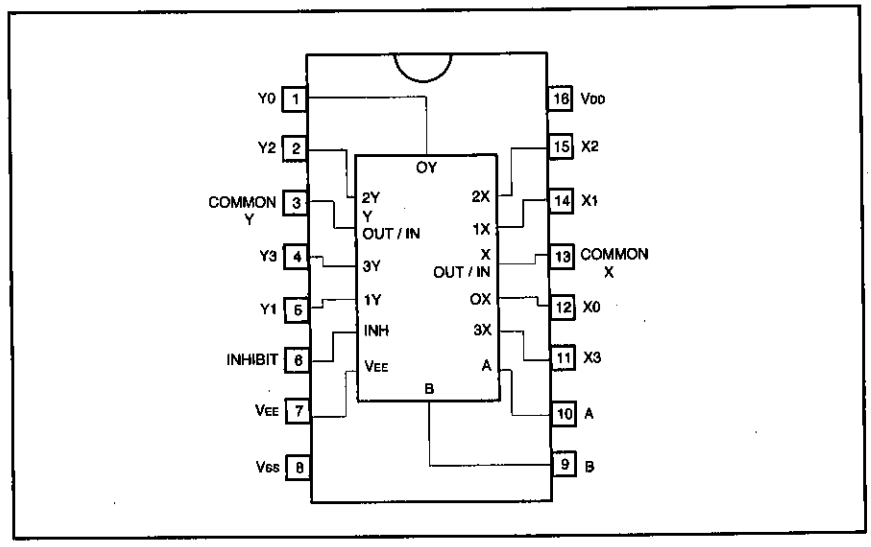
Dual 4-channel analog multiplexer/ demultiplexer

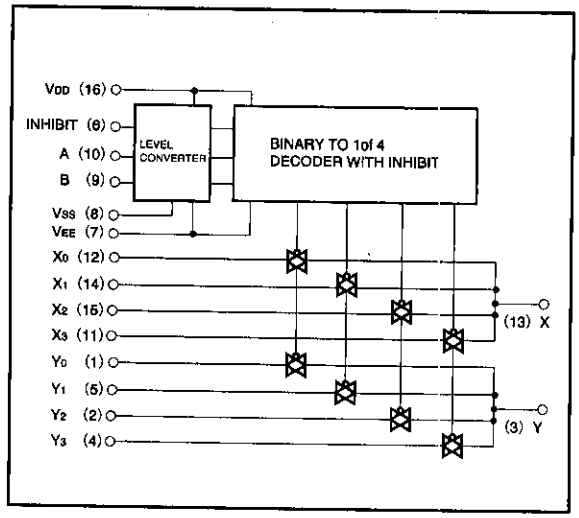
BU4052BC/BU4052BCF/BU4052BCFV

The BU4052BC, BU4052BCF, and BU4052BCFV are multiplexers/demultiplexers capable of selecting and combining analog signals and digital signals with a configuration of 4 ch × 2.
Inhibit signals and control signals are used to turn on the switch of the corresponding channel. In addition, even if the logical amplitude (V_{DD}-V_{SS}) of the control signal is low, signals with a large amplitude (V_{DD}-V_{EE}) can be switched.
In addition, as each switch has a low ON resistance, it can be connected to a low impedance circuit.

●Block diagram



●Logic diagram



●Truth table

INHIBIT	A	B	ON SWITCH
L	L	L	X_0 Y_0
L	H	L	X_1 Y_1
L	L	H	X_2 Y_2
L	H	H	X_3 Y_3
H	X	X	NONE

X : Don't Care

●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	$V_{DD}-V_{EE}$	−0.3~20	V
Power dissipation	Pd	1000 (DIP), 500 (SOP), 400 (SSOP)	mW
Operating temperature	Topr	−40~85	℃
Storage temperature	Tstg	−55~50	℃
Input voltage	V_{IN}	−0.3~V_{DD}+0.3	V

