

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

### ■ GENERAL DESCRIPTION

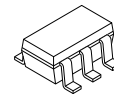
The NJU7116 is a super low operating current and low offset voltage tiny single CMOS comparator with CMOS output.

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

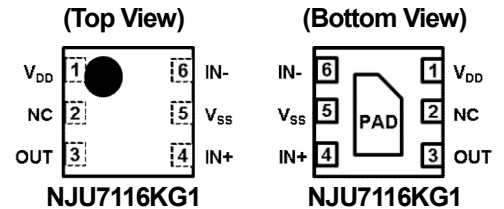
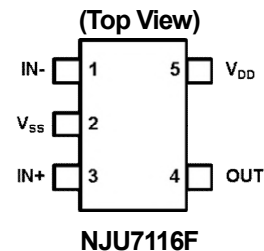


NJU7116KG1

### ■ FEATURES

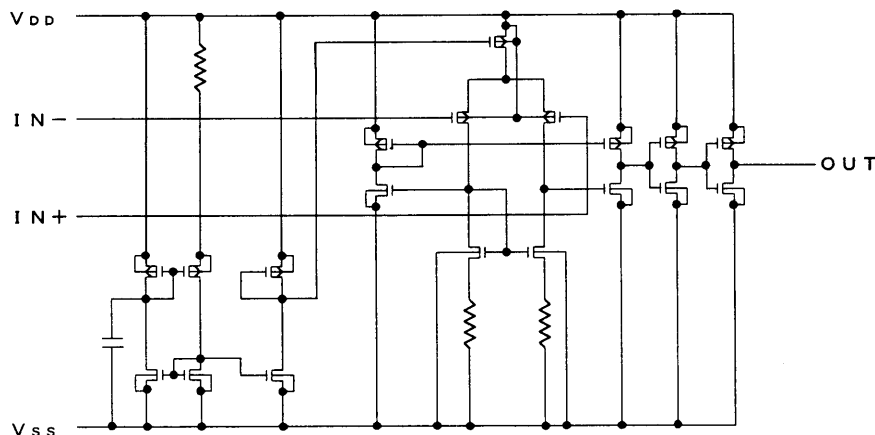
- Super Low Operating Current ( $I_{DD}=1.0\mu\text{A}$  typ. )
- Single Power Supply ( $V_{DD}=1.8$  to  $3.6\text{V}$ )
- Low Offset Voltage ( $V_{IO}=2.5\text{mV}$  max.@  $3.0\text{V}$ )
- Low Bias Current ( $I_B=1\text{pA}$  typ. )
- CMOS ( Push-pull ) Output
- Package Outline SOT-23-5, DFN6-G1
- 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 <sub>DD</sub>	7	V
Differential Input Voltage	V <sub>ID</sub>	± 7 (note1)	V
Common Mode Input Voltage	V <sub>IC</sub>	-0.3 to 7( note1)	V
Power Dissipation	P <sub>D</sub>	390 (note 3) / 520 (note 4) 260 (note 5) / 950 (note 6)	mW
Operating Temperature Range	T <sub>opr</sub>	-40 to +105	°C
Storage Temperature Range	T <sub>stg</sub>	-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<sub>DD</sub> and V<sub>SS</sub> 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. (101.5×114.5×1.6mm: based on EIA/JEDEC standard, 2Layers FR-4, with Exposed Pad)

( note6 ) Mounted on glass epoxy board. (101.5×114.5×1.6mm: based on EIA/JEDEC standard, 4Layers FR-4, with Exposed Pad)

(For 4Layers: Applying 99.5×99.5mm 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<sub>DD</sub>=3.0V, R<sub>L</sub>=∞ )

