

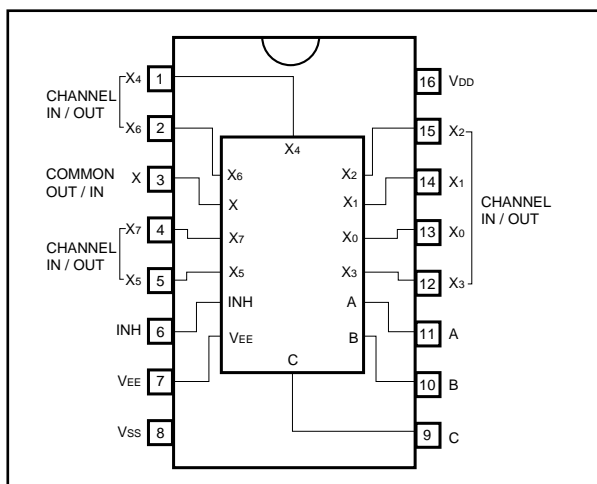
# 8-channel analog multiplexer / demultiplexer

## BU4051BC / BU4051BCF / BU4051BCFV

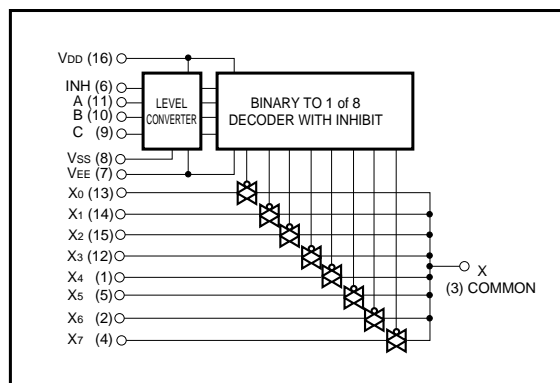
The BU4051BC, BU4051BCF and BU4051BCFV are analog multiplexers / demultiplexers which use three-input digital signals for control via an 8-channel analog switch.

These products feature high on / off output voltage ratio and low crosstalk between analog switches.

### ●Block diagram



### ●Logic circuit diagram



### ●Truth table

INH	A	B	C	ON SWITCH
L	L	L	L	X <sub>0</sub>
L	H	L	L	X <sub>1</sub>
L	L	H	L	X <sub>2</sub>
L	H	H	L	X <sub>3</sub>
L	L	L	H	X <sub>4</sub>
L	H	L	H	X <sub>5</sub>
L	L	H	H	X <sub>6</sub>
L	H	H	H	X <sub>7</sub>
H	X	X	X	NONE

X: Irrelevant

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage 1	V <sub>DD</sub>	− 0.5 ~ + 20	V
Power supply voltage 2	V <sub>DD</sub> —V <sub>EE</sub>	− 0.5 ~ + 20	V
Power dissipation	P <sub>d</sub>	1000 (DIP), 500 (SOP), 400 (SSOP)	mW
Operating temperature	T <sub>opr</sub>	− 40 ~ + 85	°C
Storage temperature	T <sub>stg</sub>	− 55 ~ + 150	°C
Input voltage	V <sub>IN</sub>	− 0.5 ~ V <sub>DD</sub> + 0.5	V

●Electrical characteristics

DC characteristics (unless otherwise noted, Ta = 25°C, V<sub>EE</sub> = V<sub>SS</sub> = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V <sub>DD</sub> (V)	Conditions
Input high-level voltage	V <sub>IH</sub>	3.5	—	—	V	5	—
		7.0	—	—		10	
		11.0	—	—		15	
Input low-level voltage	V <sub>IL</sub>	—	—	1.5	V	5	—
		—	—	3.0		10	
		—	—	4.0		15	
Input high-level current	I <sub>IH</sub>	—	—	0.3	μA	15	V <sub>IH</sub> = 15V
Input low-level current	I <sub>IL</sub>	—	—	− 0.3	μA	15	V <sub>IL</sub> = 0V
RON resistance	R <sub>ON</sub>	—	—	950	Ω	5	V <sub>IN</sub> = V <sub>DD</sub> / 2
		—	—	250		10	
		—	—	160		15	
RON resistance deflexion	ΔR <sub>ON</sub>	—	10	—	Ω	5	—
		—	6	—		10	
		—	4	—		15	
OFF-channel leakage current	I <sub>OFF</sub>	—	—	0.3	μA	15	—
		—	—	− 0.3		15	
Static current dissipation	I <sub>DD</sub>	—	—	5	μA	5	V <sub>I</sub> = V <sub>DD</sub> or GND
		—	—	10		10	
		—	—	15		15	