●Electrical characteristics

DC characteristics (unless otherwise noted, Ta=25℃, V_{EE}=V_{SS}=0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V_{DD} (V)	Conditions	Measurement Circuit
High-level input voltage	V_{IH}	3.5	—	—	V	5	—	Fig.1
		7.0	—	—		10		
		11.0	—	—		15		
Low-level input voltage	V_{IL}	—	—	1.5	V	5	—	Fig.1
		—	—	3.0		10		
		—	—	4.0		15		
High-level input current	I_{IH}	—	—	0.3	μA	15	V_{IH}=15V	Fig.1
Low-level input current	I_{IL}	—	—	−0.3	μA	15	V_{IL}=0V	Fig.1
ON resistance	R_{ON}	—	—	950	Ω	5	—	Fig.2
		—	—	250		10		
		—	—	160		15		
ON resistance deflexion	$\triangle R_{ON}$	—	25	—	Ω	5	—	Fig.2
		—	10	—		10		
		—	5	—		15		
OFF - Channel leakage current	I_{OFF}	—	—	0.3	μA	15	—	Fig.3
		—	—	−0.3		15		
Quiescent supply current	I_{DD}	—	—	5	μA	5	V_I=V_{DD} or GND	—
		—	—	10		10		
		—	—	15		15		

●Switching characteristics (unless otherwise noted, Ta=25℃, V_{EE}=V_{SS}=0V, R_L=1kΩ, C_L=50pF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V_{DD} (V)	Conditions	Measurement Circuit
Propagation delay time Switch IN → OUT	t_{PLH}, t_{PHL}	—	15	45	ns	5	—	Fig.4
		—	8	20		10		
		—	6	15		15		
Propagation delay time CONT → OUT	t_{PHZ}, t_{PLZ} t_{PZH}, t_{PZL}	—	170	550	ns	5	—	Fig.5, 6
		—	90	240		10		
		—	70	160		15		
Propagation delay time INH → OUT	t_{PHZ}, t_{PLZ} t_{PZH}, t_{PZL}	—	170	450	ns	5	—	Fig.5, 6
		—	90	210		10		
		—	70	160		15		
Maximum propagation frequency	$f_{Max.}$	—	15	—	MHz	5	V_{EE}=−5V*1	Fig.7
Feedthrough attentuation	FT	—	0.7	—	MHz	5	V_{EE}=−5V*2	Fig.7
Sinewave distortion ratio	D	—	0.02	—	%	5	V_{EE}=−5V*3	Fig.7
Input capacitance (control)	C_C	—	5	—	pF	—	—	—
Input capacitance (switch)	C_S	—	10	—	pF	—	—	—

*1 V_{IN}=5Vp-p sine wave, frequency that enables 20 $\log_{10}$ V_{OUT}/V_{IN}=-3 dB

*2 V_{IN}=5Vp-p sine wave, frequency that enables 20 $\log_{10}$ V_{OUT}/V_{IN}=-50 dB at channel off