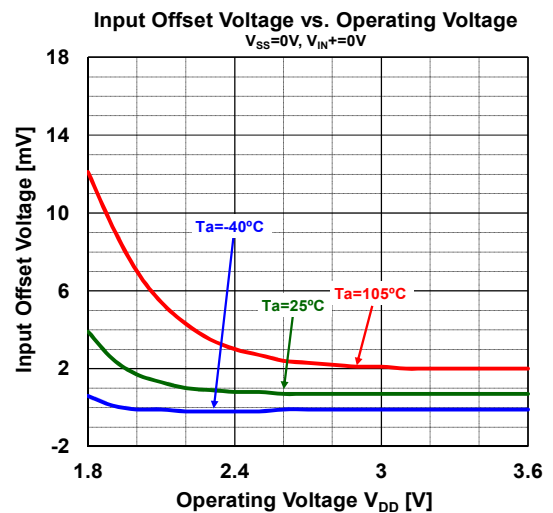
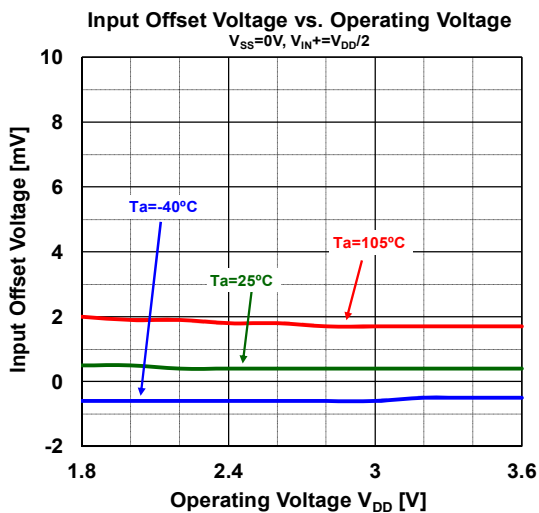
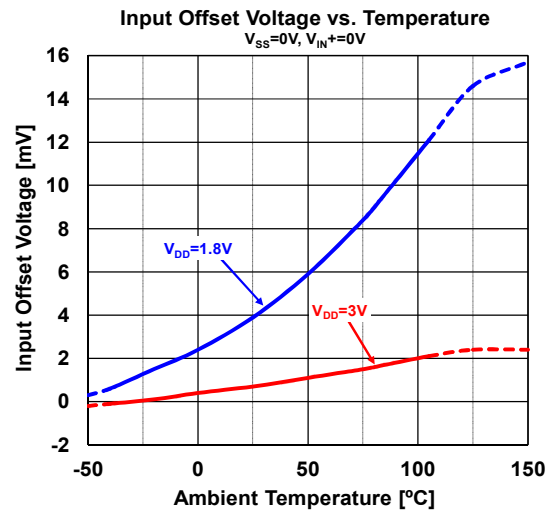
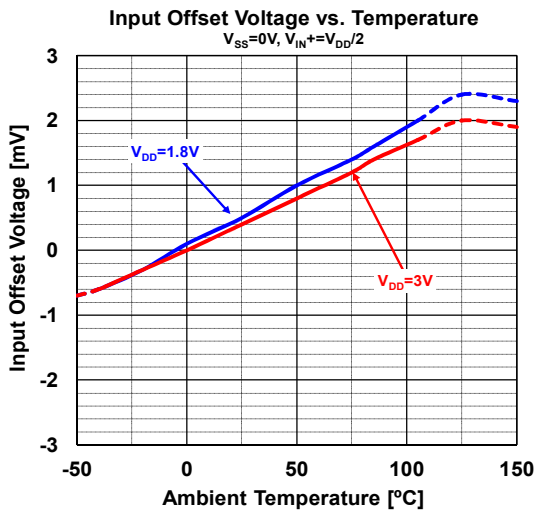
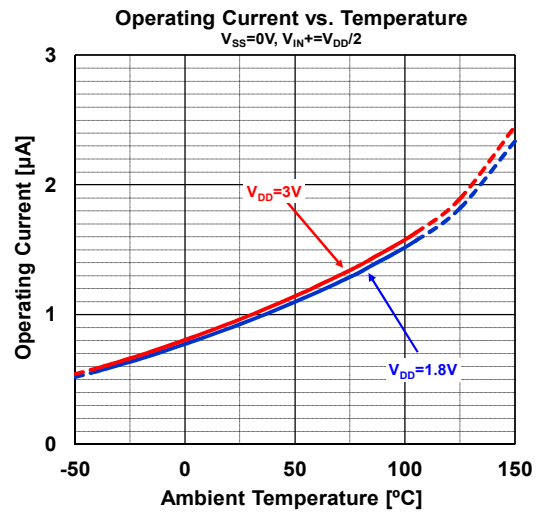
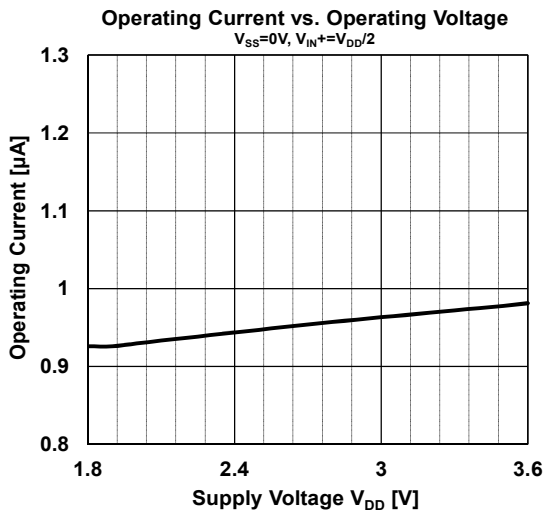
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V <sub>DD</sub>		1.8	-	3.6	V
Input Offset Voltage	V <sub>IO</sub>	V <sub>IN</sub> =1/2V <sub>DD</sub>	-	-	2.5	mV
Input Offset Current	I <sub>IO</sub>		-	1	-	pA
Input Bias Current	I <sub>IB</sub>		-	1	-	pA
Input Common Mode Voltage Range	V <sub>ICM</sub>		0~2.5	-	-	V
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

