General-purpose CMOS Logic IC Series (BU4S,BU4000B Series)

Single Gate CMOS Logic ICs <Logic Gate>

BU4S01G2, BU4S11G2, BU4SU69G2,BU4S71G2, BU4S81G2, BU4S584G2

No.09050EAT01

●Description

The BU4SxxxG2 are 1ch logic ICs encapsulated in an SSOP5 package.
They are interchangeable with the genaral-purpose BU4000B series.

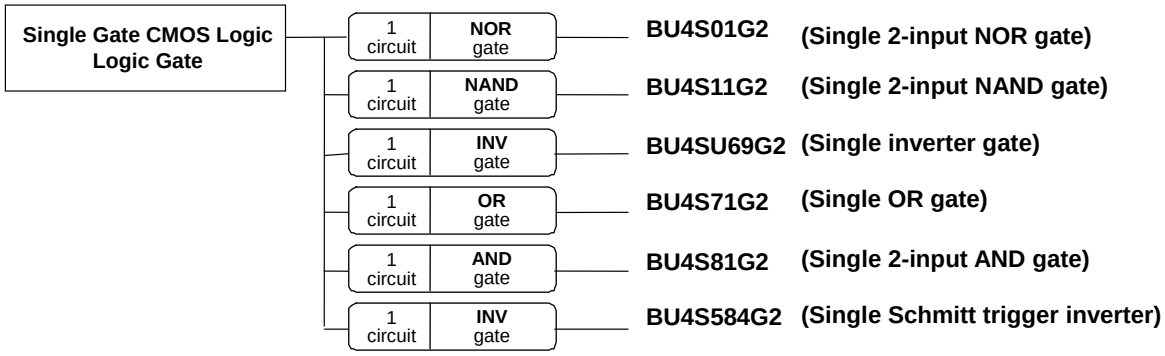
●Features

1) Low power consumption
2) Surface mount package (SSOP5)
3) Broad operating supply voltage range: 3V-16V
4) High input impedance
5) High fan out
6) L-TTL2 and LS-TTL1 inputs can be driven directly.
7) Function compatible with BU4000B series (1ch).

●Applications

Suitable for use where low power consumption and a high degree of noise tolerance are required.

●Lineup



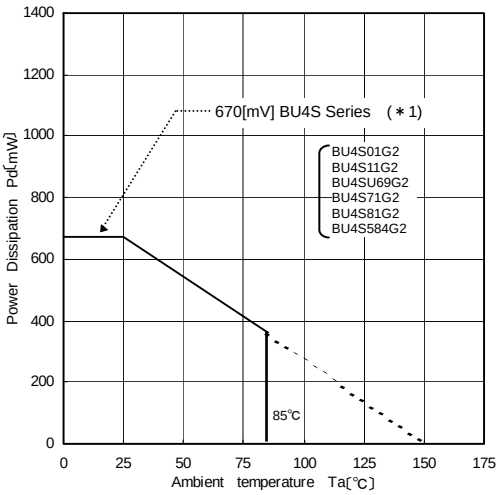
●Absolute Maximum Ratings

Parameter	Symbol	Limit						Unit
		BU4S01G2	BU4S11G2	BU4SU69G2	BU4S71G2	BU4S81G2	BU4S584G2	
Power supply voltage	VDD	-0.3 to 18						V
Supply current	Iin	±10						mA
Operating temperature	Topr	-40 to 85						℃
Storage temperature	Tstg	-55 to 150						℃
Input voltage	VIN	-0.3 to VDD+0.3						V
Maximum junction temperature	Tjmax	150						℃

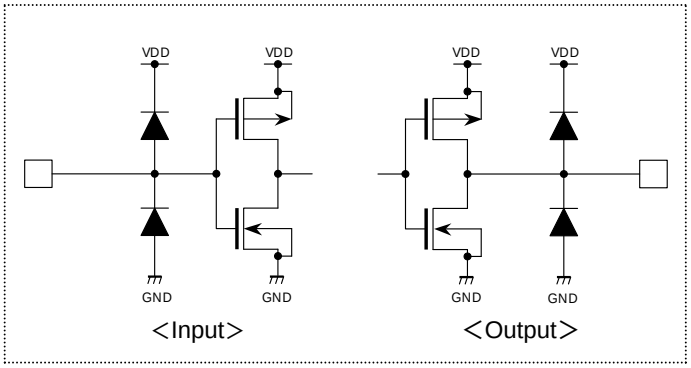
●Recommended Operating Conditions

Parameter	Symbol	Limit						Unit
		BU4S01G2	BU4S11G2	BU4SU69G2	BU4S71G2	BU4S81G2	BU4S584G2	
Operating power supply	VDD	3 to 16						V
Input voltage	VIN	0 to VDD						V

●Thermal Derating Curve



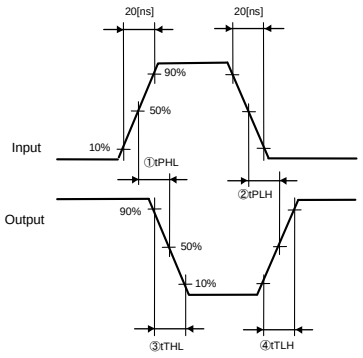
●Input / output Equivalent Circuits



(*1)	UNIT
5.3	mW/℃

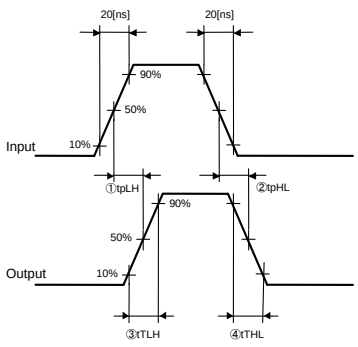
When used at Ta=25[°C] or above, values of above are reduced per 1[°C].
Power dissipation is the value for mounting 70[mm] x 70[mm] x 1.6[mm]
FR4 glass epoxy circuit board (copper foil area is 3% or less).

●Switching Characteristics



Description of symbols

(1) tPHL: Time up to 50% of rise time of input waveform
~ 50% of fall time of output waveform
(2) tPLH: Time up to 50% of fall time of input waveform
~ 50% of rise time of output waveform
(3) tTHL: Time up to 90% ~ 10% of fall time of output waveform
(4) tTLH: Time up to 10% ~ 90% of rise time of output waveform



Description of symbols

(1) tPLH: Time up to 50% of rise time of input waveform
~50% of rise time of output waveform
(2) tPHL: Time up to 50% of fall time of input waveform
~ 50% of fall time of output waveform
(3) tTLH: Time up to 10% ~ 90% of rise time of output waveform
(4) tTHL: Time up to 90% ~ 10% of fall time of output waveform

