

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

### ■ GENERAL DESCRIPTION

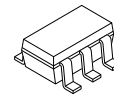
The NJU7116 is a super low operating current and low offset voltage tiny single CMOS comparator with CMOS output.

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 DFN6-G1; therefore it can be especially applied to battery operated portable items.

### ■ PACKAGE OUTLINE



NJU7116F

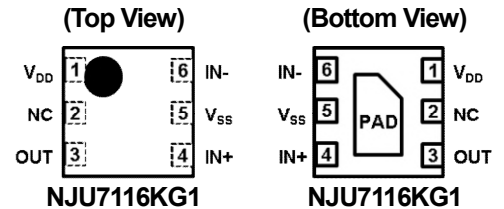
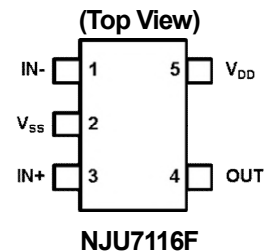


NJU7116KG1

### ■ FEATURES

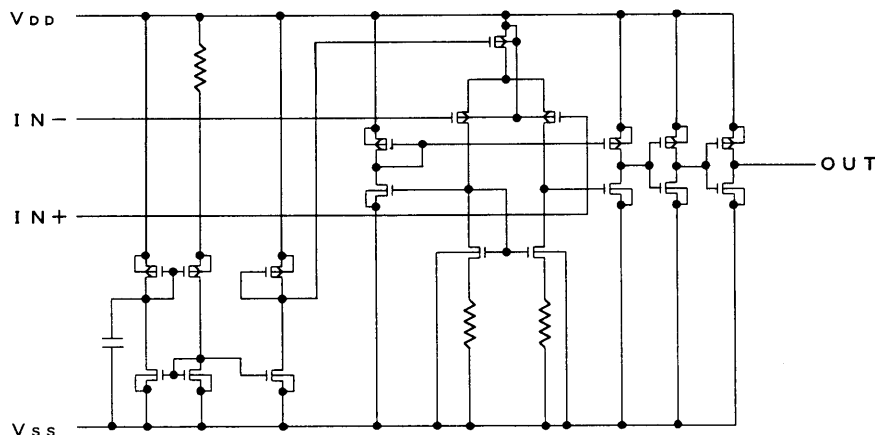
- Super Low Operating Current (  $I_{DD}=1.0\mu\text{A}$  typ. )
- Single Power Supply (  $V_{DD}=1.8$  to  $3.6\text{V}$  )
- Low Offset Voltage (  $V_{IO}=2.5\text{mV}$  max.@  $3.0\text{V}$  )
- Low Bias Current (  $I_B=1\text{pA}$  typ. )
- CMOS ( Push-pull ) Output
- Package Outline SOT-23-5, DFN6-G1
- CMOS Technology

### ■ PIN CONFIGURATION



The NC pin and the PAD should connect with a VSS terminal.

### ■ EQUIVALENT CIRCUIT



# NJU7116

## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{DD}$	7	V
Differential Input Voltage	$V_{ID}$	$\pm 7$ (note1)	V
Common Mode Input Voltage	$V_{IC}$	-0.3 to 7( note1)	V
Power Dissipation	$P_D$	390 (note 3) / 520 (note 4) 260 (note 5) / 950 (note 6)	mW
Operating Temperature Range	$T_{opr}$	-40 to +105	°C
Storage Temperature Range	$T_{stg}$	-55 to +125	°C

( note1) For supply voltage less than 7V, the absolute maximum rating is equal to the supply voltage.

( note2 ) Decoupling capacitor should be connected between  $V_{DD}$  and  $V_{SS}$  due to the stabilized operation for the circuit.