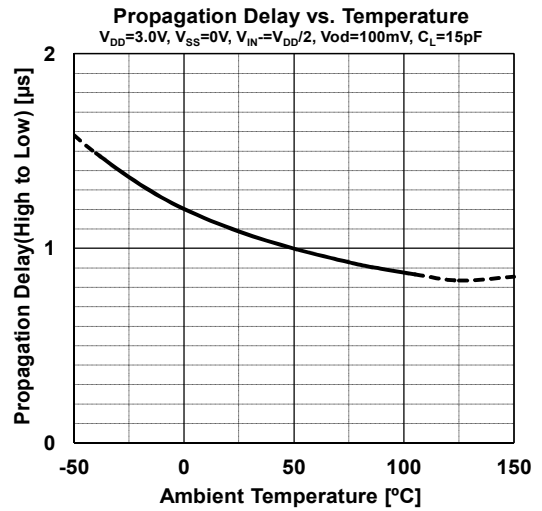
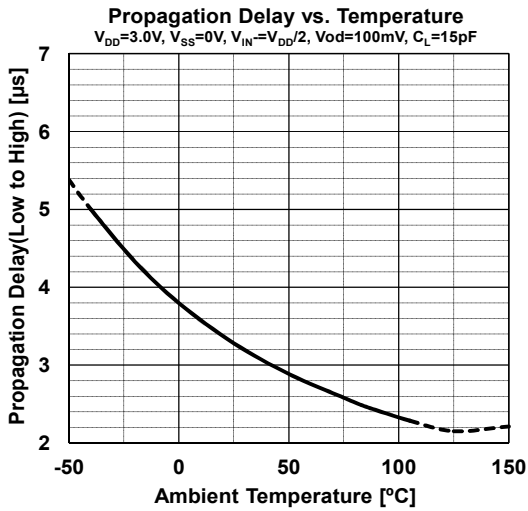
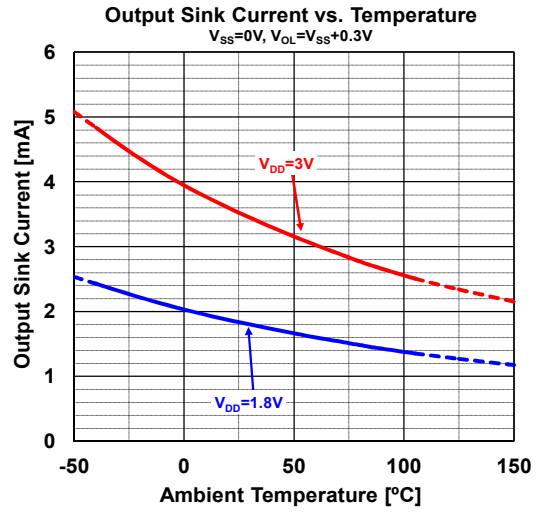
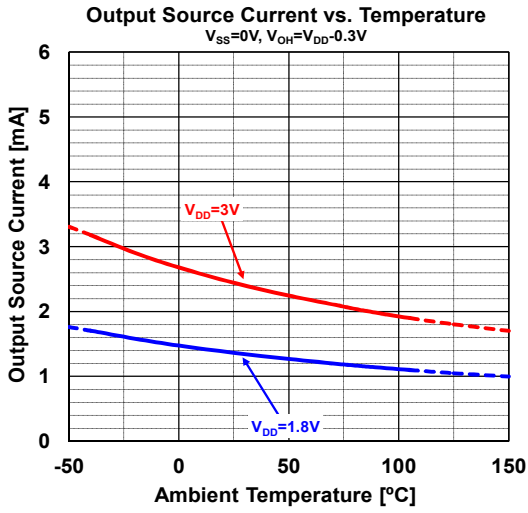
( Ta=25°C, V<sub>DD</sub>=3.0V, f=1kHz, C<sub>L</sub>=15pF )

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay High to Low	t <sub>PHL</sub>	Over Drive=100mV	-	1.2	2.0	μs
		TTL Level Step In.	-	0.37	-	
Propagation Delay Low to High	t <sub>PLH</sub>	Over Drive=100mV	-	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