Switching characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{EE} = V_{SS} = 0\text{V}$ ,  $R_L = 1\text{k}\Omega$ ,  $C_L = 50\text{pF}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	$V_{DD}$ (V)	Conditions	Measurement circuit
Propagation delay time CHANNEL 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 INHIBIT→OUT	$t_{PHZ}$ , $t_{PLZ}$ $t_{PZH}$ , $t_{PZL}$	—	150	380	ns	5	—	Fig.5, 6
		—	70	200		10		
		—	50	160		15		
Max. propagation frequency	$f_{Max}$	—	20	—	MHz	5	$V_{EE} = -5\text{V}^{*1}$	Fig.7
Feedthrough	FT	—	0.5	—	MHz	5	$V_{EE} = -5\text{V}^{*2}$	Fig.7
Sinewave distortion	D	—	0.02	—	%	5	$V_{EE} = -5\text{V}^{*3}$	Fig.7
Input capacitance (control)	$C_C$	—	5	—	pF	—	—	—
Input capacitance (switch)	$C_S$	—	10	—	pF	—	—	—

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

\*2  $V_{IN} = 5\text{VP-P}$  sine wave, frequency that enables  $20 \log_{10} V_{OUT} / V_{IN} = -50\text{dB}$  at Channel off

\*3  $V_{IN} = 5\text{VP-P}$  sine wave

### ●Measurement circuits

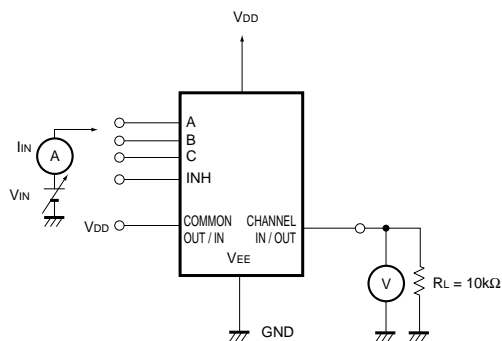


Fig. 1 Input voltage, current

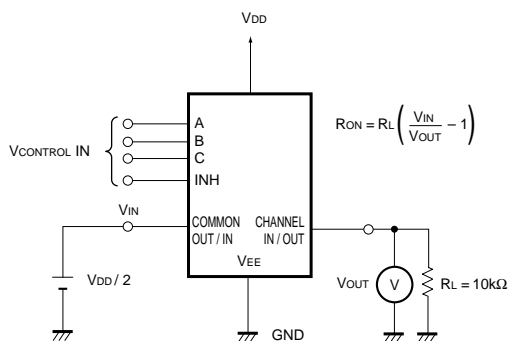


Fig. 2 ON resistance, ON resistance deviation

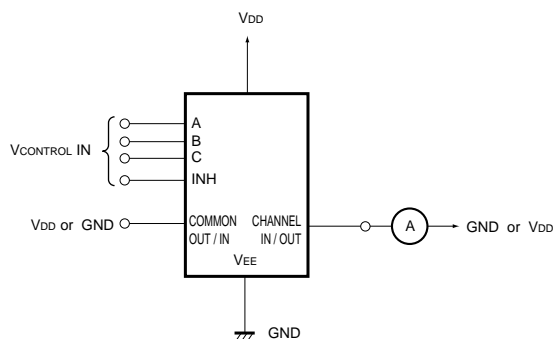


Fig. 3 OFF-channel leakage current

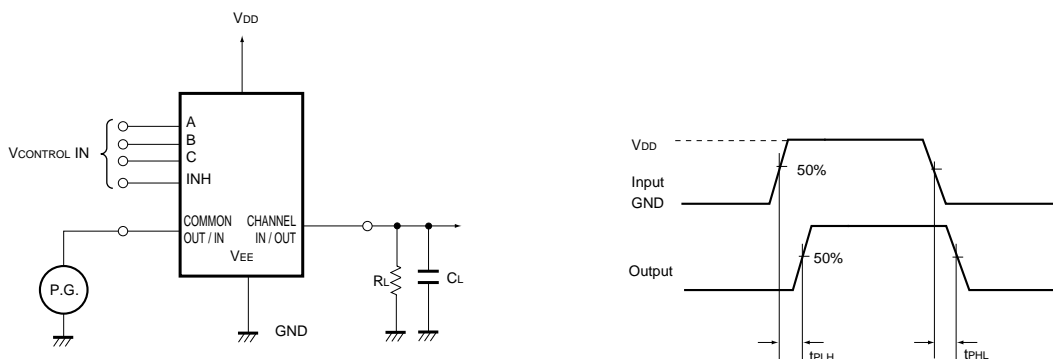


Fig. 4 Propagation delay time (Switch IN to OUT)