*3 V_{IN}=5Vp-p sine wave

●Measurement circuits

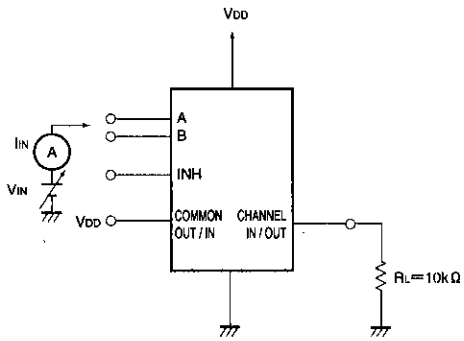


Fig.1 Input voltage, current

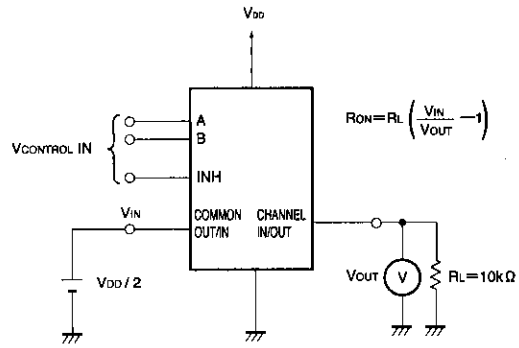


Fig.2 ON resistance

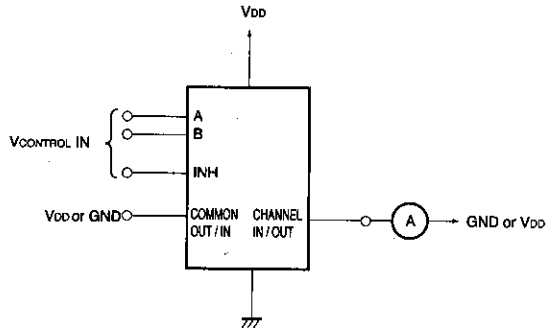


Fig.3 OFF channel leakage current

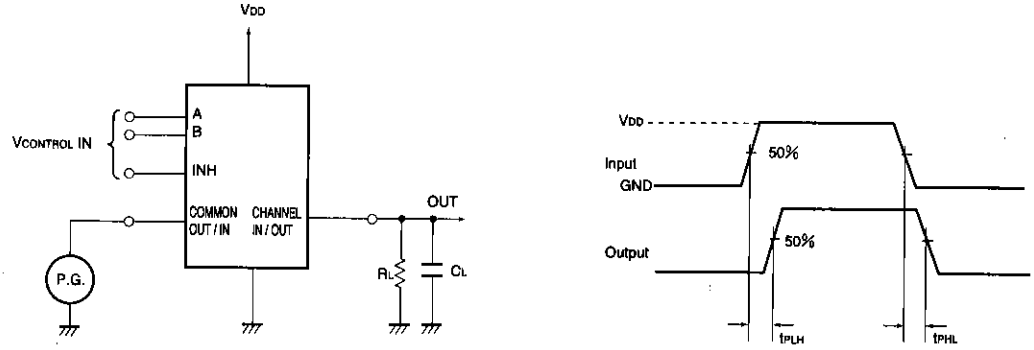


Fig.4 Propagation delay time (Switch IN to OUT)

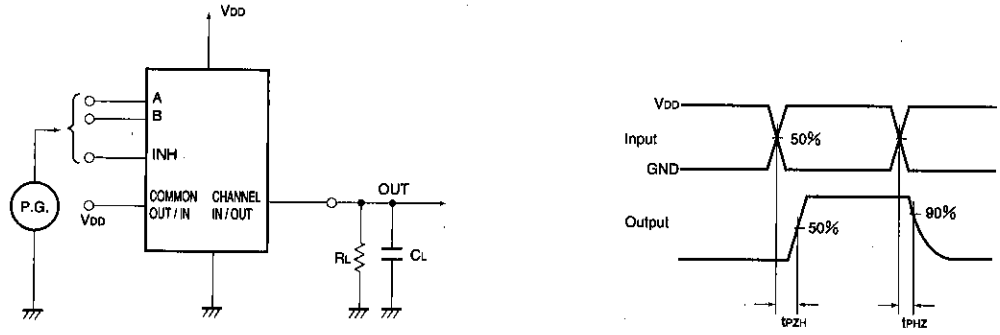


Fig.5 Propagation delay time (CONT, INH to OUT)

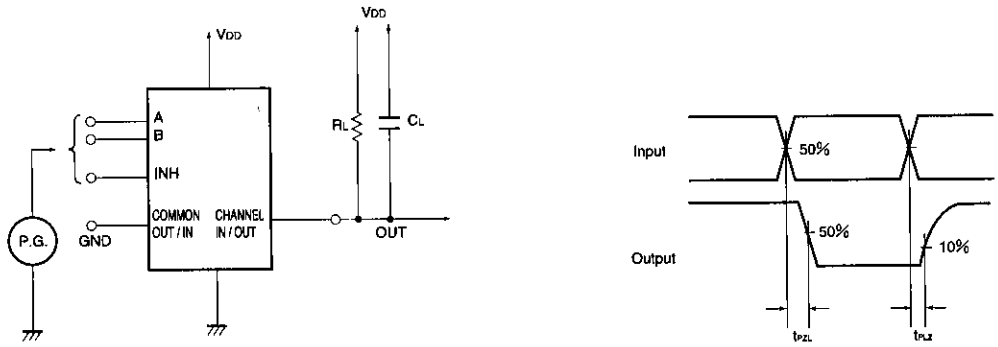


Fig.6 Propagation delay time (CONT, INH to OUT)

