QUAD PIN ELECTRONICS DRIVER

■GENERAL DESCRIPTION

The NJU6495 is a quad pin driver fabricated in a wide voltage CMOS process. It is designed specifically for Test During Burn In (TDBI) applications, flash memory testers, where cost, functional density, and power are all at a premium.

The NJU6495 incorporates four channels of programmable drivers into a small 64 lead LQFP package. Each channel has independent driver levels, data, and high impedance control.

This device has a 15V output range, can operate 50MHz signal and features very low leakage in HiZ mode. Those features enable to interface directly with TTL, ECL, CMOS(3V, 5V and 7V), LVCMOS, and custom level circuitry, as well as high voltage levels required for many special test modes in Flash Devices and for stressing devices under test.

■Package Outline

NJU6495FH2

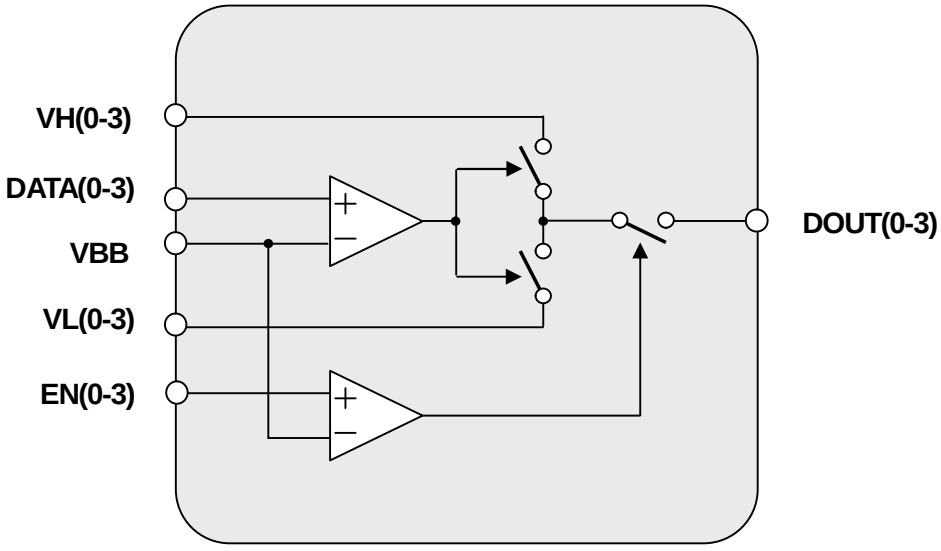
■FEATURES

- Max. 15V Output Range
- Max. 50MHz Operation
- Low Leak Current Max.2nA When Ta=25°C
- DC Output Current MaX.125mA
- PKG LQFP64-H2 (PKG size 12x12mm, 0.5mmpitch, θja=50°C/W)
- CMOS Process

