

## SUPER LOW OPERATING CURRENT AND LOW OFFSET VOLTAGE TINY SINGLE C-MOS COMPARATOR

### ■ GENERAL DESCRIPTION

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

The operating current is 1 $\mu$ 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 MTP-5, therefore it can be especially applied to battery operated portable items.

### ■ PACKAGE OUTLINE



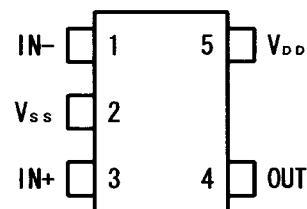
NJU7116F

### ■ FEATURES

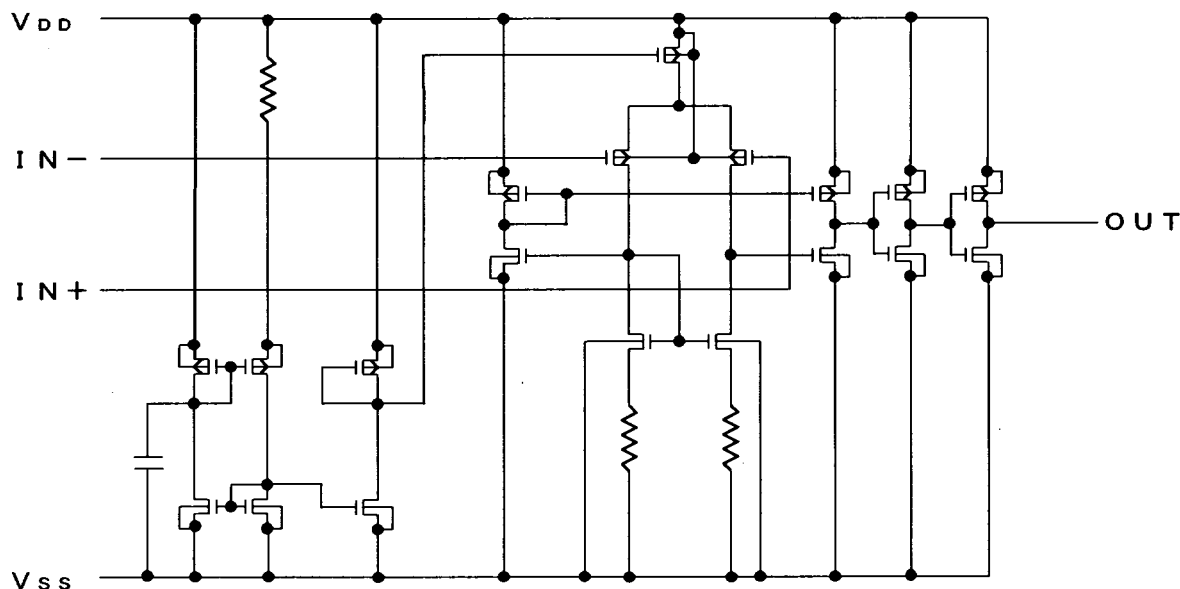
- Super Low Operating Current      $I_{DD}=3.0\mu A$  typ.
- Single Power Supply              $V_{DD}=1.8\sim 3.6V$
- Low Offset Voltage                  $V_{IO}=2.5mV$  max. @3.0V
- Low Bias Current                    $I_{IB}=1pA$  typ.
- C-MOS (Push-pull) Output         MTP-5
- Package Outline
- C-MOS Technology

### ■ PIN CONFIGURATION

(Top View)



### ■ EQUIVALENT CIRCUIT



**■ ABSOLUTE MAXIMUM RATINGS**

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{IN}$	7	V
Differential Input Voltage	$V_{ID}$	$\pm 7$ Note1	V
Common Mode Input Voltage	$V_{IC}$	- 0.3 ~ 7	V
Power Dissipation	$P_D$	200	mW
Operating Temperature	$T_{opr}$	- 40 ~ + 85	°C
Storage Temperature	$T_{stg}$	- 55 ~ +125	°C

Note1) If the supply voltage ( $V_{DD}$ ) is less than 7V, the input voltage must not over the  $V_{DD}$  level though 7V is limit specified.

Note2) Decoupling capacitor should be connected between  $V_{DD}$  and  $V_{SS}$  due to the stabilized operation for the circuit.