●Electrical Characteristics（BU4S01G2）

DC Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Input “H” voltage	VIH	3.5	-	-	V	5	VOUT=0.5[V] |IOUT|<1[μA]	1
		7.0	-	-		10	VOUT=1.0[V] |IOUT|<1[μA]	2
		11.0	-	-		15	VOUT=1.5[V] |IOUT|<1[μA]	3
Input “L” voltage	VIL	-	-	1.5	V	5	VOUT=4.5[V] |IOUT|<1[μA]	1
		-	-	3.0		10	VOUT=9.0[V] |IOUT|<1[μA]	2
		-	-	4.0		15	VOUT=13.5[V] |IOUT|<1[μA]	3
Input “H” current	IIH	-	-	0.3	μA	15	VIH=15[V]	-
Input “L” current	IIL	-	-	-0.3	μA	15	VIL=0[V]	-
Output “H” voltage	VOH	4.95	-	-	V	5	|IOUT|<1[μA] VIN=VSS	4
		9.95	-	-		10		
		14.95	-	-		15		
Output “L” voltage	VOL	-	-	0.05	V	5	|IOUT|<1[μA] VIN=VDD	5
		-	-	0.05		10		
		-	-	0.05		15		
Output “H” current	IOH	-0.51	-	-	mA	5	VOH=4.6[V]	4
		-2.1	-	-		5	VOH=2.5[V]	
		-1.3	-	-		10	VOH=9.5[V]	
		-3.4	-	-		15	VOH=13.5[V] VIN=VSS	
Output “L” current	IOL	0.51	-	-	mA	5	VOL=0.4[V]	5
		1.3	-	-		10	VOL=0.5[V]	
		3.4	-	-		15	VOL=1.5[V] VIN=VDD	
Static supply current	IDD	-	-	0.25	μA	5	VIN=VSS,VDD	-
		-	-	0.5		10		
		-	-	1.0		15		

Switching Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃],CL=50[pF])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Output rising time	tTLH	-	70	-	ns	5	-	6
		-	35	-		10		
		-	30	-		15		
Output falling time	tTHL	-	70	-	ns	5	-	7
		-	35	-		10		
		-	30	-		15		
Propagation delay time	tPLH	-	85	-	ns	5	-	8
		-	40	-		10		
		-	30	-		15		
	tPHL	-	85	-	ns	5	-	9
		-	40	-		10		
		-	30	-		15		
Input capacitance	CIN	-	5	-	pF	5	-	-

●**Electrical Characteristics(BU4S11G2)**

DC Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Input “H” voltage	VIH	3.5	-	-	V	5	VOUT=0.5[V]	10
		7.0	-	-		10	VOUT=1.0[V]	11
		11.0	-	-		15	VOUT=1.5[V] |IOUT|<1[μA]	12
Input “L” voltage	VIL	-	-	1.5	V	5	VOUT=4.5[V]	10
		-	-	3.0		10	VOUT=9.0[V]	11
		-	-	4.0		15	VOUT=13.5[V] |IOUT|<1[μA]	12
Input “H” current	IIH	-	-	0.3	μA	15	VIH=15[V]	-
Input “L” current	IIL	-	-	-0.3	μA	15	VIL=0[V]	-
Output “H” voltage	VOH	4.95	-	-	V	5	|IOUT|<1[μA] VIN=VSS	13
		9.95	-	-		10		
		14.95	-	-		15		
Output “L” voltage	VOL	-	-	0.05	V	5	|IOUT|<1[μA] VIN=VDD	14
		-	-	0.05		10		
		-	-	0.05		15		
Output “H” current	IOH	-0.51	-	-	mA	5	VOH=4.6[V]	13
		-2.1	-	-		5	VOH=2.5[V]	
		-1.3	-	-		10	VOH=9.5[V]	
		-3.4	-	-		15	VOH=13.5[V] VIN=VSS	
Output “L” current	IOL	0.51	-	-	mA	5	VOL=0.4[V]	14
		1.3	-	-		10	VOL=0.5[V]	
		3.4	-	-		15	VOL=1.5[V] VIN=VDD	
Static supply current	IDD	-	-	0.25	μA	5	VIN=VSS,VDD	-
		-	-	0.5		10		
		-	-	1.0		15		

Switching Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃],CL=50[pF])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Output rising time	tTLH	-	70	-	ns	5	-	15
		-	35	-		10		
		-	30	-		15		
Output falling time	tTHL	-	70	-	ns	5	-	16
		-	35	-		10		
		-	30	-		15		
Propagation delay time	tPLH	-	85	-	ns	5	-	17
		-	40	-		10		
		-	30	-		15		
	tPHL	-	85	-	ns	5	-	18
		-	40	-		10		
		-	30	-		15		
Input capacitance	CIN	-	5	-	pF	5	-	-

●Electrical Characteristics(BU4SU69G2)

DC Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Input “H” voltage	VIH	4.0	-	-	V	5	VOUT=0.5[V]	19
		8.0	-	-		10	VOUT=1.0[V]	20
		12.0	-	-		15	VOUT=1.5[V] |IOUT|<1[μA]	21
Input “L” voltage	VIL	-	-	1.0	V	5	VOUT=4.5[V]	19
		-	-	2.0		10	VOUT=9.0[V]	20
		-	-	3.0		15	VOUT=13.5[V] |IOUT|<1[μA]	21
Input “H” current	IIH	-	-	0.3	μA	15	VIH=15[V]	-
Input “L” current	IIL	-	-	-0.3	μA	15	VIL=0[V]	-
Output “H” voltage	VOH	4.95	-	-	V	5	|IOUT|<1[μA] VIN=VSS	22
		9.95	-	-		10		
		14.95	-	-		15		
Output “L” voltage	VOL	-	-	0.05	V	5	|IOUT|<1[μA] VIN=VDD	23
		-	-	0.05		10		
		-	-	0.05		15		
Output “H” current	IOH	-0.51	-	-	mA	5	VOH=4.6[V]	22
		-2.1	-	-		5	VOH=2.5[V]	
		-1.3	-	-		10	VOH=9.5[V]	
		-3.4	-	-		15	VOH=13.5[V]	
							VIN=VSS	
Output “L” current	IOL	0.51	-	-	mA	5	VOL=0.4[V]	23
		1.3	-	-		10	VOL=0.5[V]	
		3.4	-	-		15	VOL=1.5[V]	
							VIN=VDD	
Static supply current	IDD	-	-	0.25	μA	5	VIN=VSS,VDD	-
		-	-	0.5		10		
		-	-	1.0		15		

Switching Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃],CL=50[pF])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Output rising time	tTLH	-	70	-	ns	5	-	24
		-	35	-		10		
		-	30	-		15		
Output falling time	tTHL	-	70	-	ns	5	-	25
		-	35	-		10		
		-	30	-		15		
Propagation delay time	tPLH	-	55	-	ns	5	-	26
		-	30	-		10		
		-	25	-		15		
	tPHL	-	55	-	ns	5	-	27
		-	30	-		10		
		-	25	-		15		
Input capacitance	CIN	-	5	-	pF	5	-	-

●Electrical Characteristics(BU4S71G2)

DC Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Input “H” voltage	VIH	3.5	-	-	V	5	|IOUT|<1[μA]	28
		7.0	-	-		10		29
		11.0	-	-		15		30
Input “L” voltage	VIL	-	-	1.5	V	5	|IOUT|<1[μA]	28
		-	-	3.0		10		29
		-	-	4.0		15		30
Input “H” current	IIH	-	-	0.3	μA	18	VIH=18[V]	-
Input “L” current	IIL	-	-	-0.3	μA	18	VIL=0[V]	-
Output “H” voltage	VOH	4.95	-	-	V	5	|IOUT|<1[μA] VIN=VSS or VDD	31
		9.95	-	-		10		
		14.95	-	-		15		
Output “L” voltage	VOL	-	-	0.05	V	5	|IOUT|<1[μA] VIN=VSS	32
		-	-	0.05		10		
		-	-	0.05		15		
Output “H” current	IOH	-0.51	-	-	mA	5	VOH=4.6[V]	31
		-2.1	-	-		5	VOH=2.5[V]	
		-1.3	-	-		10	VOH=9.5[V]	
		-3.4	-	-		15	VOH=13.5[V]	
Output “L” current	IOL	0.51	-	-	mA	5	VOL=0.4[V]	32
		1.3	-	-		10	VOL=0.5[V]	
		3.4	-	-		15	VOL=1.5[V]	
Static supply current	IDD	-	-	0.25	μA	5	VIN=VSS,VDD	-
		-	-	0.5		10		
		-	-	1.0		15		