■APPLICATION

- Burn In ATE
- Low Cost ATE
- Instrumentation

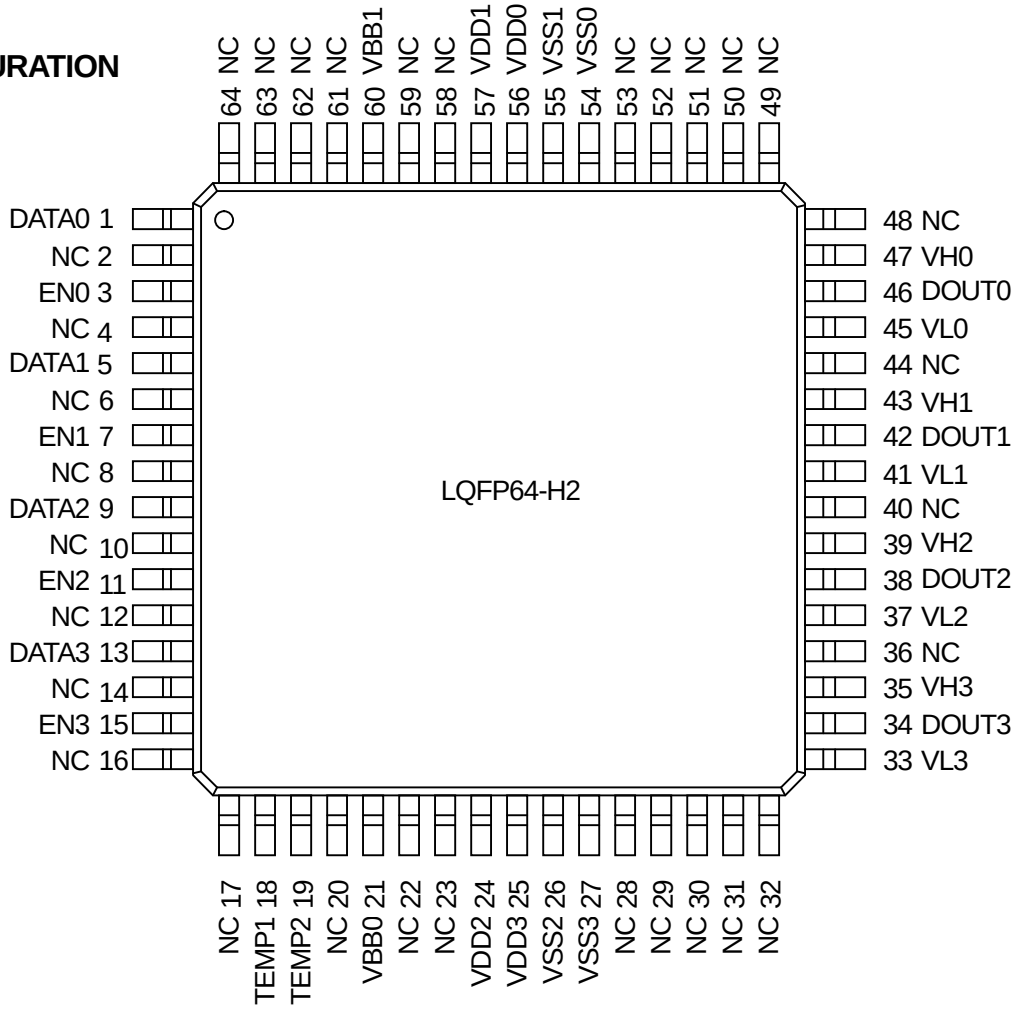
■BLOCK DIAGRAM



*1) This block diagram shows only 1channel. Actually this IC contains 4 channels(0 to 3).

*2) (0-3) is applied to one of a figure 0 to 3, and it shows the channel. VBB is a common in all channels.

■PIN CONFIGURATION



Pin NO.	Pin Name	Function
1,5,9,13	DATA(0-3)(*3)	Driver Control Input. Switch output to VH/VL. See Truth Table.
3,7,11,15	EN(0-3)(*3)	Driver Control Input. Select Active/HiZ mode. See Truth Table.
34,38,42,46	DOUT(0-3)(*3)	Driver Output.
35,39,43,47	VH(0-3)(*3*4)	Driver High Level Voltage Input.
33,37,41,45	VL(0-3)(*3)	Driver Low Level Voltage Input.
21,60	VBB(0-1)(*5)	Comparator Reference Voltage Input. See Truth Table.
24,25,56,57	VDD(0-3)(*5)	Positive Power Supply.
26,27,54,55	VSS(0-3)(*5)	Negative Power Supply.
18	TEMP1	Diode Anode Input.
19	TEMP2	Diode Cathode Input.
2,4,6,8,10,12,14,16,17,20,22,23, 28,29,30,31,32,36, 40,44,48,49, 50,51,52,53,58,59,61,62,63,64	NC	No Connect.

*3) (0-3) is applied to channel number, 0 to 3.

*4) VH(0-3) require caution to the extraneous noise including the ESD(electrical static discharge) because the ESD protection can't be designed as well as other terminals.

*5) VSS(0-3),VDD(0-3) and VBB(0-1) are shorted in the IC, respectively. But connect all of the pins to decrease the

impedance of power supply lines.

■ABSOLUTE MAXIMUM RATIOS(Ta=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Rating	Units
Supply Voltage	V_{DD} - V_{SS}	V_{DD},V_{SS}total vol.	17.0	V
Input Voltage	V_{IN}	DATA(0-3),EN(0-3),VH(0-3),VL(0-3), VBB	V_{SS}– 0.3 to V_{DD}(*6)	V
Power Dissipation	P_D	on EIA/JEDEC board (76.2X114.3X1.6mm, 4layer, FR-4)	2500	mW
Output Current	Iout		130	mA
Operation Temperature	T_{opr}		-20 to +75	°C
Storage Temperature	T_{stg}		-40 to +150	°C

(*6)For supply voltage less than 17V,the maximum input voltage is equal to the supply voltage.

■RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

Parameters	Symbol	Conditions	Units
Total Power Supply	V_{DD} - V_{SS}	8.0V to 15.0V (Total)	V

■ELECTRICAL CHARACTERISTICS

V_{DD}=10V, V_{SS}=-3V, V_{BB}=1.5V, DATA=1.5±1.5V, VH=5V, VL=0V, EN=0V, CL=33pF,RL=1kΩ,Ta=25°C, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Driver DC Characteristics						
Input High Level Range	V_H		-3	-	10	V
Input Low Level Range	V_L		-3	-	10	V
Output High Level Voltage	D_{OUTH}	DATA=3.0V	4.75	-	-	V
Output Low Level Voltage	D_{OUTL}	DATA=0V	-	-	0.25	V
HiZ Leak Current	Ileak	EN=3V, D_{OUT}=9.5V or –3V	-2	-	2	nA
Output Resistance	Rout		8.9	13.9	18.9	Ω
DC Output Current (source)	I source DC		125	-	-	mA
DC Output Current (sink)	I sink DC		125	-	-	mA
High Level Input Voltage	V_{IH}		2.0	-	-	V
Low Level Input Voltage	V_{IL}		-	-	1.0	V
Input Bias Current	Iin		-100	-	100	nA
Driver AC Characteristics (f=10MHz)						
Propagation Delay						
DATA to D_{OUT} Fig.1	Tpd	VH=3V, VL=0V	9.5	11	12.5	ns
EN to D_{OUT} (Active to HiZ) Fig.2	Taz	VH=3V, VL=0V, DATA=3 .0V, EN=0V to 3.0V,f =500kHz	16	22	27	ns
EN to D_{OUT} (HiZ to Active) Fig.2	Tza	VH=3V, VL=0V, DATA=3 .0V, EN=3.0V to 0V,f =500kHz	7.5	11	14.5	ns
Propagation Delay Mismatch Fig.1	| Tpd+ - Tpd - |	VH=3V, VL=0V	-	-	1	ns

V_{DD}=10V, V_{SS}= -3V, V_{BB}=1.5V, DATA=1.5±1.5V, VH=3V, VL= 0V, EN=0V, CL=33pF, RL=1kΩ, Ta=25°C unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Driver AC Characteristics (f=10MHz) Rise/Fall Time						
1V Swing Fig.3	Tr 1/ Tf1	VH=1V, VL=0V, 20% to 80%	-	3.2	8	ns
3V Swing Fig.3	Tr 3/ Tf3	VH=3V, VL=0V, 10% to 90%	-	4.6	11.5	ns
5V Swing Fig.3	Tr 5/ Tf5	VH=5V, VL=0V, 10% to 90%	-	4.7	11.5	ns
10V Swing Fig.3	Tr 10/ Tf10	VH=10V, VL=0V, 10% to 90%	-	5.9	-	ns
15V Swing Fig.3	Tr15 / Tf15	VDD=12V , VH=12V,VL=-3V, 10% to 90%	-	6.2	-	ns
Rise / Fall Time Mismatch Fig.3	| Tr - Tf |		-	-	2	ns
Overshoot Undershoot Preshoot	Vshoot	VH=3V, VL=0V,CL=33pF	-	150	-	mV
Max. Operating Frequency Fig.4	Fmax	VH=5V, VL=0V	50	-	-	MHz
Min. Pulse Width Fig.4	Tpw	VH=5V, VL=0V	-	-	10	ns
Diode Characteristics						
Voltage Temperature Coefficient	dV/dT	Id=100µA	-	-7.4	-	mV/°C
Power Supplies						
Positive Power Supply DC Current	I_{DD}		-	24	50	mA
Negative Power Supply DC Current	I_{SS}		-50	-24	-	mA

