

## SUPER LOW OPERATING CURRENT AND LOW OFFSET VOLTAGE TINY SINGLE CMOS COMPARATOR

### ■ GENERAL DESCRIPTION

The NJU7116 is a super low operating current and low offset voltage tiny single CMOS comparator with CMOS output.

The operating current is  $1\mu\text{A}$  (typ), and the operating of 1.8V to 3.6V.

The input offset voltage is lower than 2.5mV (max).

Furthermore, the NJU7116 is packaged with very small SOT-23-5; therefore it can be especially applied to battery operated portable items.

### ■ PACKAGE OUTLINE

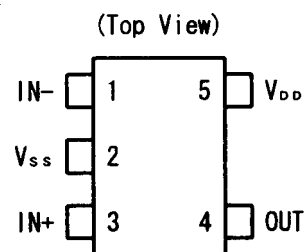


NJU7116F

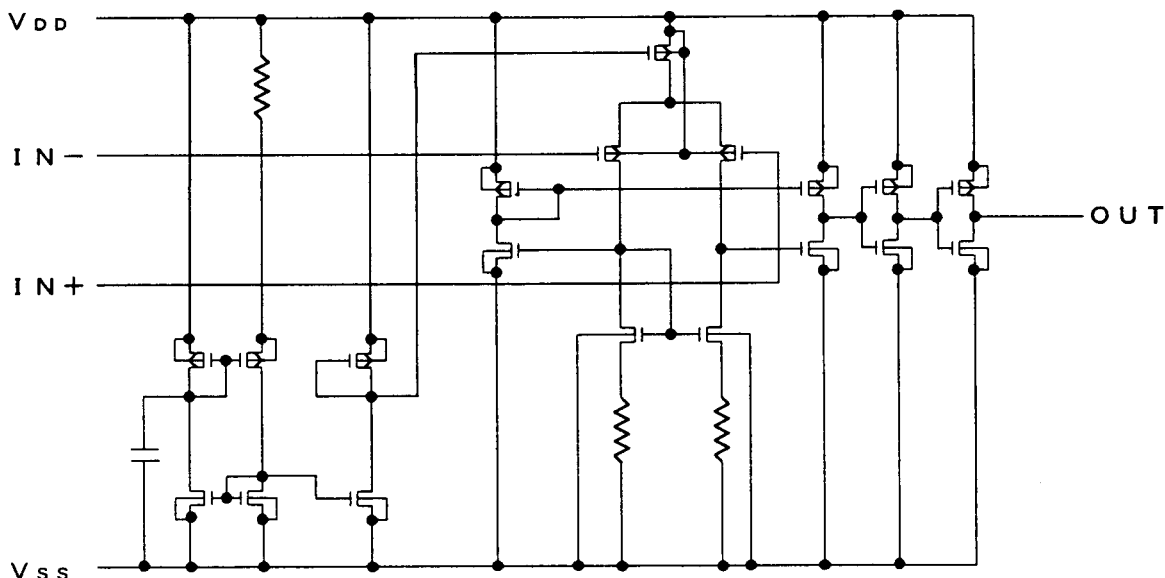
### ■ FEATURES

- Super Low Operating Current ( $I_{DD}=3.0\mu\text{A}$  typ.)
- Single Power Supply ( $V_{DD}=1.8$  to  $3.6\text{V}$ )
- Low Offset Voltage ( $V_{IO}=2.5\text{mV}$  max.@  $3.0\text{V}$ )
- Low Bias Current ( $I_B=1\text{pA}$  typ.)
- CMOS (Push-pull) Output
- Package Outline SOT-23-5
- CMOS Technology

### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT



# NJU7116

## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>IN</sub>	7	V
Differential Input Voltage	V <sub>ID</sub>	± 7 ( note1 )	V
Common Mode Input Voltage	V <sub>IC</sub>	-0.3~7	V
Power Dissipation	P <sub>D</sub>	200	mW
Operating Temperature Range	T <sub>opr</sub>	-40~+85	°C
Storage Temperature Range	T <sub>stg</sub>	-55~+125	°C

( note1 ) If the supply voltage ( V<sub>DD</sub> ) is less than 7V, the input voltage must not over the V<sub>DD</sub> level though 7V is limit specified.

( note2 ) Decoupling capacitor should be connected between V<sub>DD</sub> and V<sub>SS</sub> due to the stabilized operation for the circuit.