**■ ELECTRICAL CHARACTERISTICS**

 (Ta=25°C,  $V_{DD}=3.0V$ ,  $R_L=\infty$ )

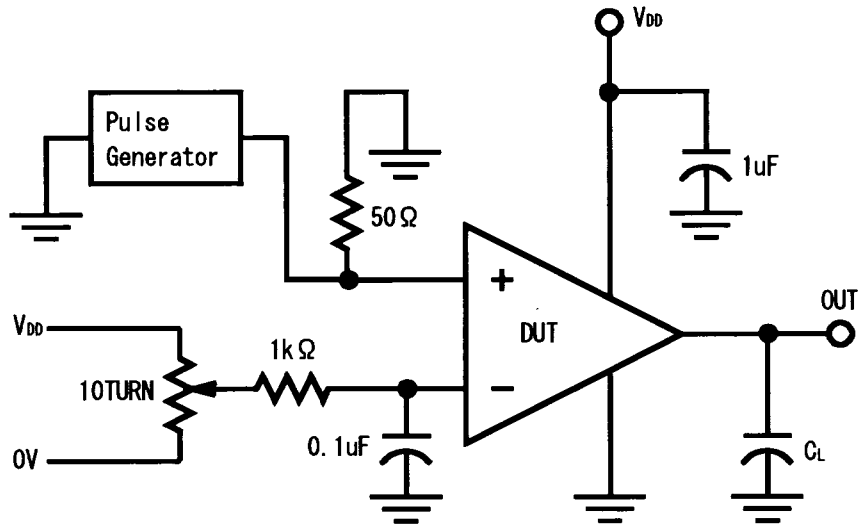
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{DD}$		1.8	—	3.6	V
Input Offset Voltage	$V_{IO}$	$V_{IN}=1/2V_{DD}$	—	—	2.5	mV
Input Offset Current	$I_{IO}$		—	1	—	pA
Input Bias Current	$I_{IB}$		—	1	—	pA
Input Common Mode Voltage Range	$V_{ICM}$		0~2.5	—	—	V
Output Leakage Current	$I_{OFF}$	$V_{OH}=V_{DD}$	—	—	1	uA
High Level Output Voltage	$V_{OH}$	$I_{OH}=2mA$	2.7	—	—	V
Low Level Output Voltage	$V_{OL}$	$I_{OL}=-2mA$	—	—	0.3	V
Common Mode Rejection Ratio	CMR	$V_{IC}=1/2V_{DD}$	50	—	—	dB
Supply Voltage Rejection Ratio	SVR	$V_{DD}=1.8\sim 3.6V$	50	—	—	dB
Operating Current	$I_{DD}$	No Load, $V_o=0V$	—	1	1.5	uA

**■ SWITCHING CHARACTERISTICS**

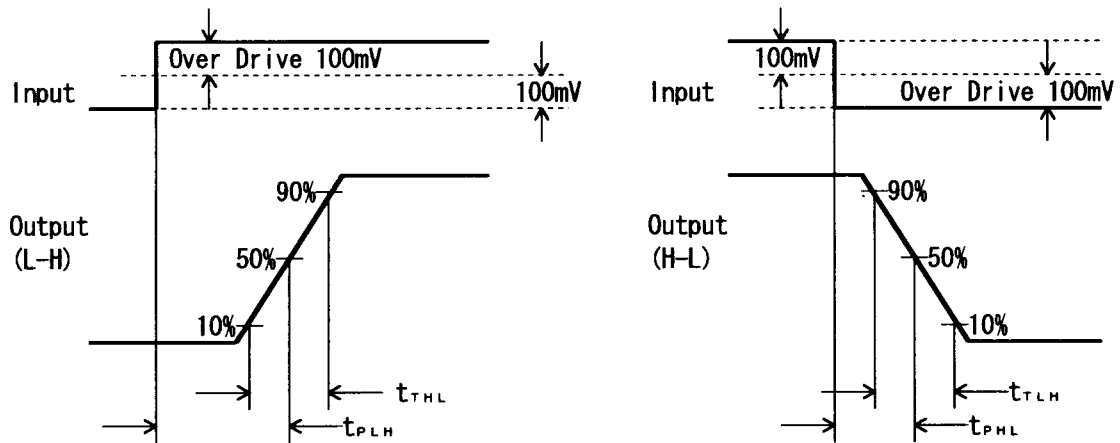
 (Ta=25°C,  $V_{DD}=3.0V$ ,  $f=1kHz$ ,  $C_L=15pF$ )

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay High to Low	$t_{PHL}$	Over Drive=100mV	—	1.2	2.0	us
		TTL Level Step In.	—	0.37	—	
Propagation Delay Low to High	$t_{PLH}$	Over Drive=100mV	—	3.3	5.0	us
		TTL Level Step In.	—	2.6	—	
Propagation Delay Time Lag	$t_{PD}$	$t_{PLH}-t_{PHL}$	—	2.1	3.0	us
Output Signal Falling Time	$t_{THL}$	Over Drive=100mV	—	15	—	ns
Output Signal Rising Time	$t_{TLH}$	Over Drive=100mV	—	40	—	ns

■ SWITCHING CHARACTERISTICS MEASUREMENT CIRCUIT



■ TIMING WAVEFORM



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