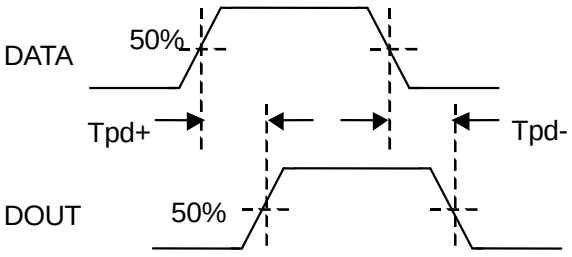


Fig.1

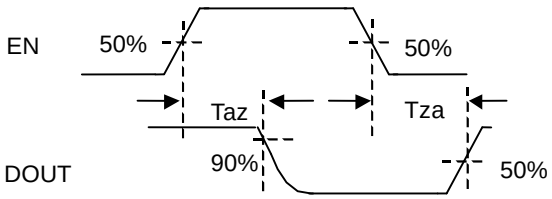


Fig.2

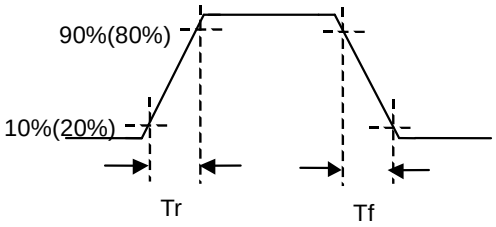


Fig.3

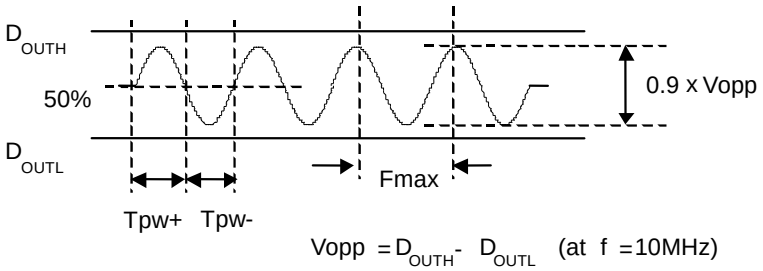


Fig.4

■TRUTH TABLES

EN , DATA	Status
>VBB+0.5V	H
<VBB-0.5V	L

EN	DATA	DOUT
H	X	HiZ(OPEN)
L	H	VH
L	L	VL

■TYPICAL CHARACTERISTICS

V_{DD}=10V, V_{SS}= -3V, V_{BB}=1.5V, DATA=1.5±1.5V, VH=3V,VL= 0V, EN=0V, CL=1.9pF, RL=1MΩ, Ta=25°C unless otherwise specified

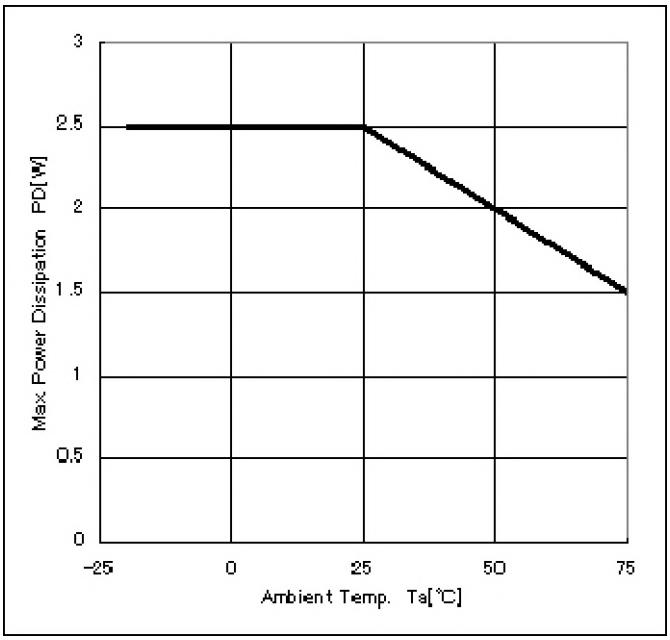


Fig.5 Derating Curve
(Max. Power Dissipation VS Ambient Temperature)

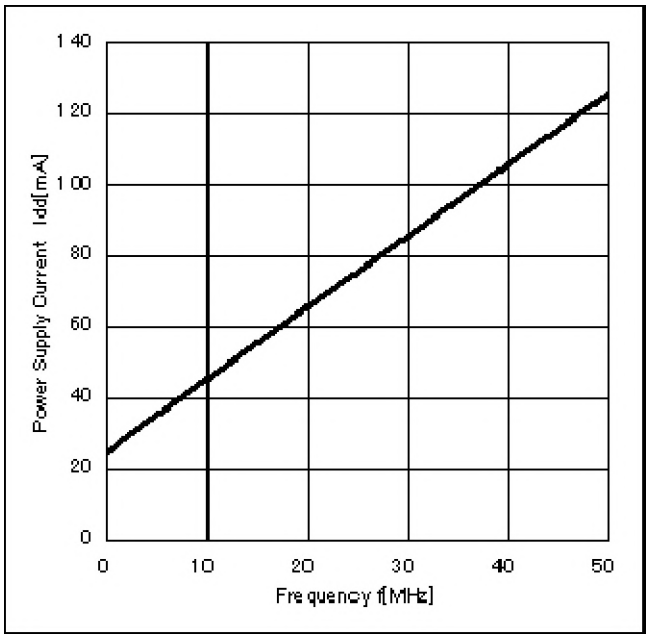


Fig.6 Power Supply Current VS Operating Frequency
(4ch Operation, 4ch Summation)