Switching Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃],CL=50[pF])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Output rising time	tTLH	-	70	-	ns	5	-	33
		-	35	-		10		
		-	30	-		15		
Output falling time	tTHL	-	70	-	ns	5	-	34
		-	35	-		10		
		-	30	-		15		
Propagation delay time	tPLH	-	90	-	ns	5	-	35
		-	45	-		10		
		-	30	-		15		
	tPHL	-	90	-	ns	5	-	36
		-	45	-		10		
		-	30	-		15		
Input capacitance	CIN	-	5	-	pF	5	-	-

●Electrical Characteristics(BU4S81G2)

DC Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Input “H” voltage	VIH	3.5	-	-	V	5	|IOUT|<1[μA]	37
		7.0	-	-		10		38
		11.0	-	-		15		39
Input “L” voltage	VIL	-	-	1.5	V	5	|IOUT|<1[μA]	37
		-	-	3.0		10		38
		-	-	4.0		15		39
Input “H” current	IIH	-	-	0.3	μA	18	VIH=18[V]	-
Input “L” current	IIL	-	-	-0.3	μA	18	VIL=0[V]	-
Output “H” voltage	VOH	4.95	-	-	V	5	|IOUT|<1[μA] VIN=VSS or VDD	40
		9.95	-	-		10		
		14.95	-	-		15		
Output “L” voltage	VOL	-	-	0.05	V	5	|IOUT|<1[μA] VIN=VSS	41
		-	-	0.05		10		
		-	-	0.05		15		
Output “H” current	IOH	-0.51	-	-	mA	5	VOH=4.6[V]	40
		-2.1	-	-		5	VOH=2.5[V]	
		-1.3	-	-		10	VOH=9.5[V]	
		-3.4	-	-		15	VOH=13.5[V]	
Output “L” current	IOL	0.51	-	-	mA	5	VOL=0.4[V]	41
		1.3	-	-		10	VOL=0.5[V]	
		3.4	-	-		15	VOL=1.5[V]	
Static supply current	IDD	-	-	0.25	μA	5	VIN=VSS,VDD	-
		-	-	0.5		10		
		-	-	1.0		15		

Switching Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃],CL=50[pF])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Output rising time	tTLH	-	70	-	ns	5	-	42
		-	35	-		10		
		-	30	-		15		
Output falling time	tTHL	-	70	-	ns	5	-	43
		-	35	-		10		
		-	30	-		15		
Propagation delay time	tPLH	-	90	-	ns	5	-	44
		-	45	-		10		
		-	30	-		15		
	tPHL	-	90	-	ns	5	-	45
		-	45	-		10		
		-	30	-		15		
Input capacitance	CIN	-	5	-	pF	5	-	-

●Electrical Characteristics(BU4S584G2)

DC Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Input “H” voltage	VIH	2.6	-	-	V	3	-	46
		3.5	-	-		5		47
		7.0	-	-		10		48
		11.0	-	-		15		
Input “L” voltage	VIL	-	-	0.4	V	3	-	46
		-	-	1.5		5		47
		-	-	3.0		10		48
		-	-	4.0		15		
Input “H” current	IIH	-	-	0.3	μA	15	VIH=15[V]	-
Input “L” current	IIL	-	-	-0.3	μA	15	VIL=0[V]	-
Output “H” voltage	VOH	2.95	-	-	V	3	|IOUT|<1[μA] VIN=VSS	49
		4.95	-	-		5		
		9.95	-	-		10		
		14.95	-	-		15		
Output “L” voltage	VOL	-	-	0.05	V	3	|IOUT|<1[μA] VIN=VDD	50
		-	-	0.05		5		
		-	-	0.05		10		
		-	-	0.05		15		
Output “H” current	IOH	-0.1	-	-	mA	3	VOH=2.7[V]	49
		-0.51	-	-		5	VOH=4.6 [V]	
		-2.1	-	-		5	VOH=2.5[V]	
		-1.3	-	-		10	VOH=9.5[V]	
		-3.4	-	-		15	VOH=13.5[V]	
Output “L” current	IOL	0.1	-	-	mA	3	VOL=0.3[V]	50
		0.51	-	-		5	VOL=0.4[V]	
		1.3	-	-		10	VOL=0.5[V]	
		3.4	-	-		15	VOL=1.5[V]	
Hysteresis voltage	VH	0.1	-	0.5	V	3	-	-
		0.15	-	0.6		5		
		0.25	-	1.0		10		
		0.40	-	1.5		15		
Supply current	IDD	-	-	0.2	μA	3	VIN=VSS or VDD	-
		-	-	0.25		5		
		-	-	0.5		10		
		-	-	1.0		15		

Switching Characteristics (Unless otherwise noted, VSS=0[V],Ta=25[℃],CL=50[pF])

Parameter	Symbol	Standard Value			Unit	Condition		Fig. No
		MIN	TYP	MAX		VDD[V]		
Output rising time	tTLH	-	140	-	ns	3	-	51
		-	70	-		5		
		-	35	-		10		
		-	30	-		15		
Output falling time	tTHL	-	140	-	ns	3	-	52
		-	70	-		5		
		-	35	-		10		
		-	30	-		15		
Propagation delay time	tPLH	-	230	-	ns	3	-	53
		-	125	-		5		
		-	60	-		10		
		-	50	-		15		
	tPHL	-	230	-	ns	3	-	54
		-	125	-		5		
		-	60	-		10		
		-	50	-		15		

●Electrical Characteristics Curves(BU4S01G2)

