# Dual 4-channel analog multiplexer / demultiplexer
BU4052BC / BU4052BCF / BU4052BCFV
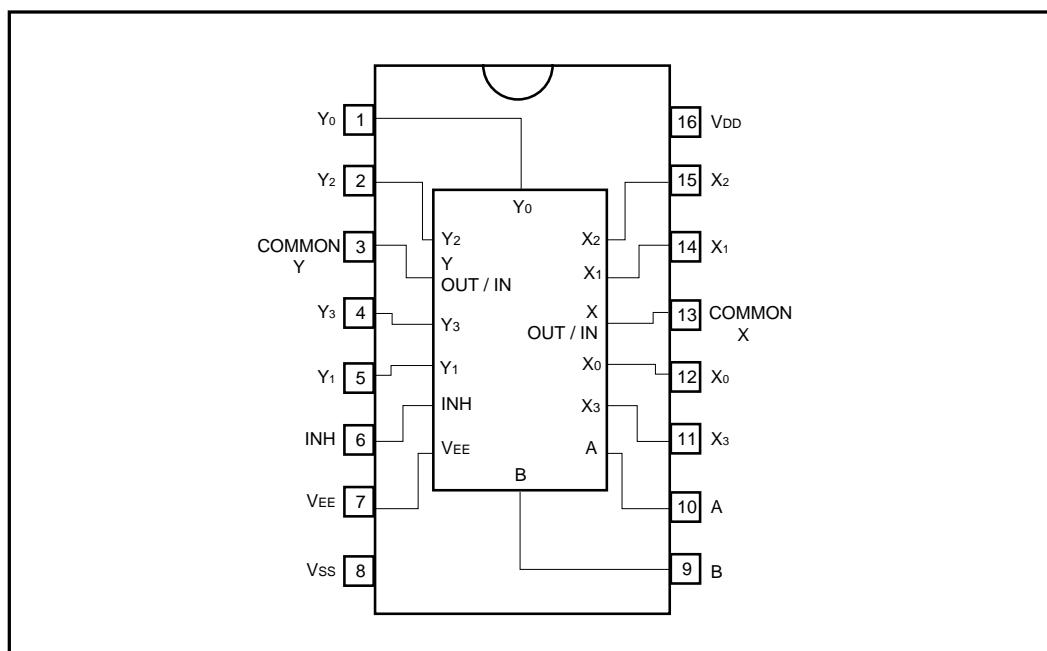
The BU4052BC, BU4052BCF, and BU4052BCFV are multiplexers / demultiplexers capable of selecting and combining analog signals and digital signals with a configuration of 4 ch × 2.
Inhibit signals and control signals are used to turn on the switch of the corresponding channel. In addition, even if the logical 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.
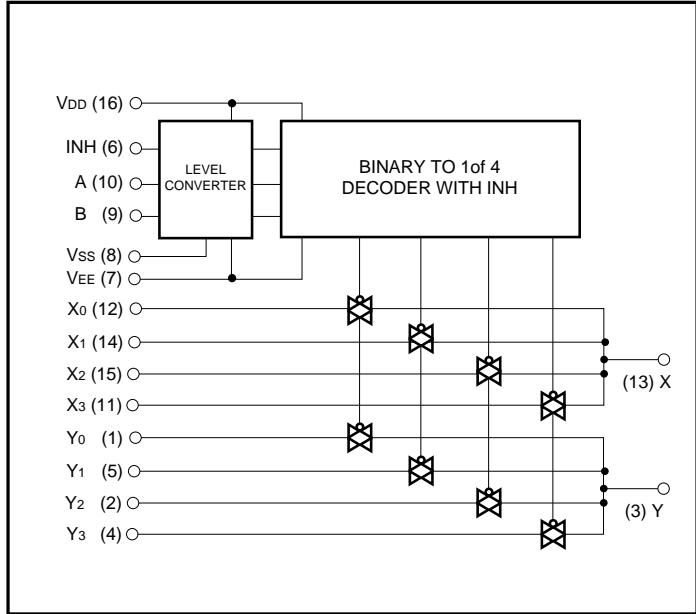
●Block diagram