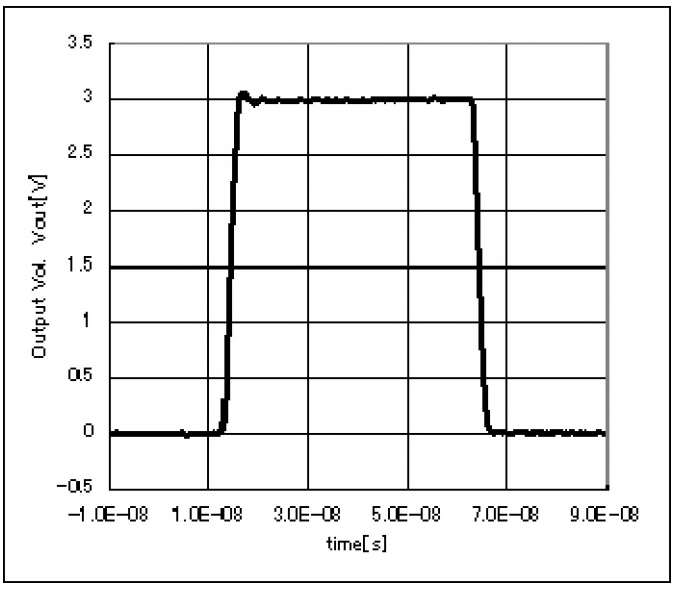


Fig.7 Output Response

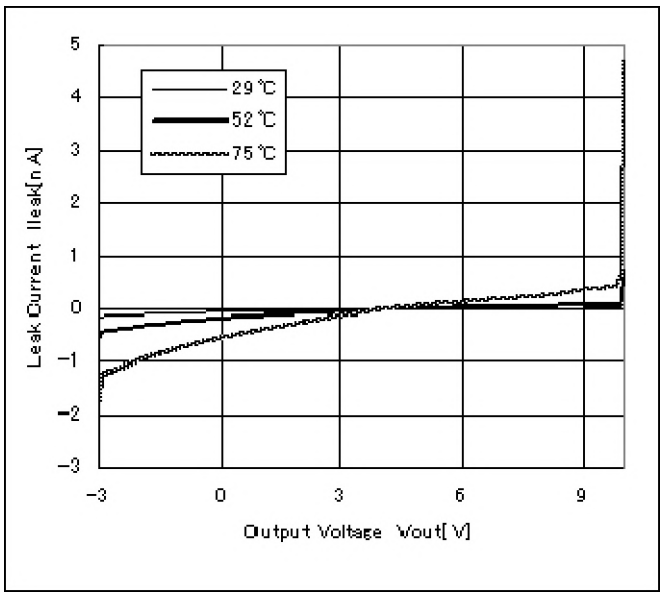


Fig.8 Leak Current

■TEST CIRCUIT

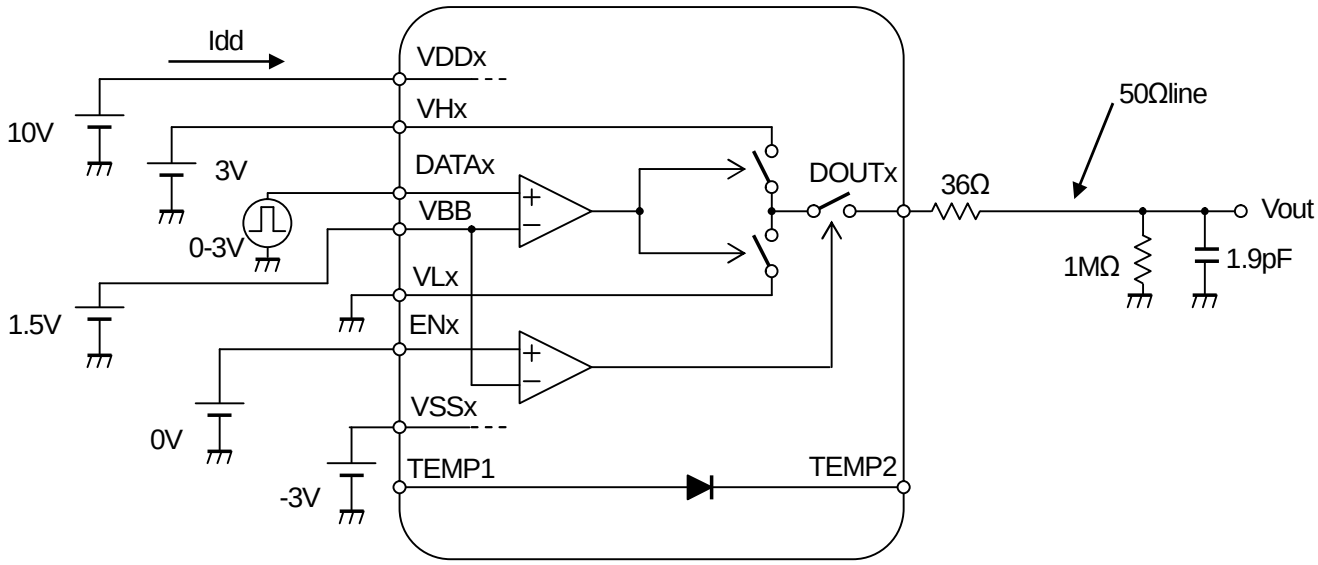


Fig.9 AC Characteristics Measurement Circuit

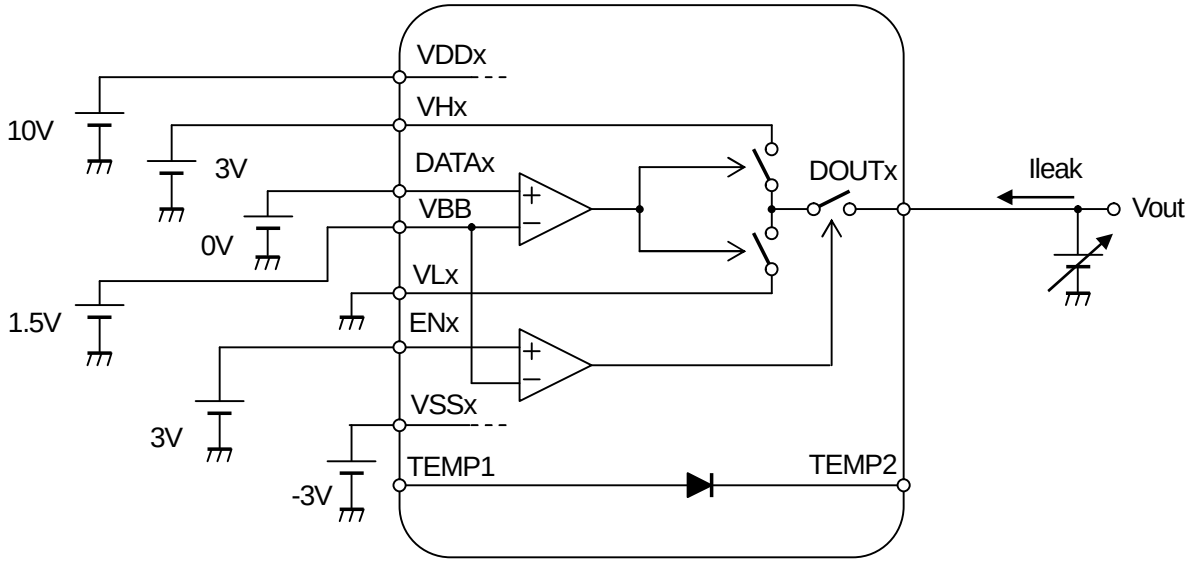


Fig.10 Leak Current Measurement Circuit

■IMPORTANT NOTES

1) Short pins in IC and connection to them on the board

VSS(0-3),VDD(0-3) and VBB(0-1) are shorted in the IC, respectively. But connect all of the pins to decrease the impedance of power supplies.

2) Input Order

First, apply VSS(0-3), second VDD(0-3), next VBB(0-2),then apply the other inputs. Otherwise the voltage stress may cause a permanent damage to the IC.

3) ESD(electrical static discharge)

VH(0-3) require caution to the extraneous noise including the ESD because the ESD protection can't be designed as well as other terminals.

4) Leak Current in HiZ Mode

The leak current may be over 2nA when DOUTx or VHx or VLx voltage set near VDD voltage, or when the junction is high temperature. See Fig.8.