STROBE}}$	SERIAL IN	Parallel Output		Serial Output	
				Q_1	Q_n	Q_8	Q's
↓	H	H	L	L	Q_{n-1}	Q_7	NC
↓	H	H	H	H	Q_{n-1}	Q_7	NC
↓	H	L	X	NC	NC	Q_7	NC
↓	L	X	X	Z	Z	Q_7	NC
↑	H	X	X	NC	NC	NC	Q_8
↑	L	X	X	Z	Z	NC	Q_8

NC : No Change Z : High Impedance X : Don't Care

●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{DD}	−0.3~20	V
Power dissipation	Pd	1000 (DIP), 500 (SOP) 400 (SSOP)	mW
Operating temperature	Topr	−40~85	℃
Storage temperature	Tstg	−55~150	℃
Input voltage	V_{IN}	−0.3~V_{DD}+0.3	V

●Electrical characteristics

DC characteristics (unless otherwise noted, Ta=25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V_{DD} (V)	Conditions
"H" input voltage	V_{IH}	3.5	—	—	V	5	—
		7.0	—	—		10	
		11.0	—	—		15	
"L" input voltage	V_{IL}	—	—	1.5	V	5	—
		—	—	3.0		10	
		—	—	4.0		15	
"H" input current	I_{IH}	—	—	0.3	μA	15	V_{IH}=15V
"L" input current	I_{IL}	—	—	−0.3	μA	15	V_{IL}=0V
"H" output voltage	V_{OH}	4.95	—	—	V	5	I_O=0mA
		9.95	—	—		10	
		14.95	—	—		15	
"L" output voltage	V_{OL}	—	—	0.05	V	5	I_O=0mA
		—	—	0.05		10	
		—	—	0.05		15	
"H" output current	I_{OH}	−0.16	—	—	mA	5	V_{OH}=4.6V
		−0.4	—	—		10	V_{OH}=9.5V
		−1.2	—	—		15	V_{OH}=13.5V
"L" output current	I_{OL}	0.44	—	—	mA	5	V_{OL}=0.4V
		1.1	—	—		10	V_{OL}=0.5V
		3.0	—	—		15	V_{OL}=1.5V
Quiescent supply current	I_{DD}	—	—	20	μA	5	V_I=V_{DD}, or GND
		—	—	40		10	
		—	—	80		15	

●Electrical characteristics

Switching characteristics (unless otherwise noted, Ta=25℃, C_L=50pF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V_{DD} (V)	Conditions	Measurement Circuit
Output rise time	t_{TLH}	—	100	—	ns	5	—	Fig.1
		—	50	—	ns	10		
		—	40	—	ns	15		
Output fall time	t_{THL}	—	100	—	ns	5	—	Fig.1
		—	50	—	ns	10		
		—	40	—	ns	15		
Propagation delay time, CLOCK to Qs	t_{PLH} t_{PHL}	—	350	600	ns	5	—	Fig.1
		—	125	250	ns	10		
		—	95	190	ns	15		
Propagation delay time, CLOCK to Qs	t_{PLH} t_{PHL}	—	230	460	ns	5	—	Fig.1
		—	110	220	ns	10		
		—	75	150	ns	15		
Propagation delay time, CLOCK to Qn	t_{PLH} t_{PHL}	—	420	840	ns	5	—	Fig.1
		—	195	390	ns	10		
		—	135	270	ns	15		
Propagation delay time, STROBE to Qn	t_{PLH} t_{PHL}	—	290	580	ns	5	—	Fig.1
		—	145	290	ns	10		
		—	100	200	ns	15		
3-state propagation delay time, Output Enable to Qn	t_{PHZ} t_{PZH}	—	140	280	ns	5	R_L=1kΩ	Fig.2
		—	75	150	ns	10		
		—	55	110	ns	15		
3-state propagation delay time, Output Enable to Qn	t_{PLZ} t_{PZL}	—	140	280	ns	5	R_L=1kΩ	Fig.2
		—	75	150	ns	10		
		—	55	110	ns	15		
Minimum setup time, DATA to CLOCK	t_{SU}	—	60	125	ns	5	—	Fig.1
		—	30	55	ns	10		
		—	20	35	ns	15		
Minimum hold time, CLOCK to DATA	t_H	—	10	40	ns	5	—	Fig.1
		—	10	20	ns	10		
		—	5	15	ns	15		
Minimum clock pulse width	t_W	—	100	200	ns	5	—	Fig.1
		—	50	100	ns	10		
		—	40	80	ns	15		
Maximum clock rise time and fall time	$t_{r(CL)}$ $t_{r(CL)}$	NO Limit			μs	5	—	Fig.1
					μs	10		
					μs	15		
Maximum clock frequency	f_{CL}	1.25	2.5	—	MHz	5	—	Fig.1
		2.5	5	—	MHz	10		
		3.0	6	—	MHz	15		
Minimum strobe pulse width	t_{WH}	—	100	200	ns	5	—	Fig.1
		—	40	80	ns	10		
		—	35	70	ns	15		
Input capacitance	C_{IN}	—	5	—	pF	—	—	—