( note3 ) EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 2layers, FR-4) mounting

( note4 ) EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 4layers, FR-4) mounting

( note5 ) Mounted on glass epoxy board. (101.5x114.5x1.6mm: based on EIA/JEDEC standard, 2Layers FR-4, with Exposed Pad)

( note6 ) Mounted on glass epoxy board. (101.5x114.5x1.6mm: based on EIA/JEDEC standard, 4Layers FR-4, with Exposed Pad)

(For 4Layers: Applying 99.5x99.5mm inner Cu area and a thermal via hole to a board based on JEDEC standard JESD51-5)

( note7 ) The NC pin and the PAD should connect with a VSS terminal.

( note8 ) The NC pin is electrically not connected to the die in a package.

( note9 ) The PAD is electrically connected to the backside of the die. The PAD cannot be used as VSS terminal.

## ■ ELECTRICAL CHARACTERISTICS

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

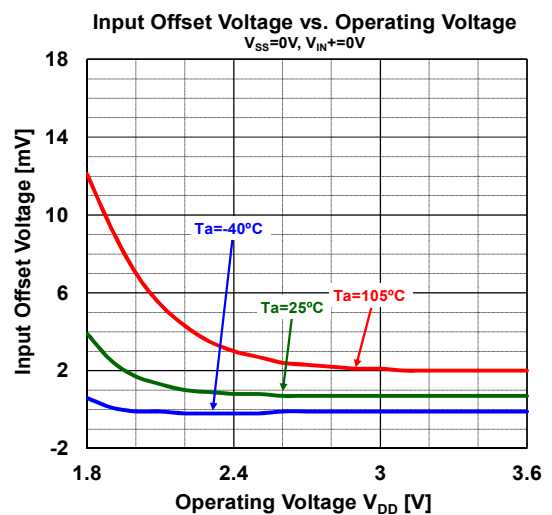
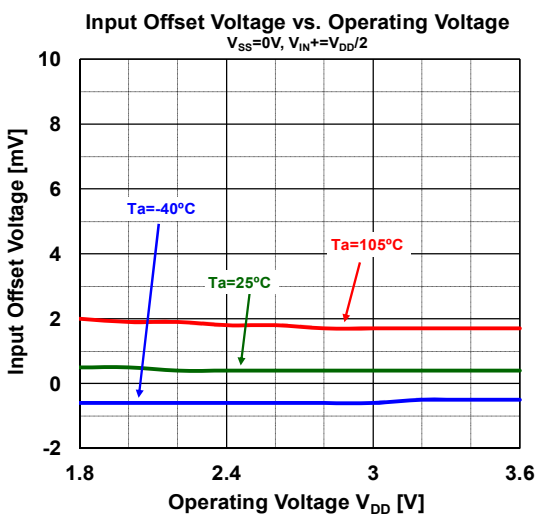
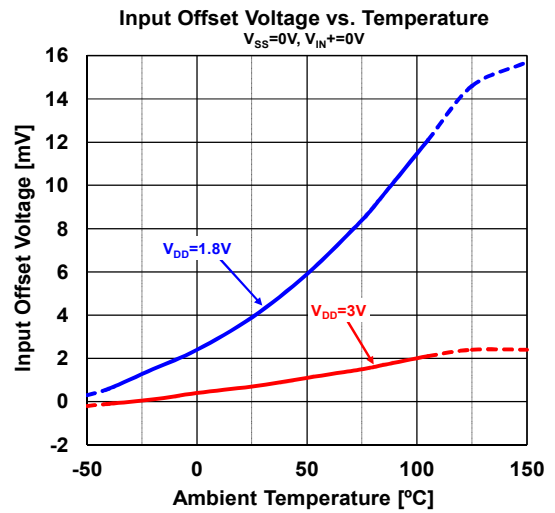
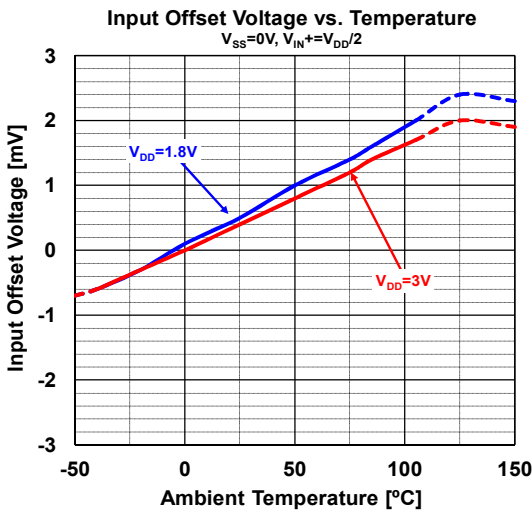
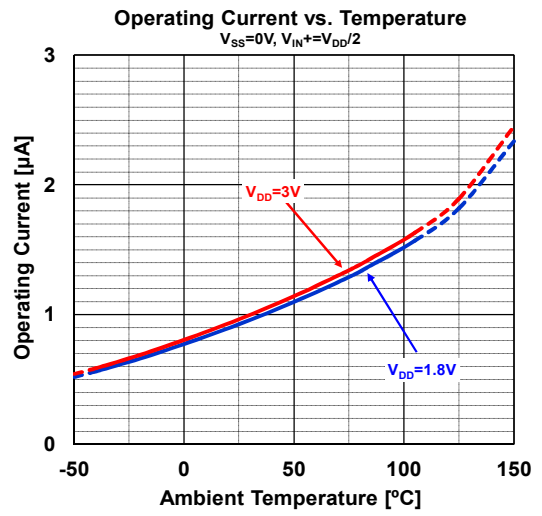
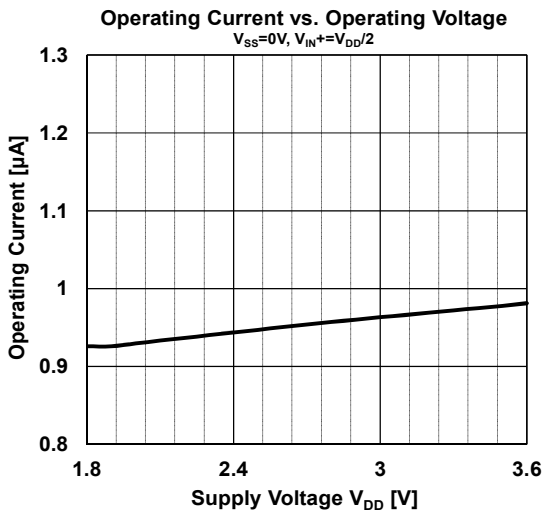
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	$V_{DD}$		1.8	-	3.6	V
Input Offset Voltage	$V_{IO}$	$V_{IN}=1/2V_{DD}$	-	-	2.5	mV
Input Offset Current	$I_{IO}$		-	1	-	pA
Input Bias Current	$I_{IB}$		-	1	-	pA
Input Common Mode Voltage Range	$V_{ICM}$		0~2.5	-	-	V
High Level Output 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	$\mu A$