●Logic circuit diagram

●Truth table

INH	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: Irrelevant

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage 1	V_{DD}	$-0.5 \sim +20$	V
Power supply voltage 2	$V_{DD} — V_{EE}$	$-0.5 \sim +20$	V
Power dissipation	Pd	1000 (DIP), 500 (SOP), 400 (SSOP)	mW
Operating temperature	Topr	$-40 \sim +85$	°C
Storage temperature	Tstg	$-55 \sim +150$	°C
Input voltage	V_{IN}	$-0.5 \sim V_{DD} + 0.5$	V

ROHM

● Electrical characteristics

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

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	$V_{IN} = V_{DD} / 2$	Fig.2
		—	—	250		10		
		—	—	160		15		
ON resistance deflexion	ΔR_{ON}	—	10	—	Ω	5	—	Fig.2
		—	6	—		10		
		—	4	—		15		
OFF-channel leakage current	I_{OFF}	—	—	0.3	μA	15	—	Fig.3
		—	—	− 0.3		15		
Static current dissipation	I_{DD}	—	—	5	μA	5	$V_I = V_{DD}$ or GND	—
		—	—	10		10		
		—	—	15		15		

Switching characteristics (unless otherwise noted, Ta = 25°C, 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}	—	150	380	ns	5	—	Fig.5, 6
		—	70	200		10		
		—	50	160		15		
Maximum propagation frequency	$f_{Max.}$	—	20	—	MHz	5	$V_{EE} = -5V$[*1]	Fig.7
Feedthrough attentuation	FT	—	0.5	—	MHz	5	$V_{EE} = -5V$[*2]	Fig.7
Sine wave 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} = 5V_{P-P} sine wave, frequency that enables 20 $\log_{10}$ V_{OUT} / V_{IN} = − 3dB.

∗2 V_{IN} = 5V_{P-P} sine wave, frequency that enables 20 $\log_{10}$ V_{OUT} / V_{IN} = − 50dB at channel off.

∗3 V_{IN} = 5V_{P-P} sine wave.

●Measurement circuits
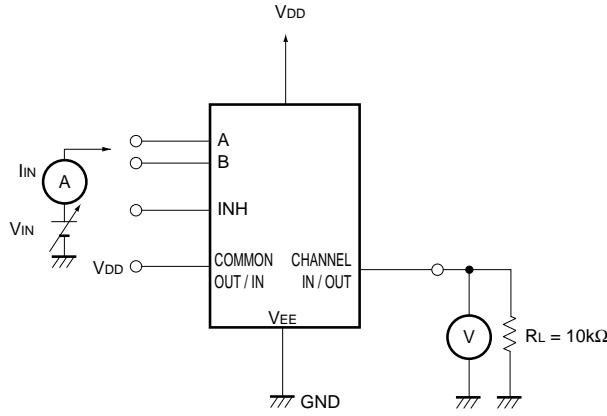
Fig.1 Input voltage, current

$$R_{ON} = R_L\left(\frac{V_{IN}}{V_{OUT}} - 1\right)$$
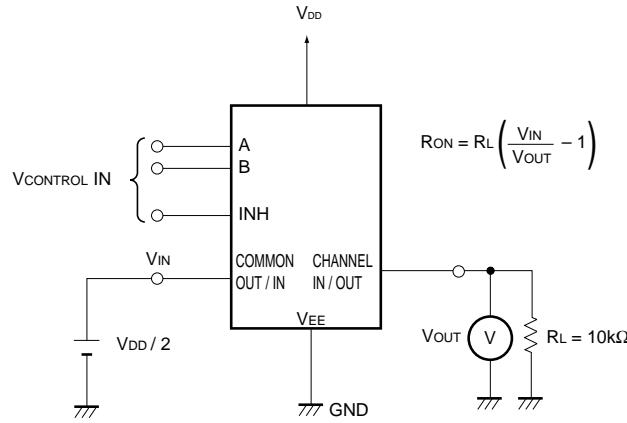
Fig.2 ON resistance

