

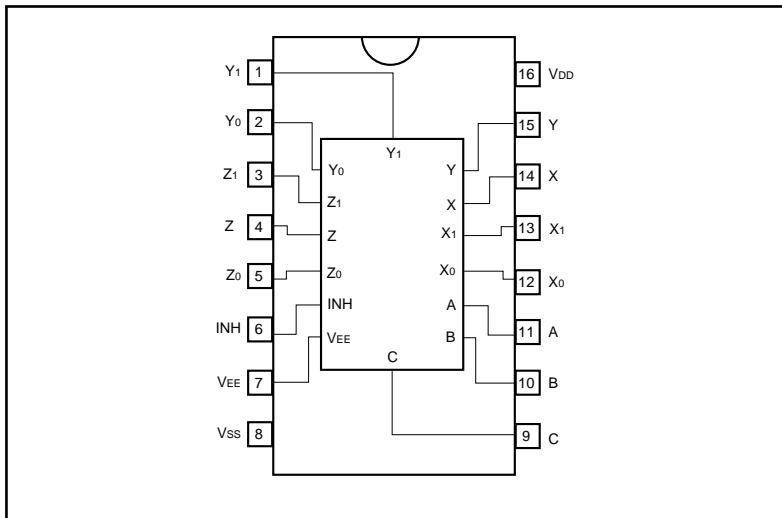
Triple 2-channel analog multiplexer / demultiplexer

BU4053BC / BU4053BCF / BU4053BCFV

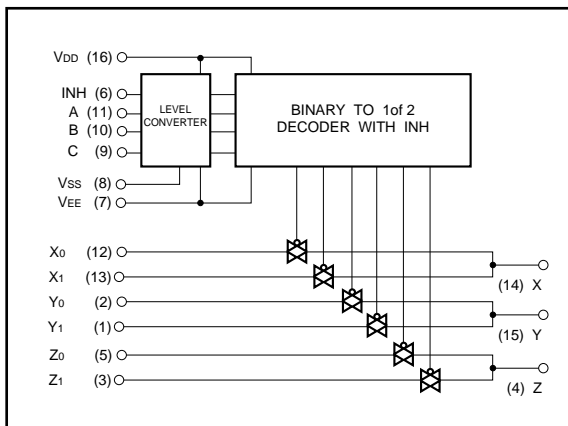
The BU4053BC, BU4053BCF, and BU4053BCFV are multiplexers / demultiplexers capable of selecting and combining analog signals and digital signals in a $2\text{ ch} \times 3$ configuration. Inhibit signals and control signals are used to turn on the switch corresponding to each of the channels. In addition, 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.

Also, 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	C	ON SWITCH
L	L	L	L	X ₀ Y ₀ Z ₀
L	H	L	L	X ₁ Y ₀ Z ₀
L	L	H	L	X ₀ Y ₁ Z ₀
L	H	H	L	X ₁ Y ₁ Z ₀
L	L	L	H	X ₀ Y ₀ Z ₁
L	H	L	H	X ₁ Y ₀ Z ₁
L	L	H	H	X ₀ Y ₁ Z ₁
L	H	H	H	X ₁ Y ₁ Z ₁
H	X	X	X	NONE

X: Irrelevant

● Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage1	V _{DD}	- 0.5 ~ + 20	V
Power supply voltage2	V _{DD} - V _{EE}	- 0.5 ~ + 20	V
Power dissipation	P _d	1000 (DIP), 500 (SOP), 400 (SSOP)	mW
Operating temperature	T _{opr}	- 40 ~ + 85	°C
Storage temperature	T _{stg}	- 55 ~ + 150	°C
Input voltage	V _{IN}	- 0.5 ~ V _{DD} + 0.5	V