## ■ SWITCHING CHARACTERISTICS

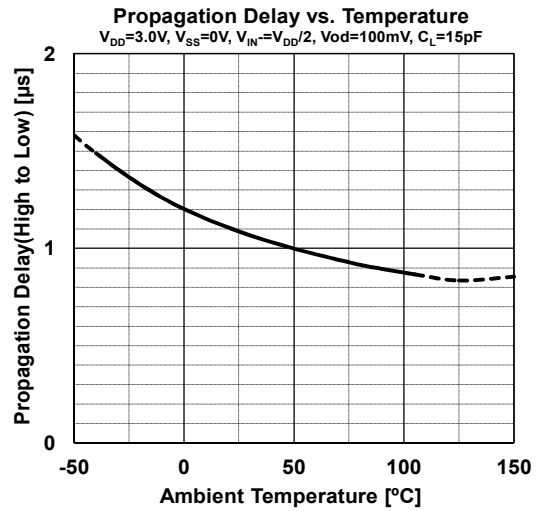
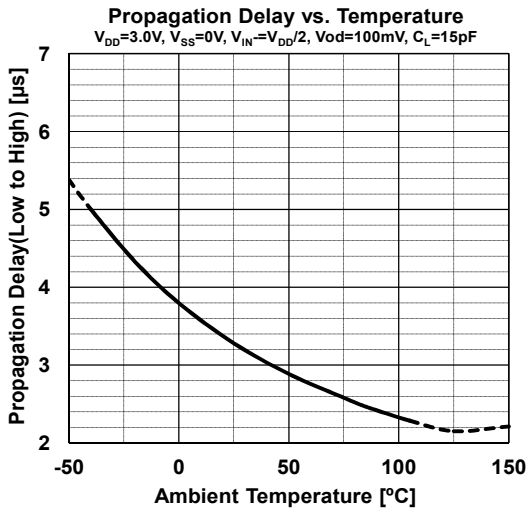
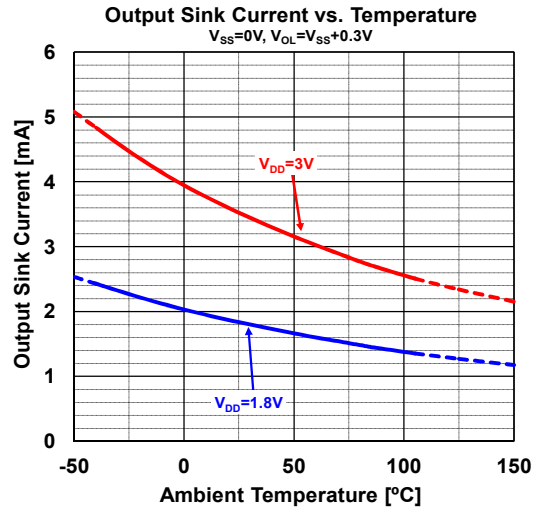
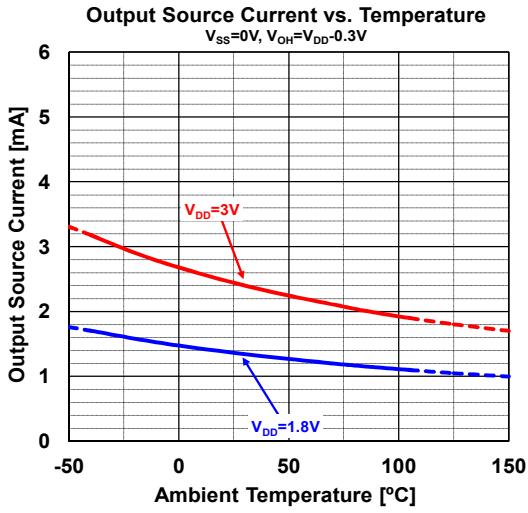
( Ta=25°C,  $V_{DD}=3.0V, f=1kHz, C_L=15pF$  )