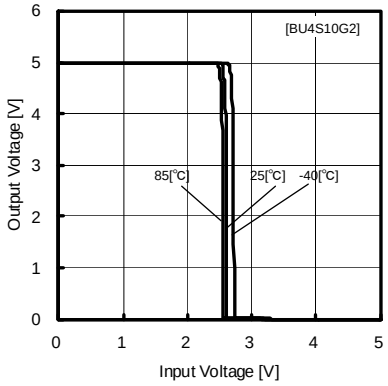


Fig.1
Output voltage－Input voltage characteristics
（VDD=5[V] / VSS=0[V]）

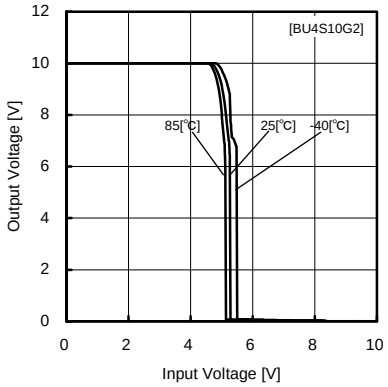


Fig.2
Output voltage－Input voltage characteristics
（VDD=10[V] / VSS=0[V]）

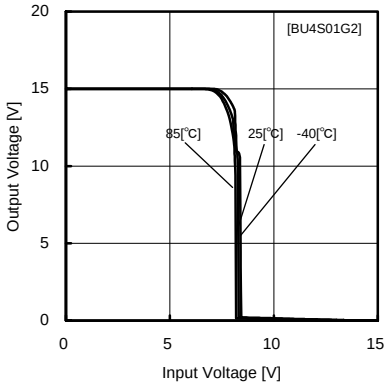


Fig.3
Output voltage－Input voltage characteristics
（VDD=15[V] / VSS=0[V]）

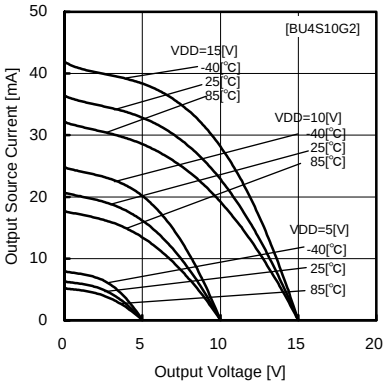


Fig.4
Output source current－voltage characteristics

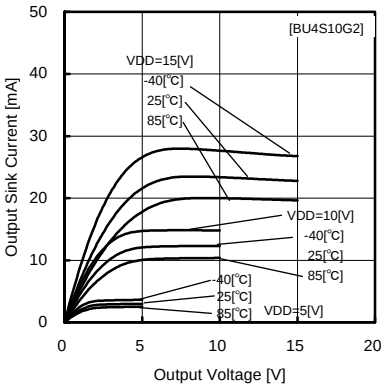


Fig.5
Output sink current－voltage characteristics

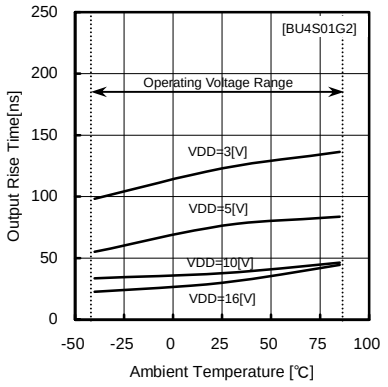


Fig.6
Output rising time tTLH

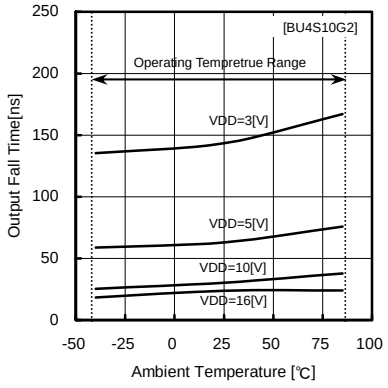


Fig.7
Output falling time tTHL

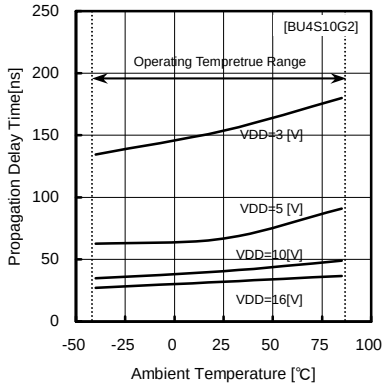


Fig.8
Propagation delay time tPLH

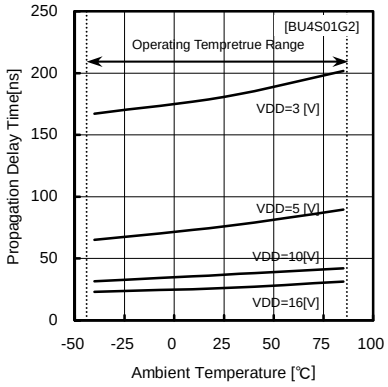
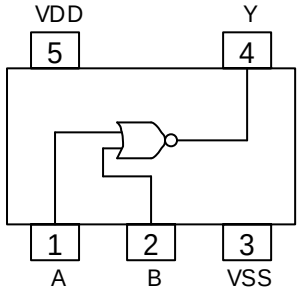


Fig.9
Propagation delay time tPHL

●Pinout Diagram ・Pin Description・Input / Output Table



PIN	PIN NAME	I/O	PIN FUNCTION
1	A	I	Input
2	B	I	Input
3	VSS	-	Power supply(-)
4	Y	O	Output
5	VDD	-	Power supply(+)

A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

●Electrical Characteristics Curves(BU4S11G2)