● 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
Input high-level voltage	V _{IH}	3.5	—	—	V	5	—	Fig.1
		7.0	—	—		10		
		11.0	—	—		15		
Input low-level voltage	V _{IL}	—	—	1.5	V	5	—	Fig.1
		—	—	3.0		10		
		—	—	4.0		15		
Input high-level current	I _{IH}	—	—	0.3	μA	15	V _{IH} = 15V	Fig.1
Input low-level current	I _{IL}	—	—	- 0.3	μA	15	V _{IL} = 0V	Fig.1
R _{ON} resistance	R _{ON}	—	—	950	Ω	5	V _{IN} = V _{DD} / 2	Fig.2
		—	—	250		10		
		—	—	160		15		
R _{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, VEE = VSS = 0V, RL = 1kΩ, CL = 50pF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	VDD (V)	Conditions	Measurement circuit
						5		
Propagation delay time Switch IN→OUT	tPLH,tPHL	—	15	45	ns	5	—	Fig.4
		—	8	20		10		
		—	6	15		15		
Propagation delay time CONT→OUT	tPHZ,tPLZ tPZH,tPZL	—	170	550	ns	5	—	Fig.5, 6
		—	90	240		10		
		—	70	160		15		
Propagation delay time INH→OUT	tPHZ,tPLZ tPZH,tPZL	—	150	380	ns	5	—	Fig.5, 6
		—	70	200		10		
		—	50	160		15		
Max. propagation frequency	fMax.	—	20	—	MHz	5	VEE = -5V*1	Fig.7
Feedthrough attenuation	FT	—	0.5	—	MHz	5	VEE = -5V*2	Fig.7
Sine wave distortion	D	—	0.02	—	%	5	VEE = -5V*3	Fig.7
Input capacitance (control)	CC	—	5	—	pF	—	—	—
Input capacitance (switch)	CS	—	10	—	pF	—	—	—

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

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

*3 VIN = 5Vp-p sine wave.