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

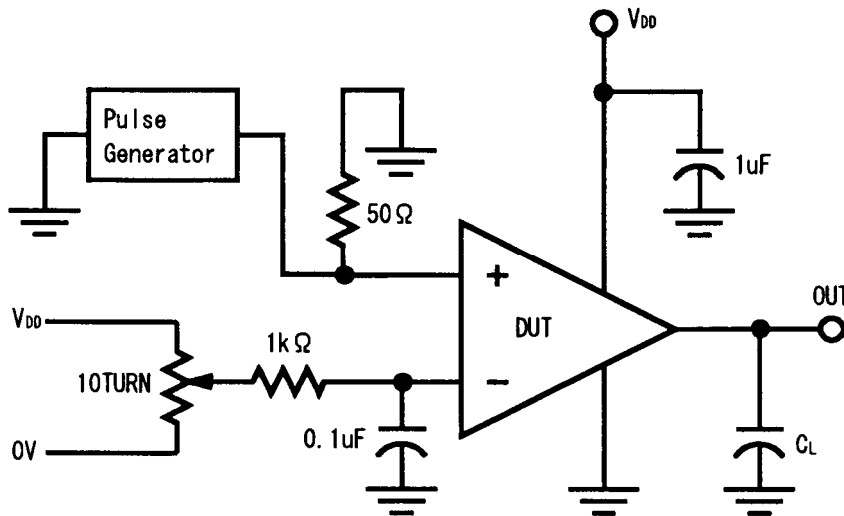
## TYPICAL CHARACTERISTICS



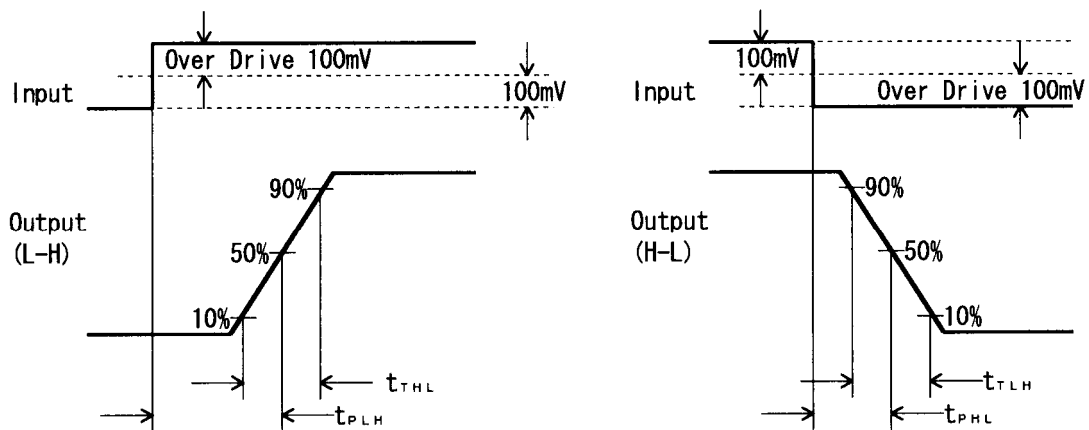
## ■ TYPICAL CHARACTERISTICS



## ■ SWITCHING CHARACTERISTICS MEASUREMENT CIRCUIT

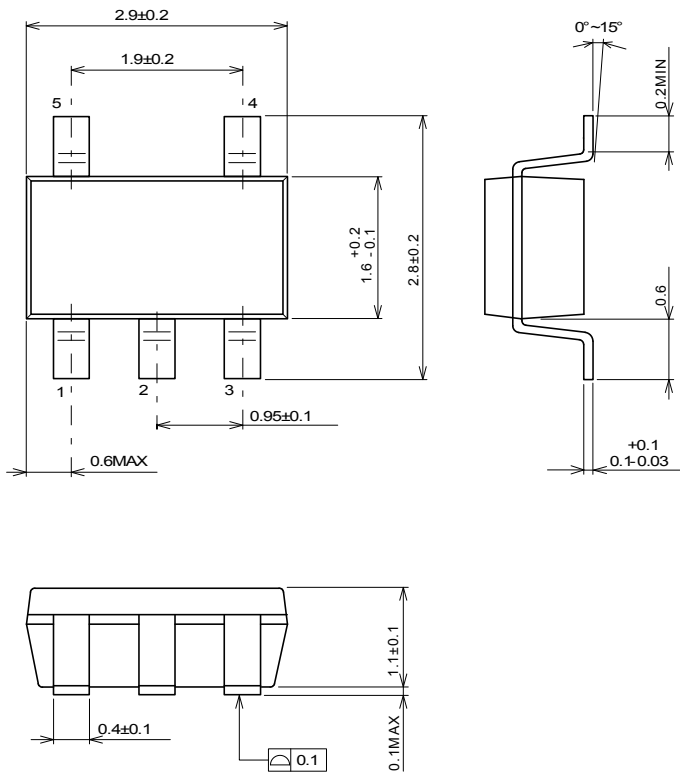