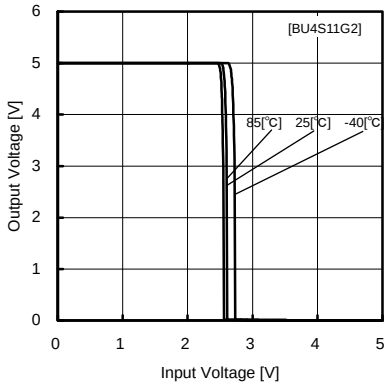


Fig.10
Output voltage－Input voltage characteristics
（VDD=5[V]/ VSS=0[V]）

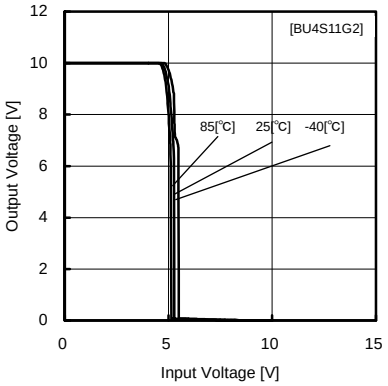


Fig.11
Output voltage－Input voltage haracteristics
（VDD=10[V] / VSS=0[V]）

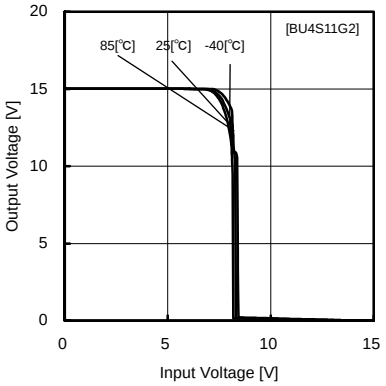


Fig.12
Output voltage－Input voltage characteristics
（VDD=15[V] / VSS=0[V]）

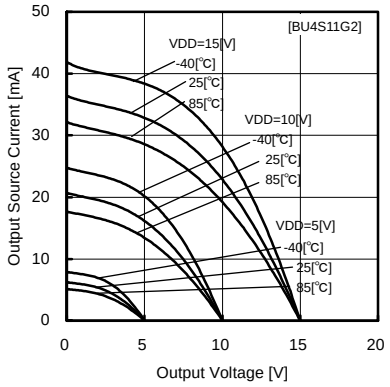


Fig.13
Output source current－voltage characteristics

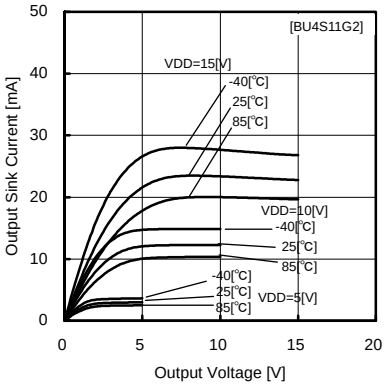


Fig.14
Output sink current－voltage characteristics

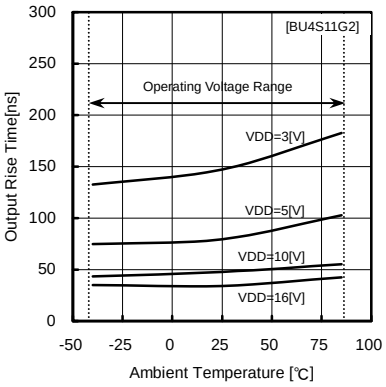


Fig.15
Output rising time tTLH

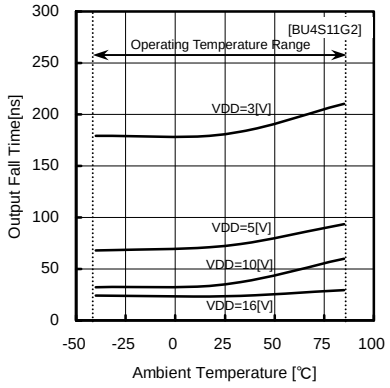


Fig.16
Output falling time tTHL

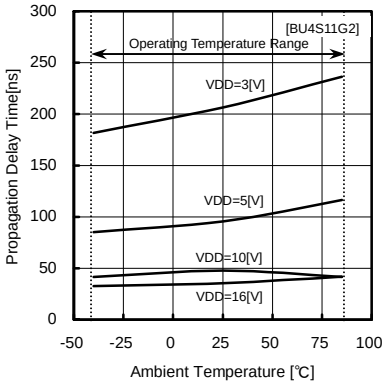


Fig.17
Propagation delay time tPLH

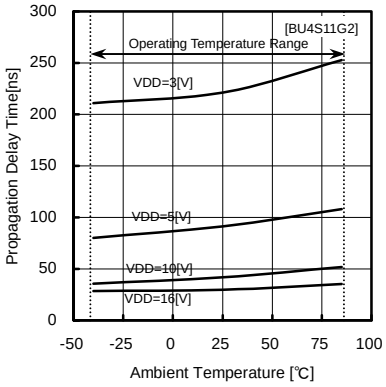
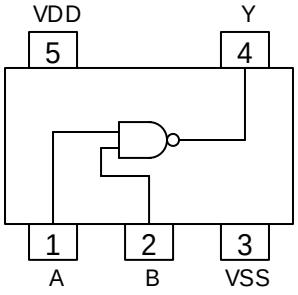


Fig.18
Propagation delay time tPHL

●Pinout Diagram ・Pin Description・Input / Output Table



PIN	PIN NAME	I/O	PIN FUNCTION
1	A	I	Input
2	B	I	Input
3	VSS	-	Power supply(-)
4	Y	O	Output
5	VDD	-	Power supply(+)

A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

●Electrical Charasteristics Curves (BU4SU69G2)

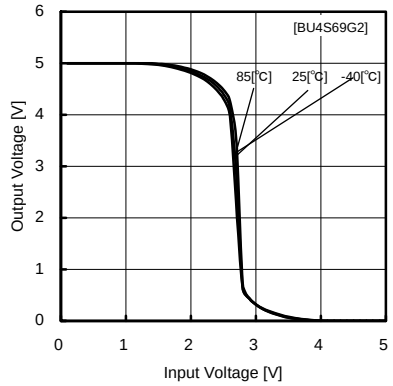


Fig.19
Output voltage－Input voltage characteristics
（VDD=5[V] / VSS=0[V]）

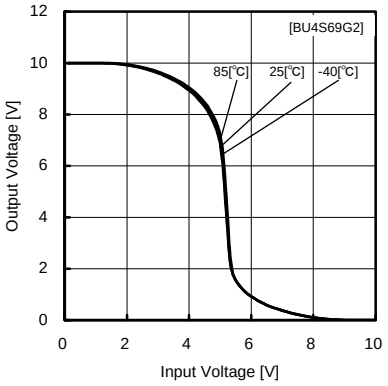


Fig.20
Output voltage－Input voltagecharacteristics
（VDD=10[V] / VSS=0[V]）

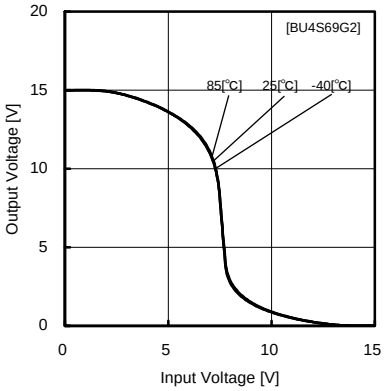


Fig.21
Output voltage－Input voltage characteristics
（VDD=15[V] / VSS=0[V]）

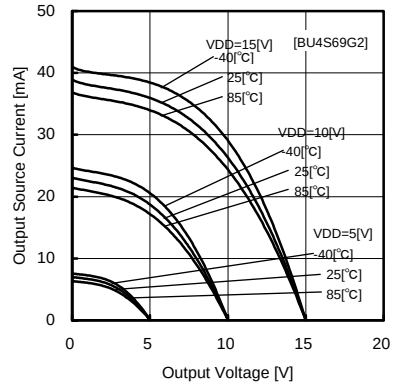


Fig.22
Output source current－voltage characteristics

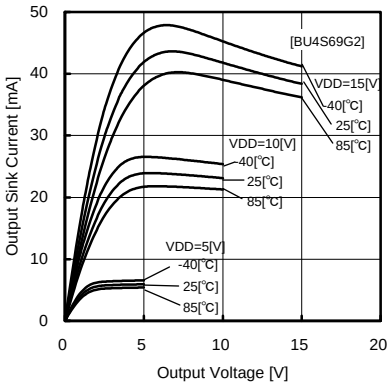


Fig.23
Output sink current－voltage characteristics

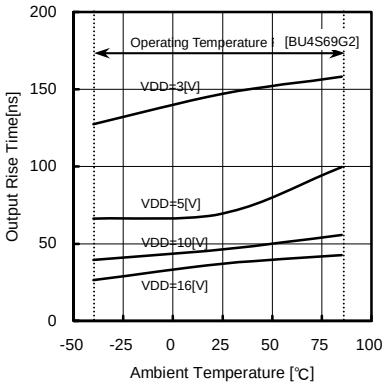


Fig.24
Output rising time tTLH

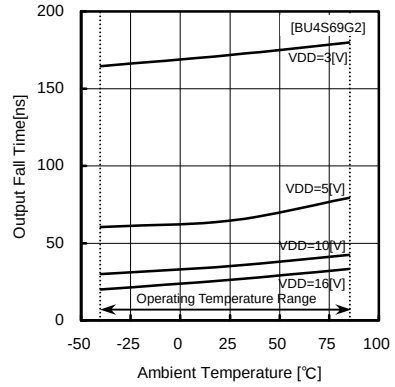


Fig.25
Output falling time tTHL

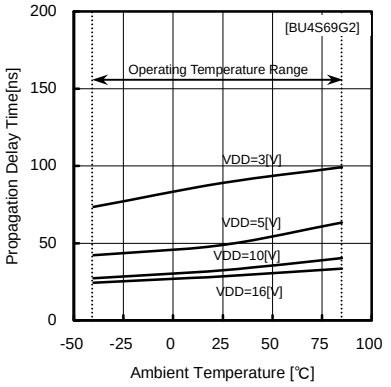


Fig.26
Propagation delay time tPLH

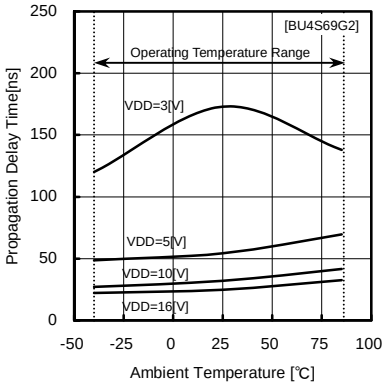
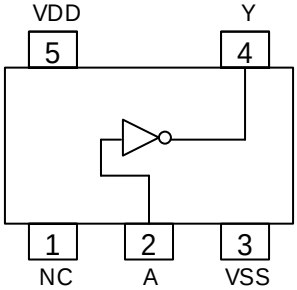