●Measurement circuits

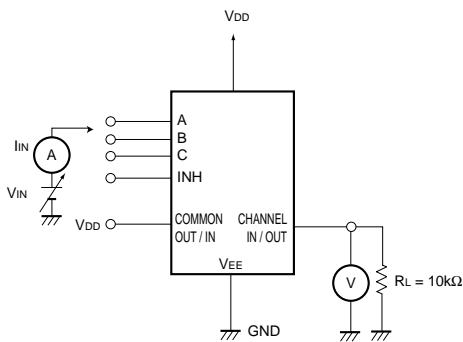


Fig. 1 Input voltage, current

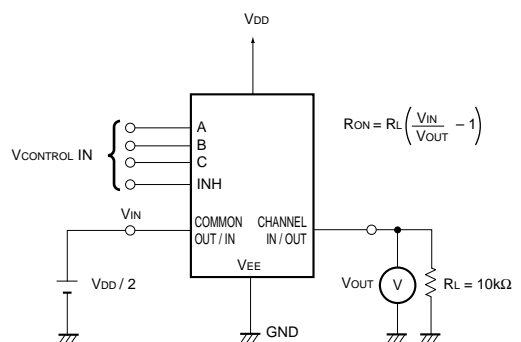


Fig. 2 ON resistance

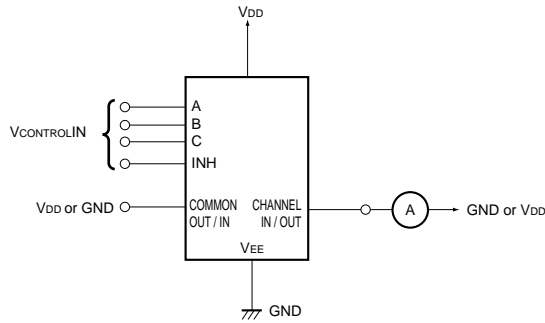


Fig. 3 Channel-OFF leakage current

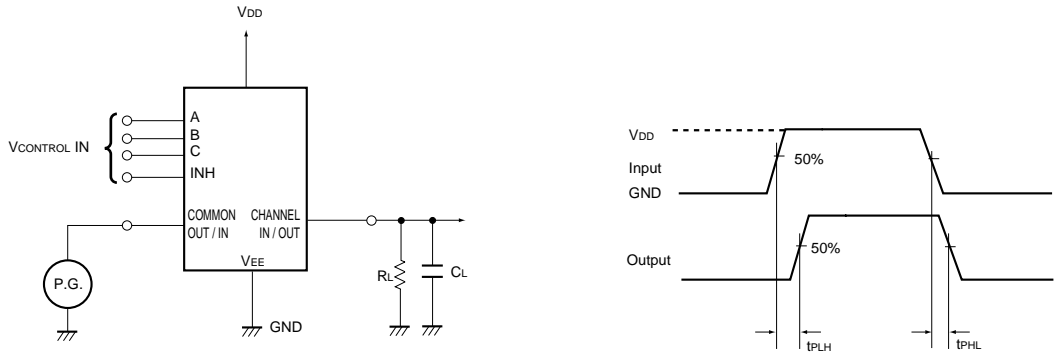


Fig. 4 Propagation delay time (Switch IN to OUT)

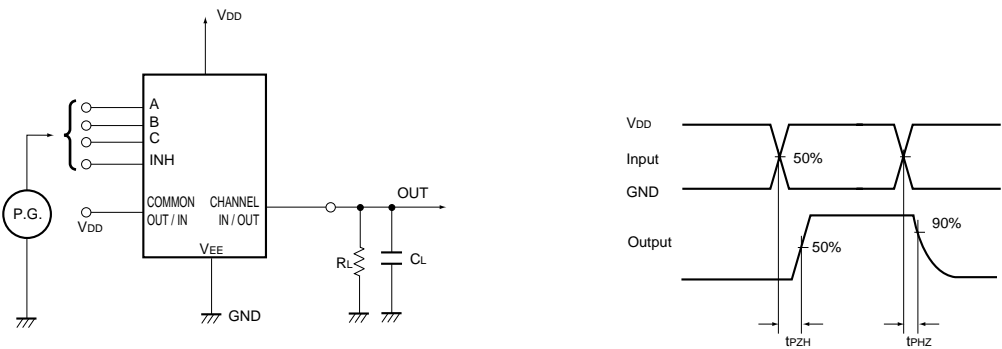


Fig. 5 Propagation delay time (CONT, INH to OUT)

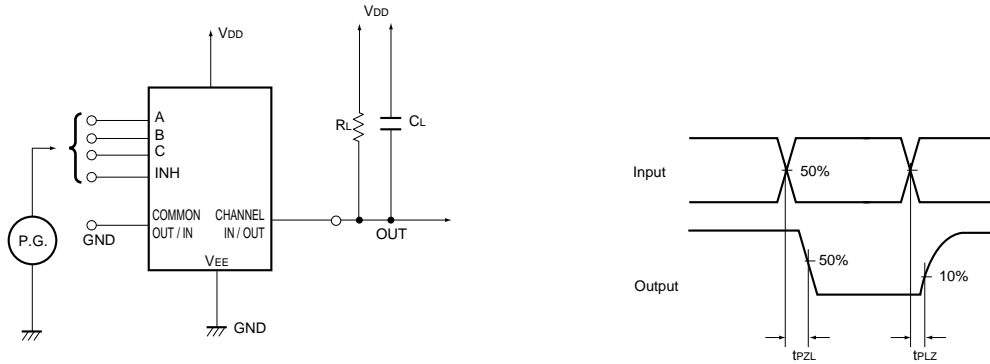


Fig. 6 Propagation delay time (CONT, INH to OUT)