## ■ TIMING WAVEFORM



# NJU7116

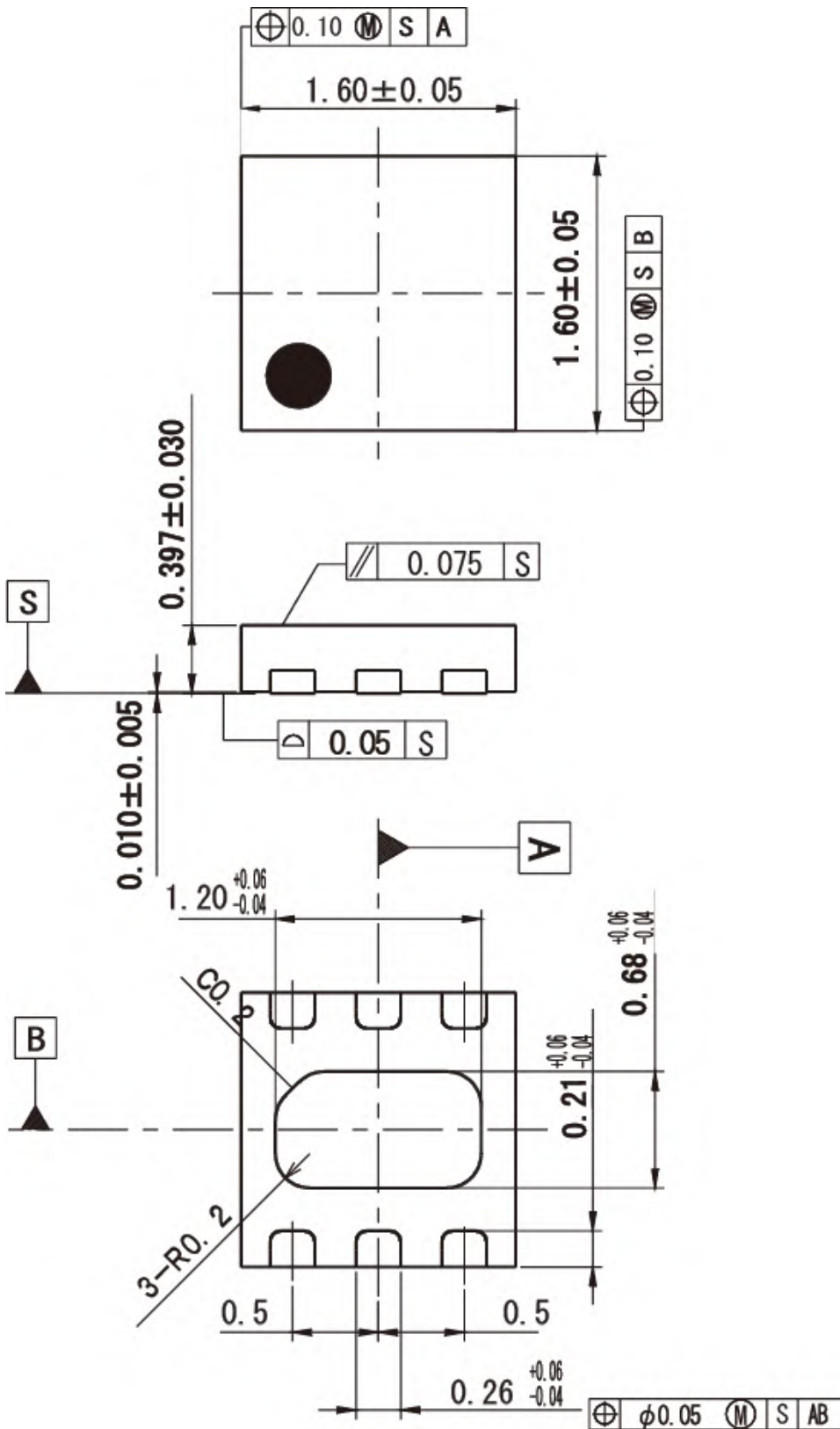
## ■ PACKAGE DIMENSIONS



Unit: mm

SOT-23-5 Package

■ PACKAGE DIMENSIONS



Unit: mm

DFN6-G1 Package

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