Fig.27
Propagation delay time tPHL

●Pinout Diagram・Pin Description・Input / Output Table



PIN	PIN NAME	I/O	PIN FUNCTION
1	NC	-	NC
2	A	I	Input
3	VSS	-	Power supply(-)
4	Y	O	Output
5	VDD	-	Power supply(+)

A	Y
L	H
H	L

●Electrical Charasteristics Curves (BU4S71G2)

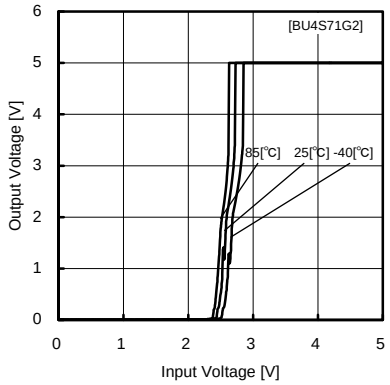


Fig.28
Output voltage－Input voltage characteristics
（VDD=5[V]/ VSS=0[V]）

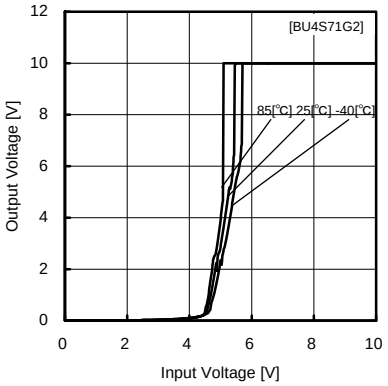


Fig.29
Output voltage－Input voltage characteristics
（VDD=10[V] / VSS=0[V]）

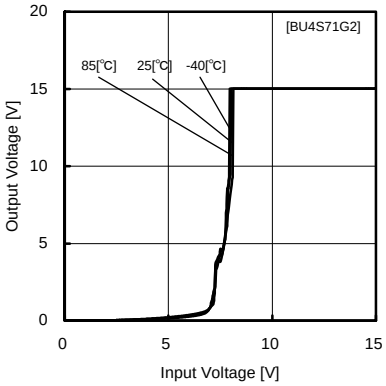


Fig.30
Output voltage－Input voltage characteristics
（VDD=15[V] / VSS=0[V]）

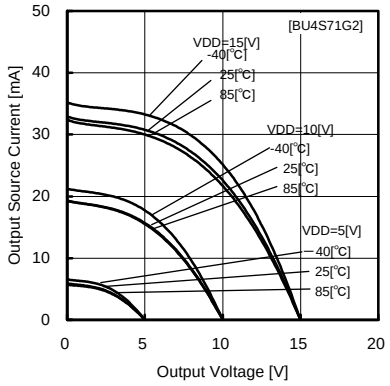


Fig.31
Output source current－voltage characteristics

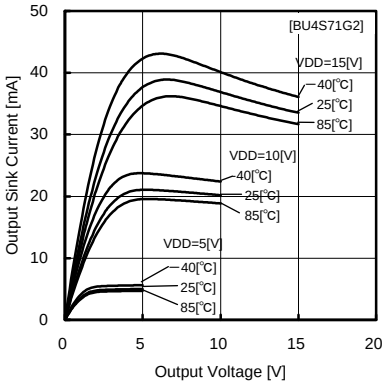


Fig.32
Output sink current－voltage characteristics

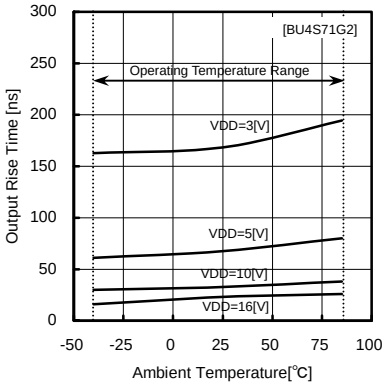


Fig.33
Rising time tTLH

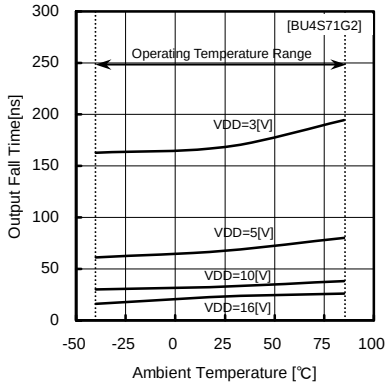


Fig.34
falling time tTHL

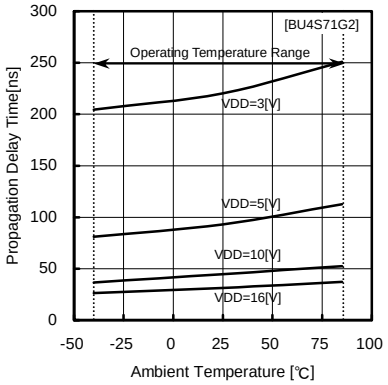


Fig.35
Propagation delay time tPLH

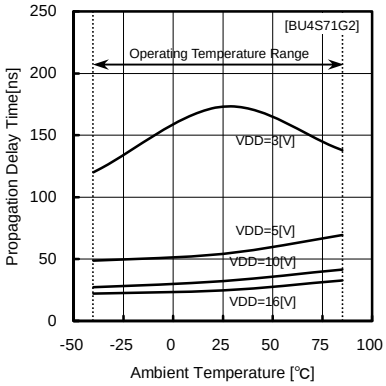
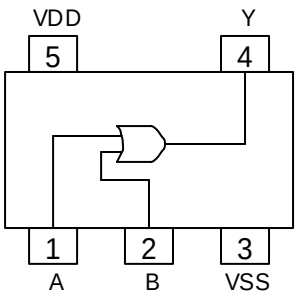


Fig.36
Propagation delay time tPHL

●Pinout Diagram・Pin Description・Input / Output Table



PIN	PIN NAME	I/O	PIN FUNCTION
1	A	I	Input
2	B	I	Input
3	VSS	-	Power supply(-)
4	Y	O	Output
5	VDD	-	Power supply(+)

A	B	Y
L	L	L
L	H	H
H	L	H
H	H	H

●Electrical Charasteristics Curves(BU4S81G2)