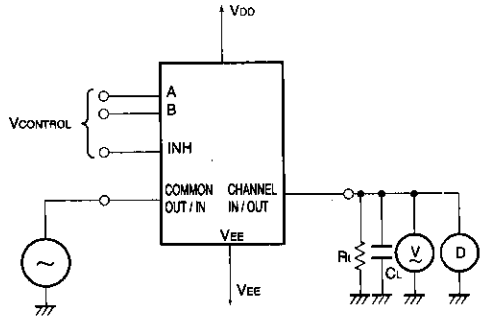


Fig.7 Maximum propagation frequency, feedthrough, sine wave distortion

●Electrical characteristic curve

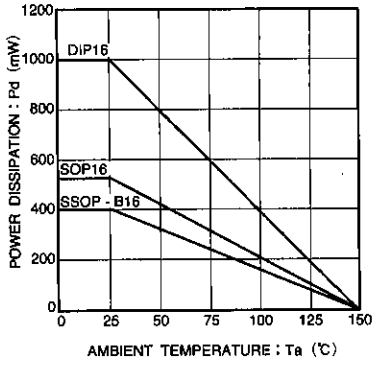
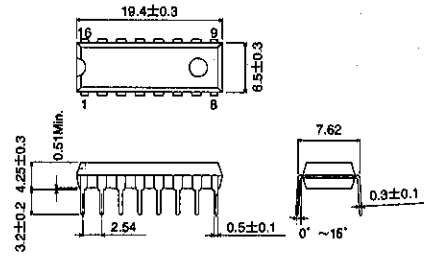


Fig.8 Power dissipation - Ta characteristic

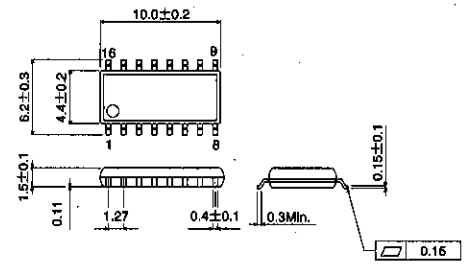
●External dimensions (Units: mm)