## ■ ELECTRICAL CHARACTERISTICS

( Ta=25°C, V<sub>DD</sub>=3.0V, R<sub>L</sub>=∞ )

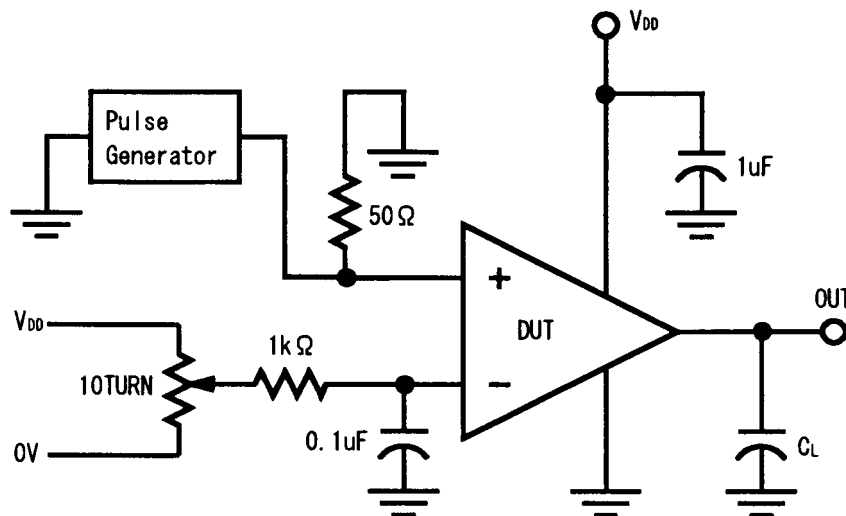
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V <sub>DD</sub>		1.8	-	3.6	V
Input Offset Voltage	V <sub>IO</sub>	V <sub>IN</sub> =1/2V <sub>DD</sub>	-	-	2.5	mV
Input Offset Current	I <sub>IO</sub>		-	1	-	pA
Input Bias Current	I <sub>IB</sub>		-	1	-	pA
Input Common Mode Voltage Range	V <sub>ICM</sub>		0~2.5	-	-	V
Output Leakage Current	I <sub>OFF</sub>	V <sub>OH</sub> =V <sub>DD</sub>	-	-	1	μA
High Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> =2mA	2.7	-	-	V
Low Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> =-2mA	-	-	0.3	V
Common Mode Rejection Ratio	CMR	V <sub>IC</sub> =1/2V <sub>DD</sub>	50	-	-	dB
Supply Voltage Rejection Ratio	SVR	V <sub>DD</sub> =1.8~3.6V	50	-	-	dB
Operating Current	I <sub>DD</sub>	No Load, V <sub>O</sub> =0V	-	1	1.5	μA

## ■ SWITCHING CHARACTERISTICS

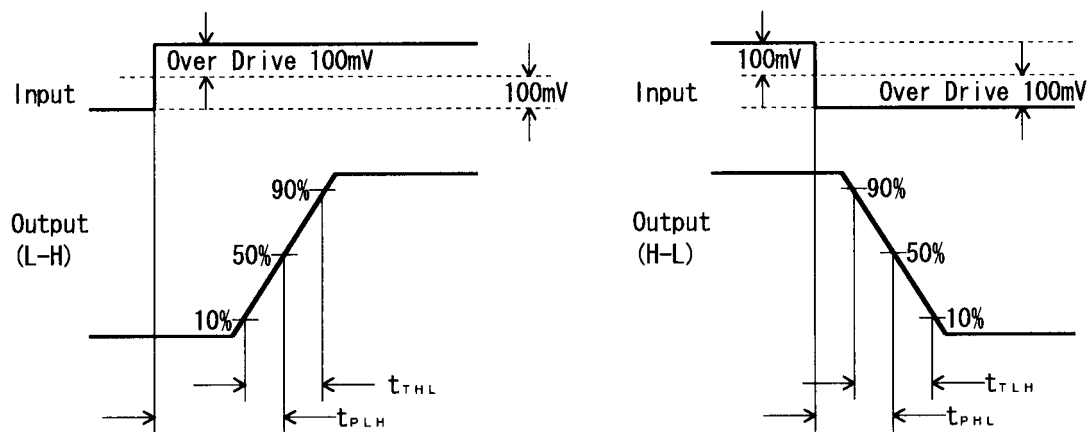
( Ta=25°C, V<sub>DD</sub>=3.0V, f=1kHz, C<sub>L</sub>=15pF )

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Propagation Delay High to Low	t <sub>PHL</sub>	Over Drive=100mV	V <sub>IC</sub> =0V	-	1.2	2.0	μs
		TTL Level Step In.		-	0.37	-	
Propagation Delay Low to High	t <sub>PLH</sub>	Over Drive=100mV	V <sub>IC</sub> =0V	-	3.3	5.0	μs
		TTL Level Step In.		-	2.6	-	
Propagation Delay Time Lag	t <sub>PD</sub>	t <sub>PLH</sub> - t <sub>PHL</sub>		-	2.1	3.0	μs
Output Signal Falling Time	t <sub>THL</sub>	Over Drive=100mV		-	15	-	ns
Output Signal Rising Time	t <sub>TLH</sub>	Over Drive=100mV		-	40	-	ns

## ■ SWITCHING CHARACTERISTICS MEASUREMENT CIRCUIT



## ■ TIMING WAVEFORM



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