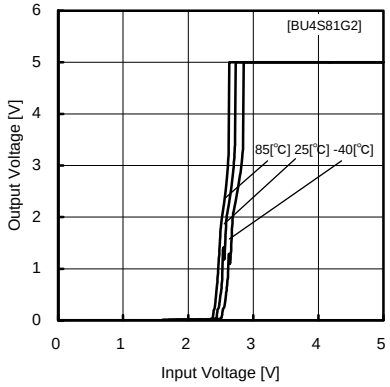


Fig.37
Output voltage－Iput voltage characteristics
（VDD=5[V] / VSS=0[V]）

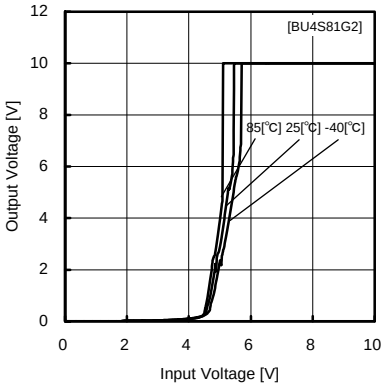


Fig.38
Output voltae－Input voltage characteristics
（VDD=10[V] / VSS=0[V]）

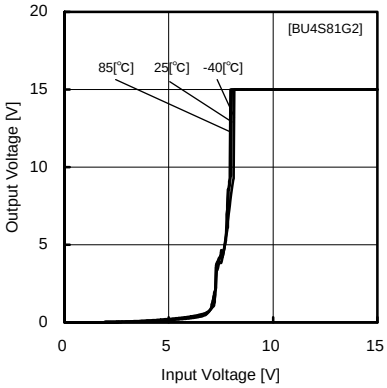


Fig.39
Output voltage－Input voltage characteristics
（VDD=15[V] / VSS=0[V]）

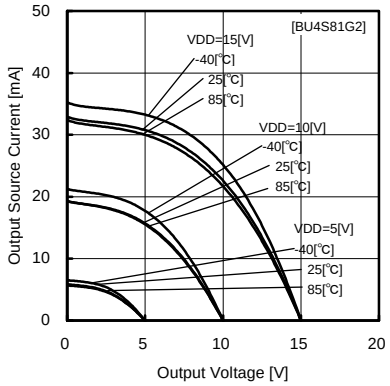


Fig.40
Output source current－voltage characteristics

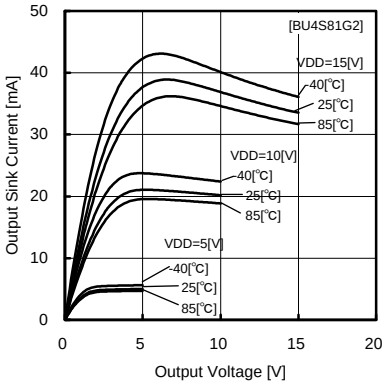


Fig.41
Output sink current－voltage characteristics

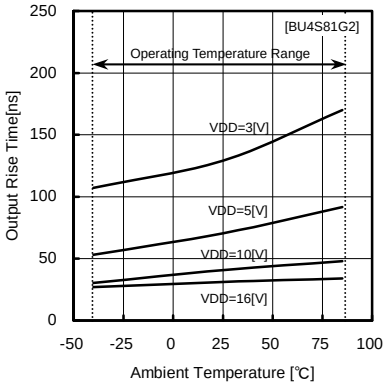


Fig.42
Output rising time tTLH

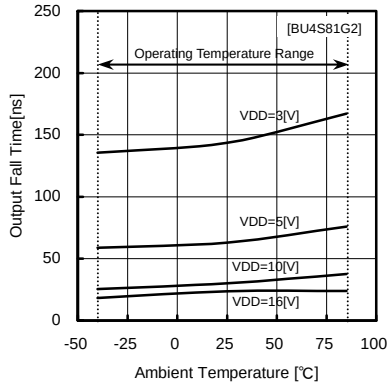


Fig.43
Output falling time tTHL

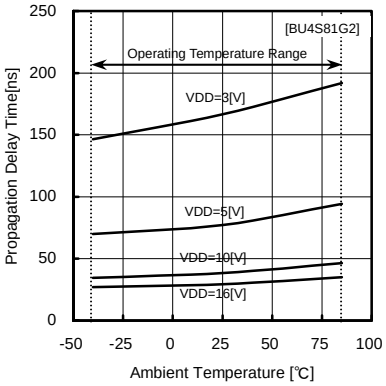


Fig.44
Propagation delay time tPLH

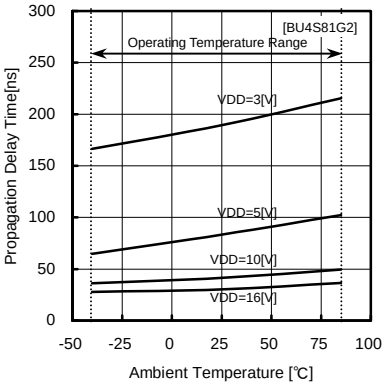
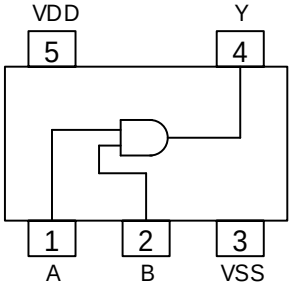


Fig.45
Propagation delay time tPHL

●Pinout Diagram・Pin Description・Input / Output Table



PIN	PIN NAME	I/O	PIN FUNCTION
1	NC	-	Input
2	A	I	Input
3	VSS	-	Power supply(-)
4	Y	O	Output
5	VDD	-	Power supply(+)

A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

●Electrical Charasteristics Curves(BU4S584G2)