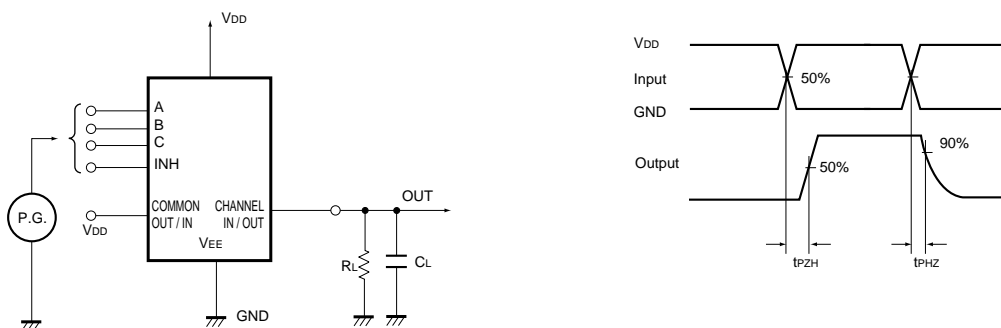


Fig. 5 Propagation delay time (CONT, INH to OUT)

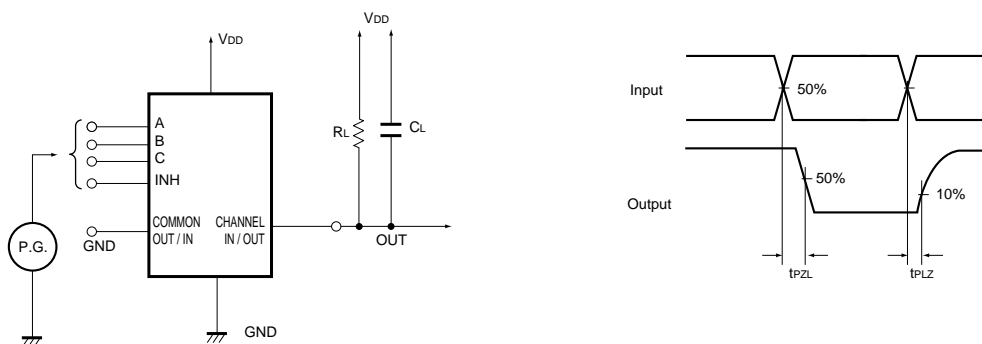


Fig. 6 Propagation delay time (CONT, INH to OUT)

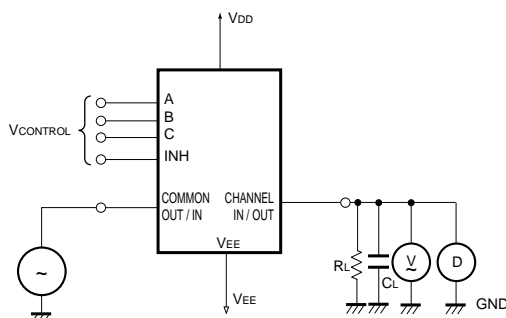


Fig. 7 Maximum propagation frequency, feedthrough attenuation, sine wave distortion

### ●Electrical characteristic curve

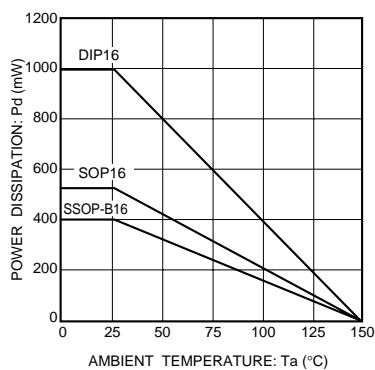
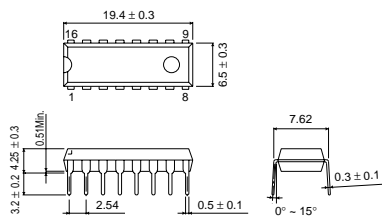


Fig. 8 Power dissipation vs. ambient temperature

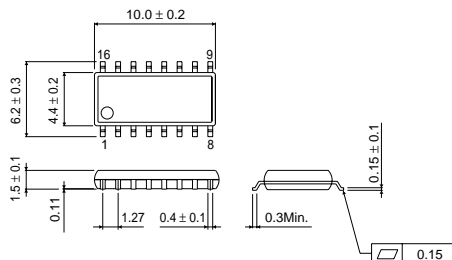
## ● External dimensions (Units: mm)

BU4051BC



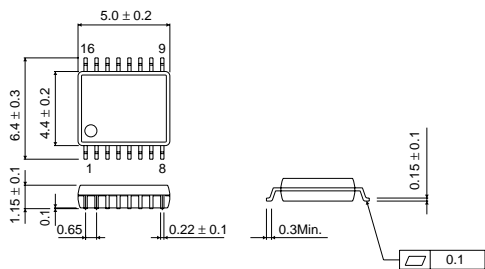
DIP16

BU4051BCF



SOP16

BU4051BCFV



SSOP-B16

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