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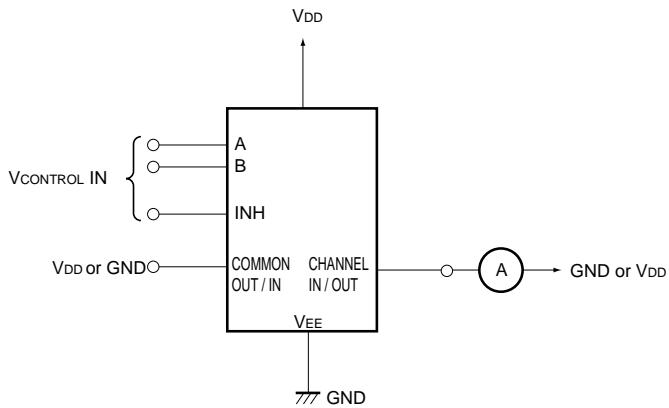
Fig.3 OFF-channel leakage current
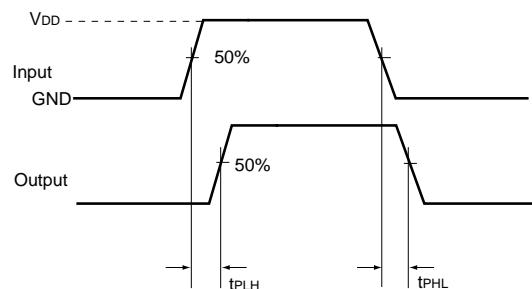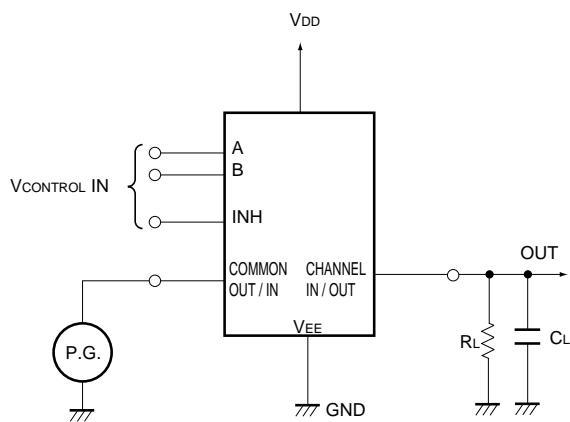
Fig.4 Propagation delay time (Switch IN to OUT)
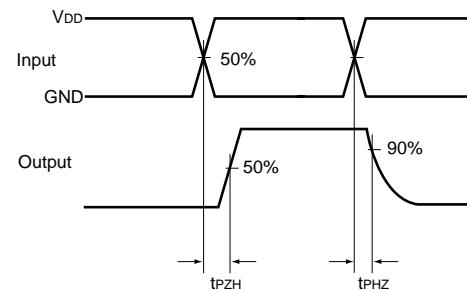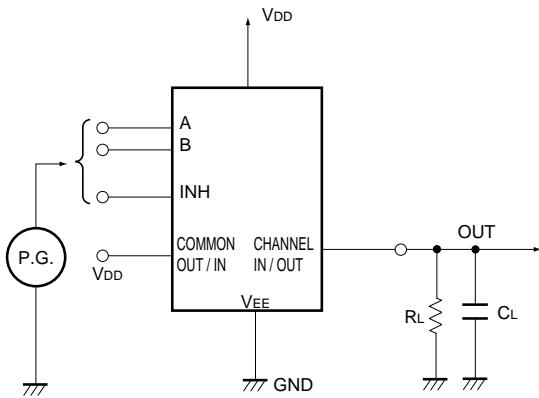
Fig.5 Propagation delay time (CONT, INH to OUT)