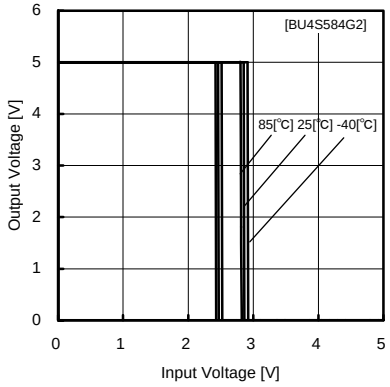


Fig.46
Output voltage－Input voltage characteristics
（VDD=5[V] / VSS=0[V]）

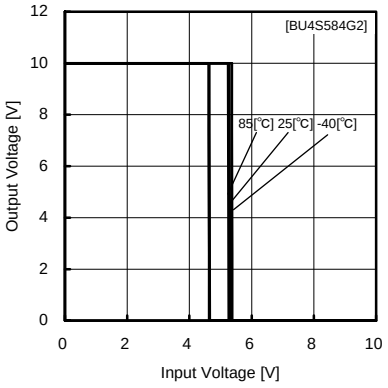


Fig.47
Output voltage－Input voltage characteristics
（VDD=10[V] / VSS=0[V]）

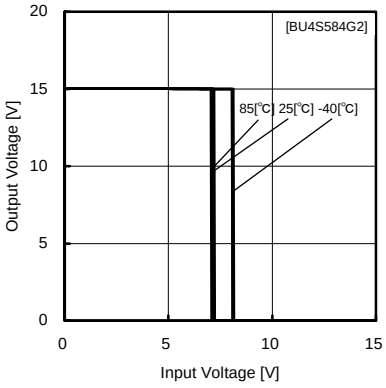


Fig.48
Output voltage－Input voltage characteristics
（VDD=15[V] / VSS=0[V]）

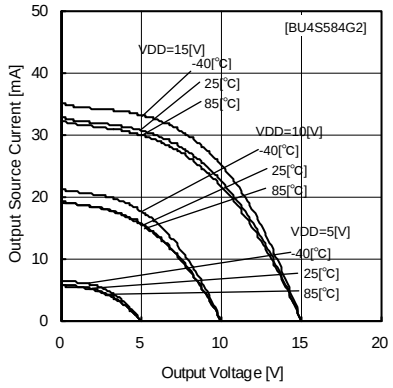


Fig.49
Output source current－voltage characteristics

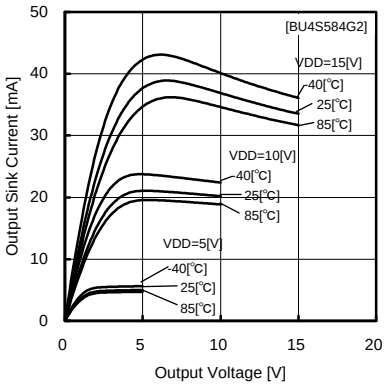


Fig.50
Output sink current－voltage characteristics

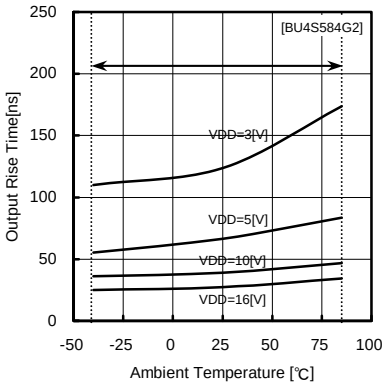


Fig.51
Output rising time tTLH

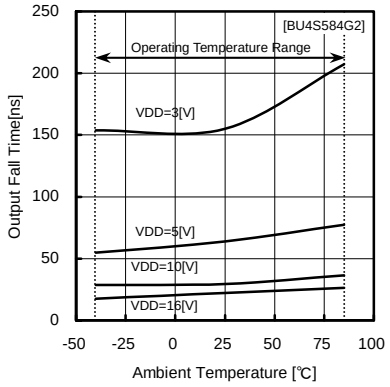


Fig.52
Output falling time tTHL

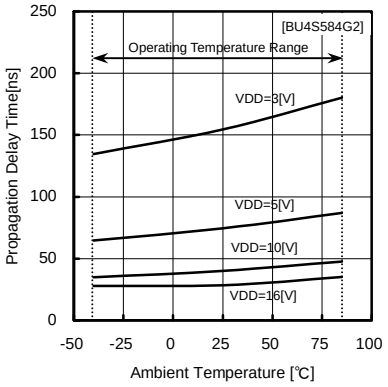


Fig.53
Propagation delay time tPLH

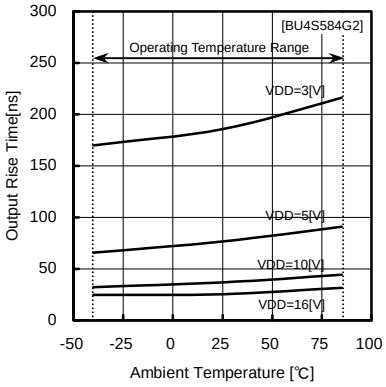
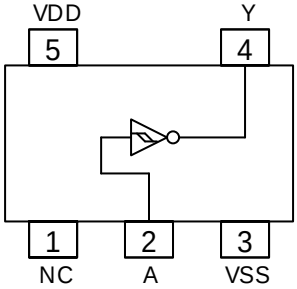


Fig.54
Propagation delay time tPHL

●Pinout Diagram・Pin Description・Input / Output Table



PIN	PIN NAME	I/O	PIN FUNCTION
1	NC	-	NC
2	A	I	Input
3	VSS	-	Power supply(-)
4	Y	O	Output
5	VDD	-	Power supply(+)

A	Y
L	H
H	L

●Notes for use

1. Absolute Maximum ratings
   An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down the devices, thus making impossible to identify breaking mode, such as short circuit or an open circuit. If any over rated values will expect to exceed the absolute maximum ratings, consider adding circuit protection devices, such as fuses.

2. Connecting the power supply connector backward
   Connecting of the power supply in reverse polarity can damage IC. Take precautions when connecting the power supply lines. An external direction diode can be added.

3. Power supply lines
   Design PCB layout pattern to provide low impedance GND and supply lines. To obtain a low noise ground and supply line, separate the ground section and supply lines of the digital and analog blocks. Furthermore, for all power supply terminals to ICs, connect a capacitor between the power supply and the GND terminal. When applying electrolytic capacitors in the circuit, not that capacitance characteristic values are reduced at low temperatures.

4. GND voltage
   The potential of GND pin must be minimum potential in all operating conditions.

5. Thermal design
   Use a thermal design that allows for a sufficient margin in light of the power dissipation (Pd) in actual operating conditions.

6. Inter-pin shorts and mounting errors
   Use caution when positioning the IC for mounting on printed circuit boards. The IC may be damaged if there is any connection error or if pins are shorted together.

7. Actions in strong electromagnetic field
   Use caution when using the IC in the presence of a strong electromagnetic field as doing so may cause the IC to malfunction.

8. Testing on application boards
   When testing the IC on an application board, connecting a capacitor to a pin with low impedance subjects the IC to stress. Always discharge capacitors after each process or step. Always turn the IC's power supply off before connecting it to or removing it from a jig or fixture during the inspection process. Ground the IC during assembly steps as an antistatic measure. Use similar precaution when transporting or storing the IC.

9. Ground Wiring Pattern
   When using both small signal and large current GND patterns, it is recommended to isolate the two ground patterns, placing a signal ground point at the ground potential of application so that the pattern wiring resistance and voltage variations caused by large currents do not cause variations in the small signal ground voltage. Be careful not to change the GND wiring pattern of any external components, either.

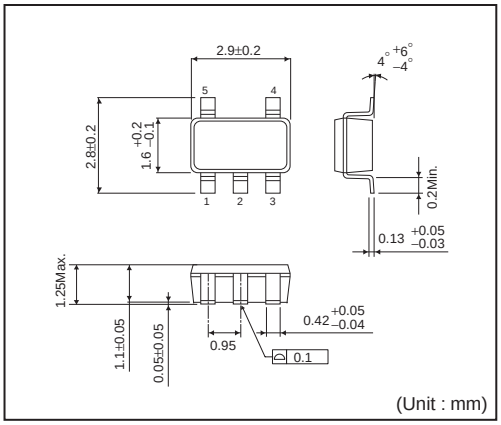
10. Unused input terminals
    Connect all unused input terminals to VDD or VSS in order to prevent excessive current or oscillation.
    Insertion of a resistor (100kΩ approx.) is also recommended.

●Ordering part number

B	U	4	S	0	1	G	2	-	T	R

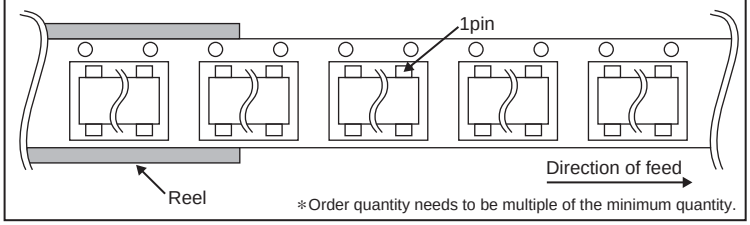
Part No.	Part No. 4S01 , 4S11 4SU69 , 4S71 4S81 , 4S584	Package G2: SSOP5	Packaging and forming specification TR: Embossed tape and reel

SSOP5



<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	3000pcs
Direction of feed	TR (The direction is the 1pin of product is at the upper right when you hold reel on the left hand and you pull out the tape on the right hand)



∗Order quantity needs to be multiple of the minimum quantity.

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1. Our Products are designed and manufactured for application in ordinary electronic equipments (such as AV equipment, OA equipment, telecommunication equipment, home electronic appliances, amusement equipment, etc.). If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), transport equipment, traffic equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

2. ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
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   [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure

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   [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
   [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
   [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
   [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
   [f] Sealing or coating our Products with resin or other coating materials
   [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
   [h] Use of the Products in places subject to dew condensation

4. The Products are not subject to radiation-proof design.

5. Please verify and confirm characteristics of the final or mounted products in using the Products.

6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

7. De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.

8. Confirm that operation temperature is within the specified range described in the product specification.

9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.

2. In principle, the reflow soldering method must be used; if flow soldering method is preferred, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

Precautions Regarding Application Examples and External Circuits

1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.

2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
   - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
   - [b] the temperature or humidity exceeds those recommended by ROHM
   - [c] the Products are exposed to direct sunshine or condensation
   - [d] the Products are exposed to high Electrostatic

2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

Precaution for Product Label

QR code printed on ROHM Products label is for ROHM's internal use only.

Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

Precaution for Foreign Exchange and Foreign Trade act

Since our Products might fall under controlled goods prescribed by the applicable foreign exchange and foreign trade act, please consult with ROHM representative in case of export.

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