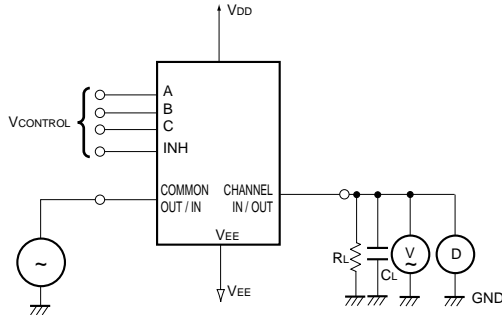


Fig. 7 Maximum propagation frequency, feedthrough, sine wave distortion

●Electrical characteristic curve

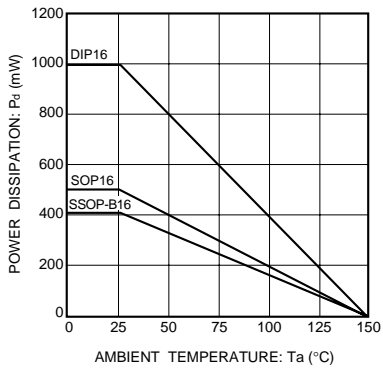
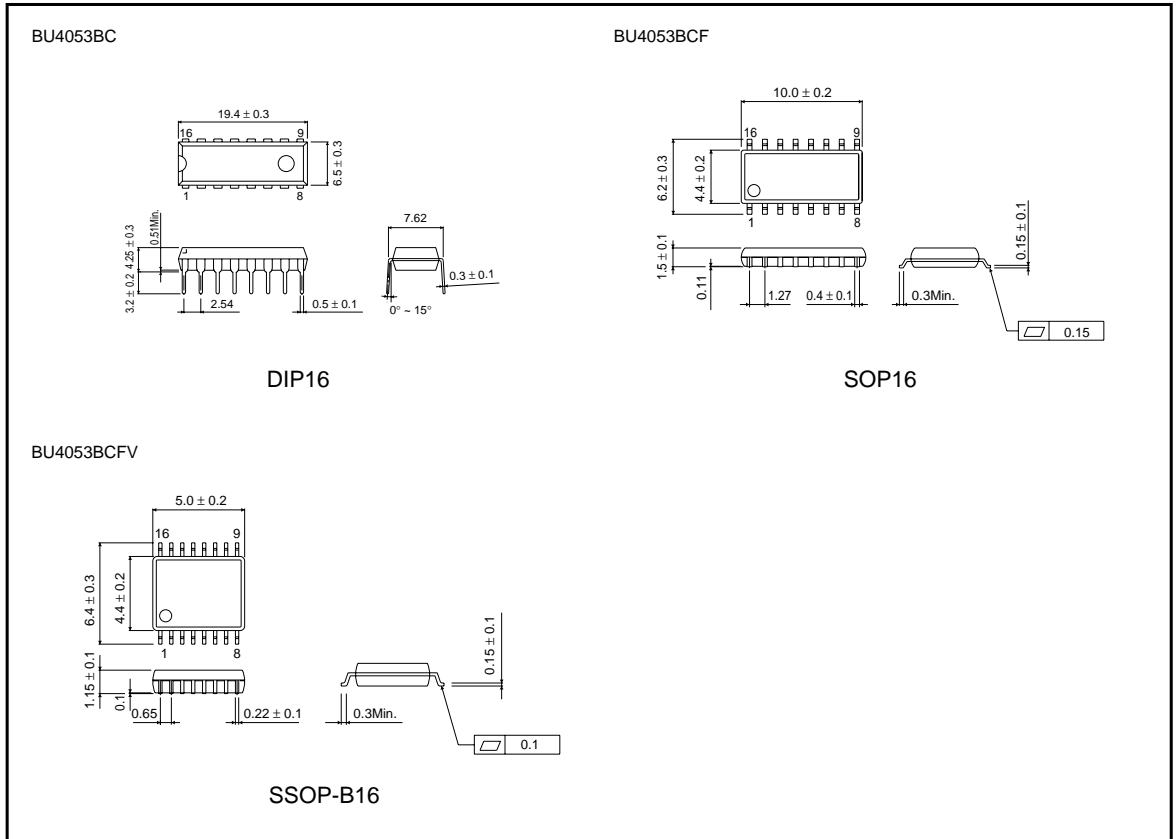


Fig. 8 Power dissipation vs. Ta

● External dimensions (Units: mm)



Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein 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 devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature 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 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.
- Products listed in this document use silicon as a basic material.
Products listed in this document are no antiradiation design.

The products listed in this document 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 and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.