●Measurement circuits

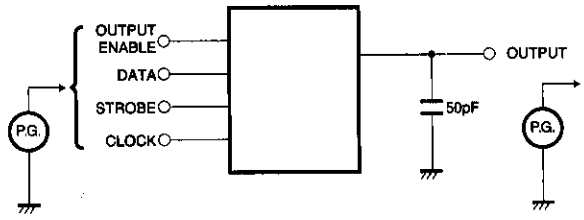


Fig. 1 Switching waveform test circuit

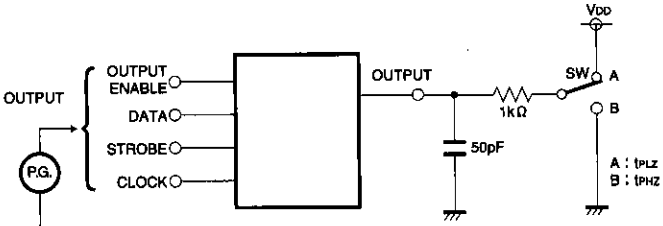


Fig. 2 3-state delay time test circuit

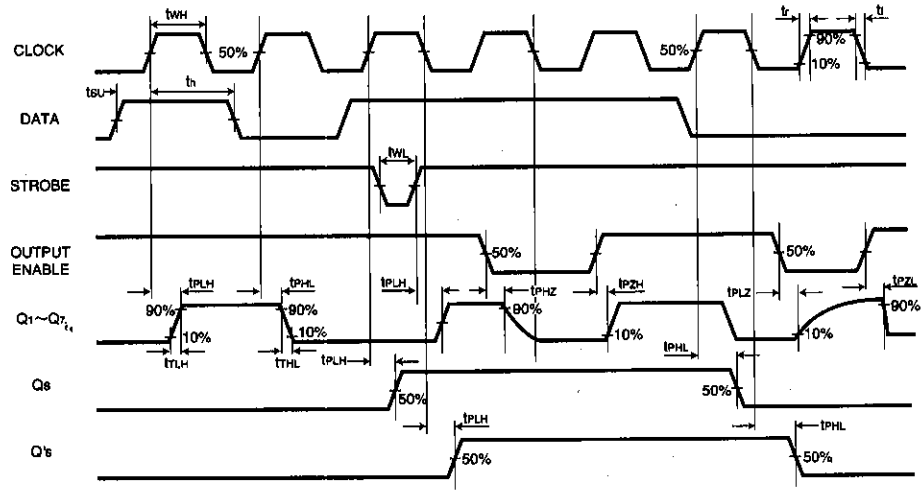


Fig. 3 Switching time test waveform

●Electrical characteristic curve

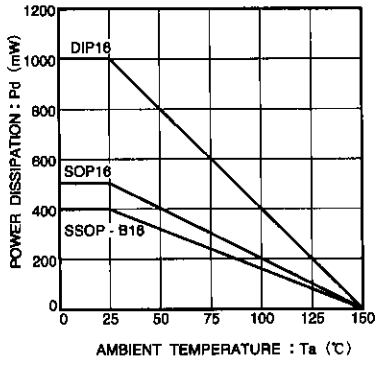
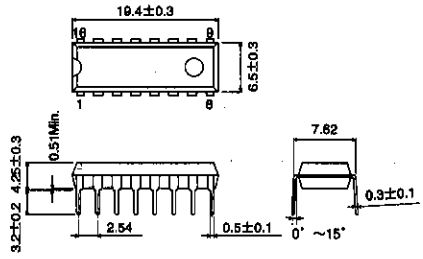