BU4052BC



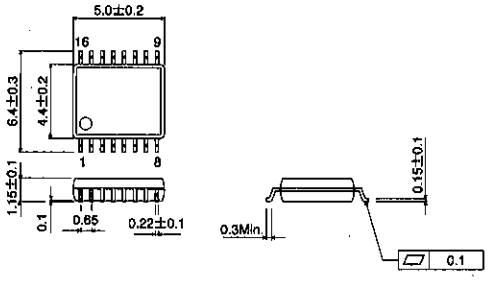
DIP16

BU4052BCF



SOP16

BU4052BCFV



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

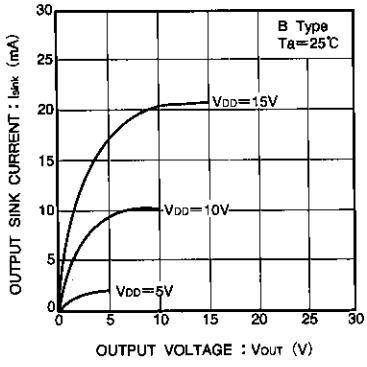


Fig.1 Output sink current - output voltage characteristic

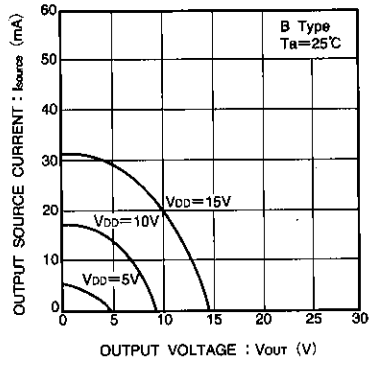


Fig.2 Output source current - output voltage characteristic

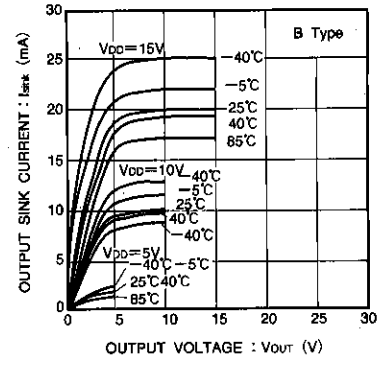


Fig.3 Output SINK current - output voltage characteristic

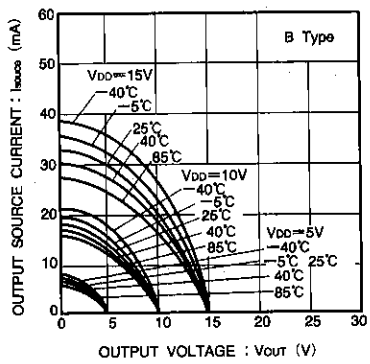


Fig.4 Output source current - output voltage characteristic

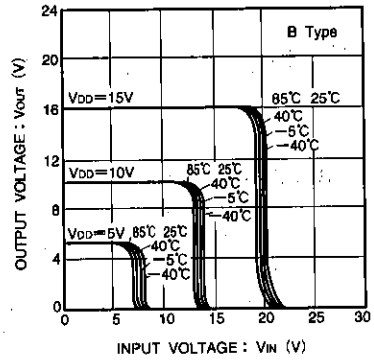


Fig.5 Output voltage - input voltage characteristic

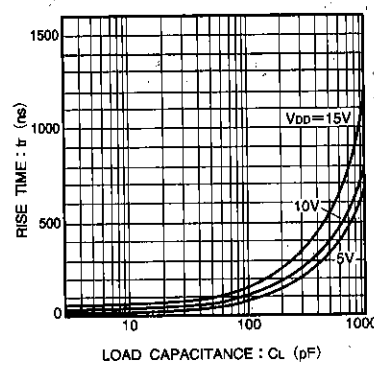


Fig.6 Rise time - load capacitance characteristic

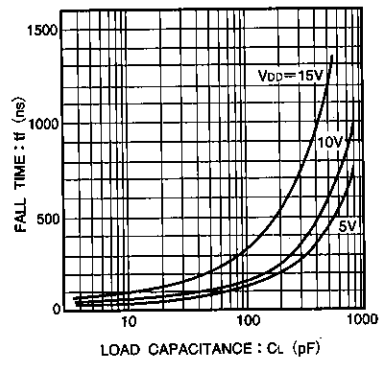


Fig.7 Fall time - load capacitance characteristic

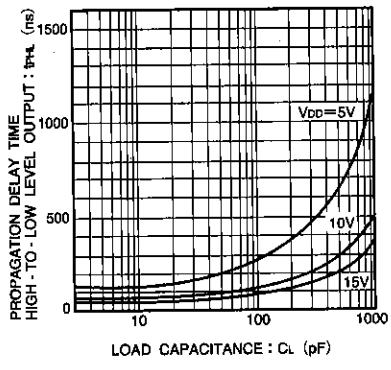


Fig.8 "H" to "L" propagation delay time - load capacitance characteristic

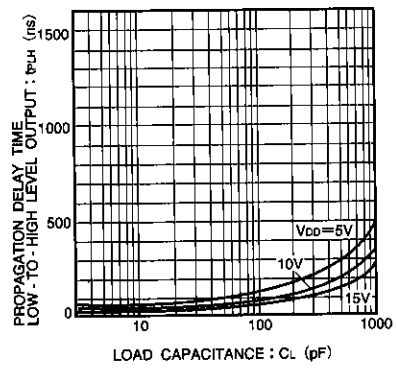


Fig.9 "L" to "H" propagation delay time - load capacitance characteristic

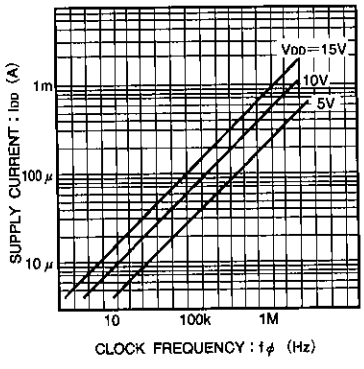


Fig.10 Supply current - clock frequency characteristic

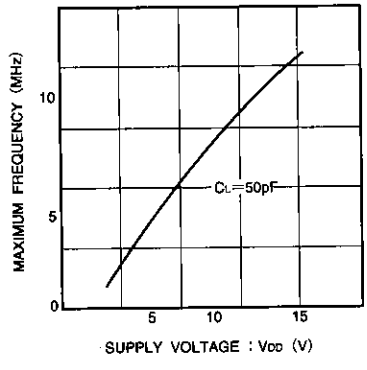


Fig.11 Maximum clock frequency - power supply voltage characteristic

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