RoHm   **5**
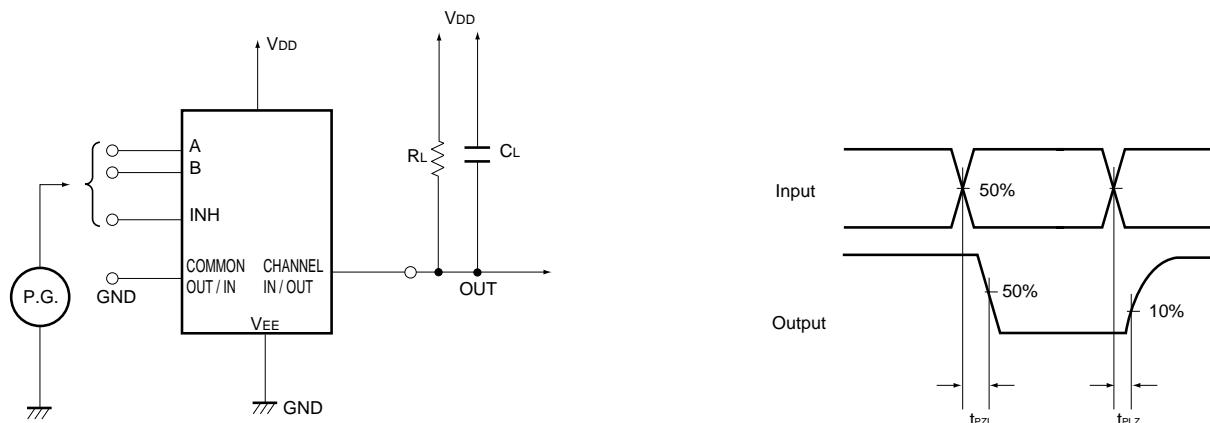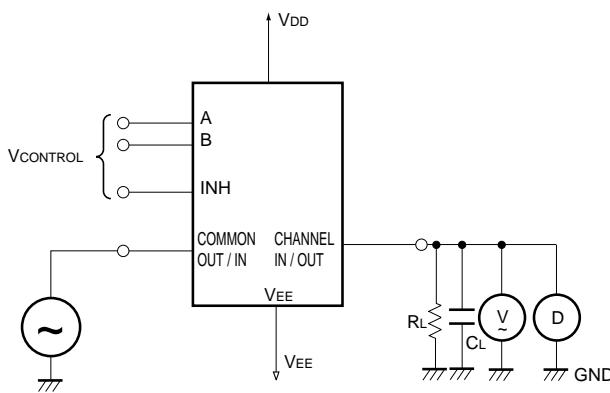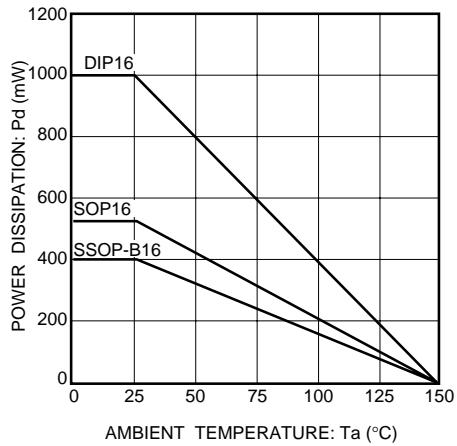
Fig.6 Propagation delay time (CONT, INH to OUT)
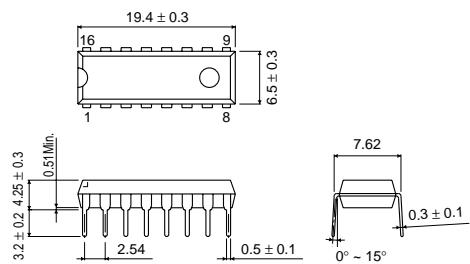
Fig.7 Maximum propagation frequency,
feedthrough, sine wave distortion

●Electrical characteristic curve
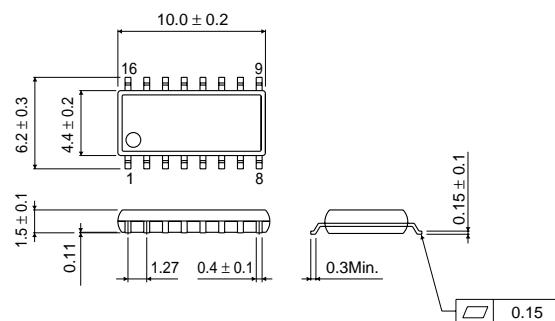
Fig.8 Power dissipation vs. Ta
characteristic

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●External dimensions (Units: mm)

BU4052BC
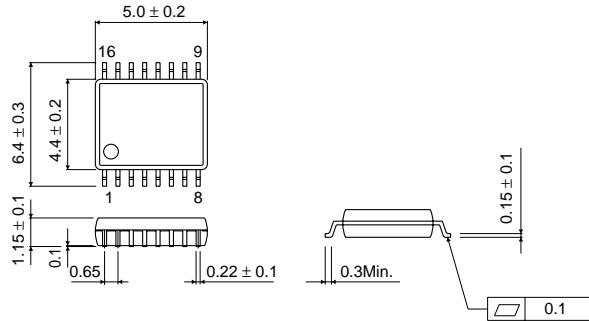
BU4052BCF

DIP16

SOP16

BU4052BCFV

SSOP-B16