Fig. 4 Power dissipation - ambient temperature characteristic

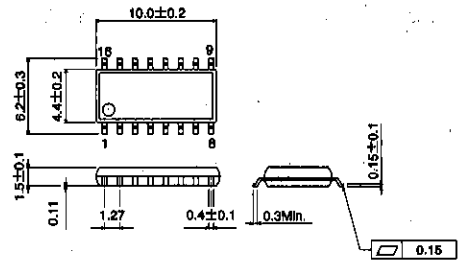
●External dimensions (Units: mm)

BU4094BC



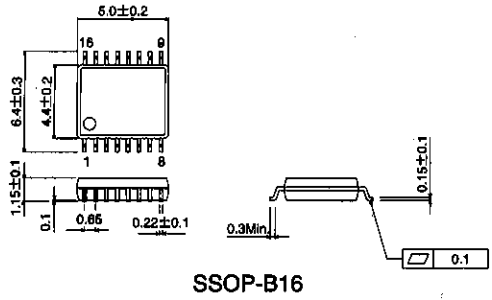
DIP16

BU4094BCF



SOP16

BU4094BCFV



SSOP-B16

Series Standard
BU4000B

The BU4000 Series are CMOS ICs featuring low voltage and low power consumption. The wide range of operating power supply voltages is compatible with the general-purpose 4000B Series, and when a 5V power supply voltage is used, the LS-TTL IC can be driven directly.
These ICs are available in SOP and SSOP packages as well as the standard DIP package.

●Features

1) Low power consumption.
2) Wide range of operating power supply voltages.
3) High input impedance.
4) High fan-out.
5) Direct drive of 2 L-TTL inputs and 1 LS-TTL input.

●Absolute maximum ratings (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{DD}	18 *1	V
Input voltage	V_{IN}	−0.3~V_{DD}+0.3	V
Power dissipation *2	Pd	Please refer to specifications for individual package	mW
Storage temperature	Tstg	−55~150	℃

*1 For the BU4XXXBC type, V_{DD} = 20 V.
*2 The values for the SOP and SSOP packages are the values when mounted on a glass epoxy PCB (50 mm x 50 mm x 1.6 mm).

●Recommended operating conditions (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{DD}	3~16 *	V
Input voltage	V_{IN}	0~V_{DD}	V
Operating temperature	Topr	−40~85	℃

* For the BU4XXXBC type, V_{DD} = 3 to 18 V.

●Electrical characteristic curves

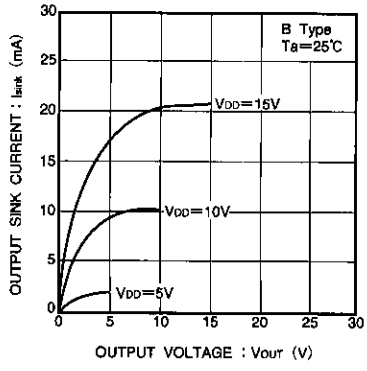


Fig.1 Output sink current - output voltage characteristic

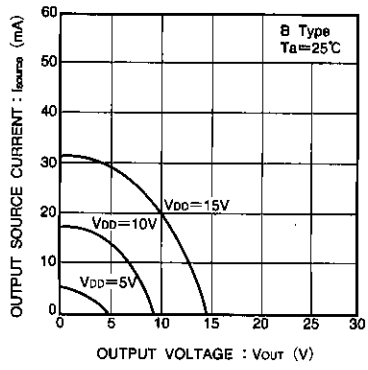


Fig.2 Output source current - output voltage characteristic

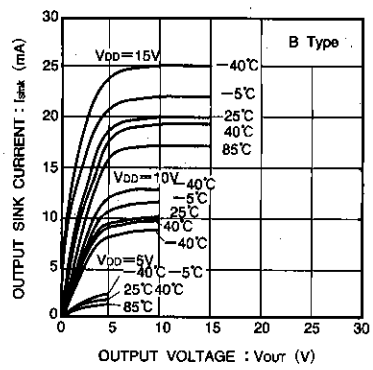


Fig.3 Output SINK current - output voltage characteristic

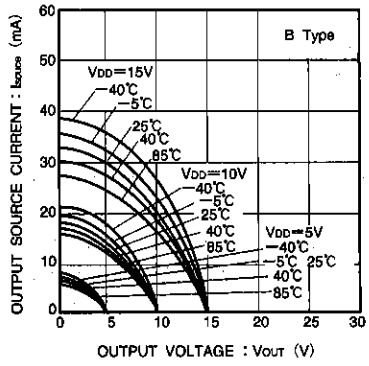


Fig.4 Output source current - output voltage characteristic

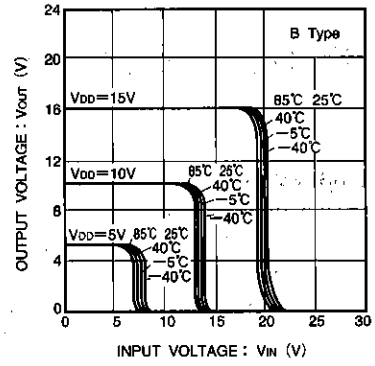


Fig.5 Output voltage - input voltage characteristic

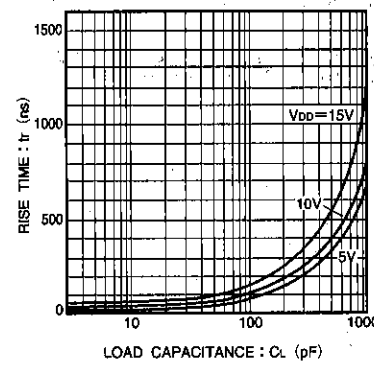


Fig.6 Rise time - load capacitance characteristic

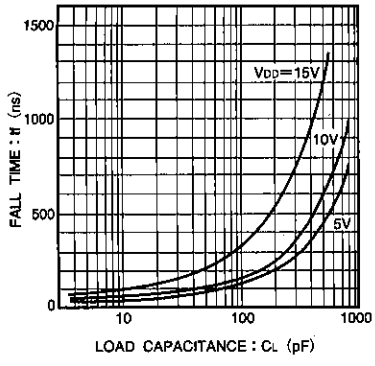


Fig.7 Fall time - load capacitance characteristic

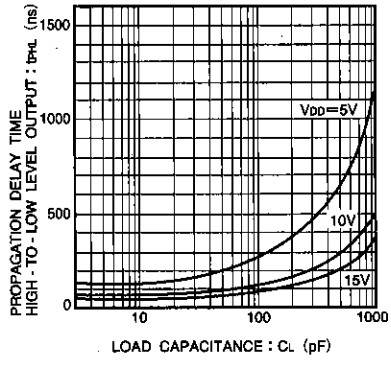


Fig.8 "H" to "L" propagation delay time - load capacitance characteristic

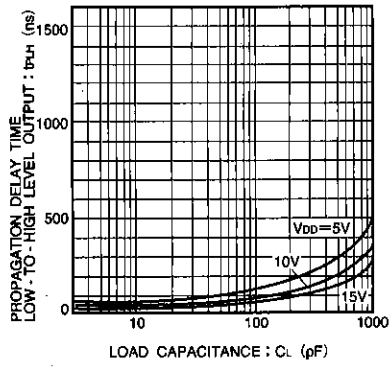


Fig.9 "L" to "H" propagation delay time - load capacitance characteristic

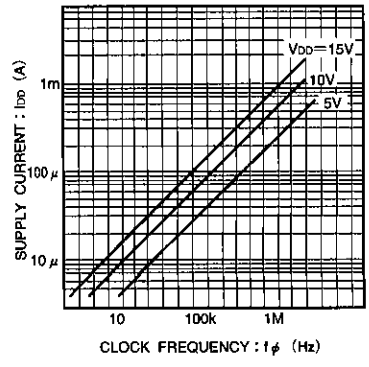


Fig.10 Supply current - clock frequency characteristic

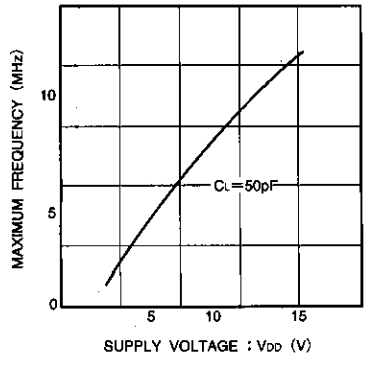


Fig.11 Maximum clock frequency - power supply voltage characteristic

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