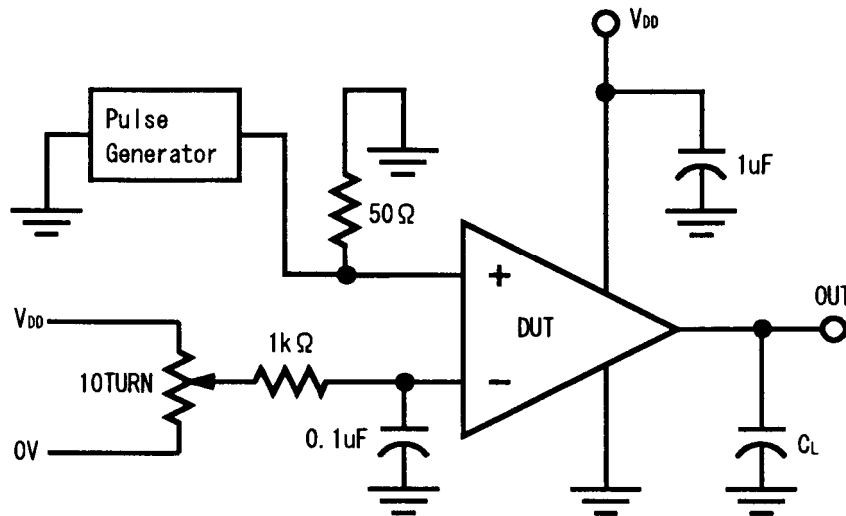
## TYPICAL CHARACTERISTICS



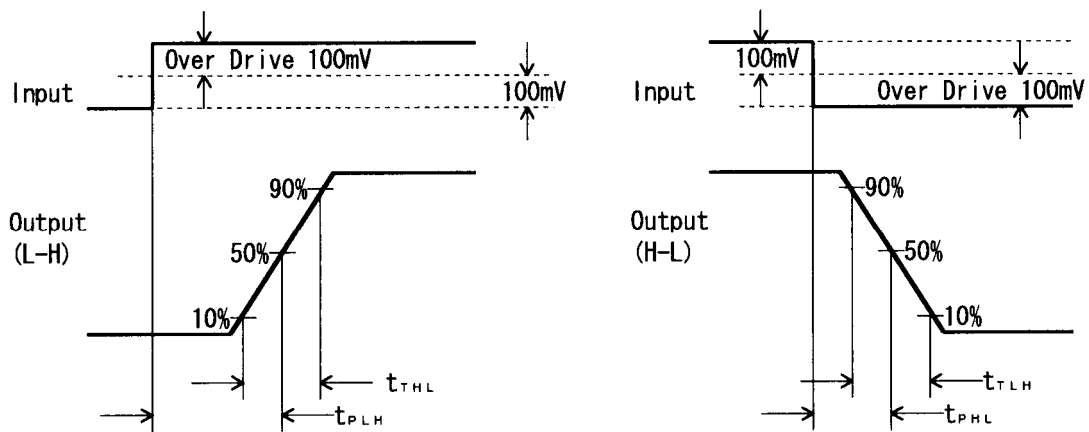
## ■ TYPICAL CHARACTERISTICS



## ■ SWITCHING CHARACTERISTICS MEASUREMENT CIRCUIT

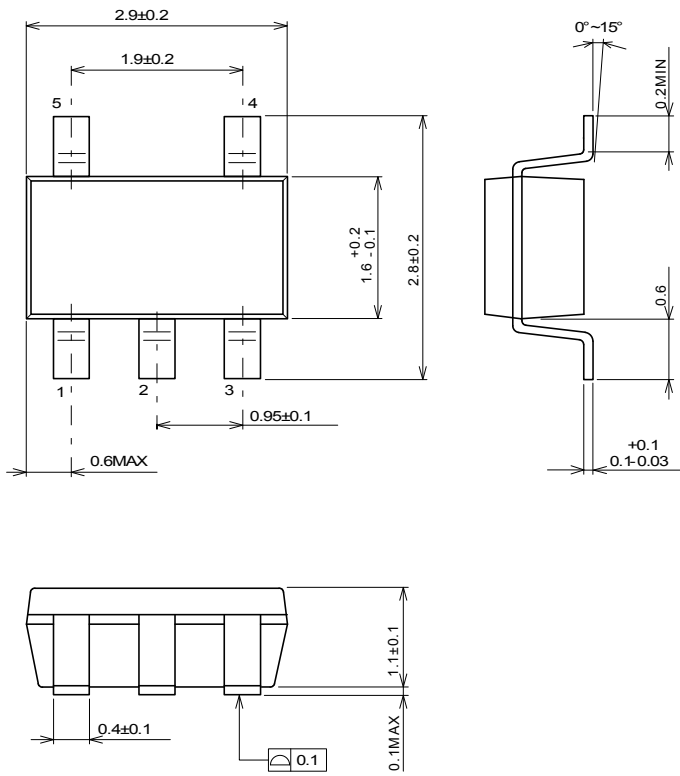


## ■ TIMING WAVEFORM



# NJU7116

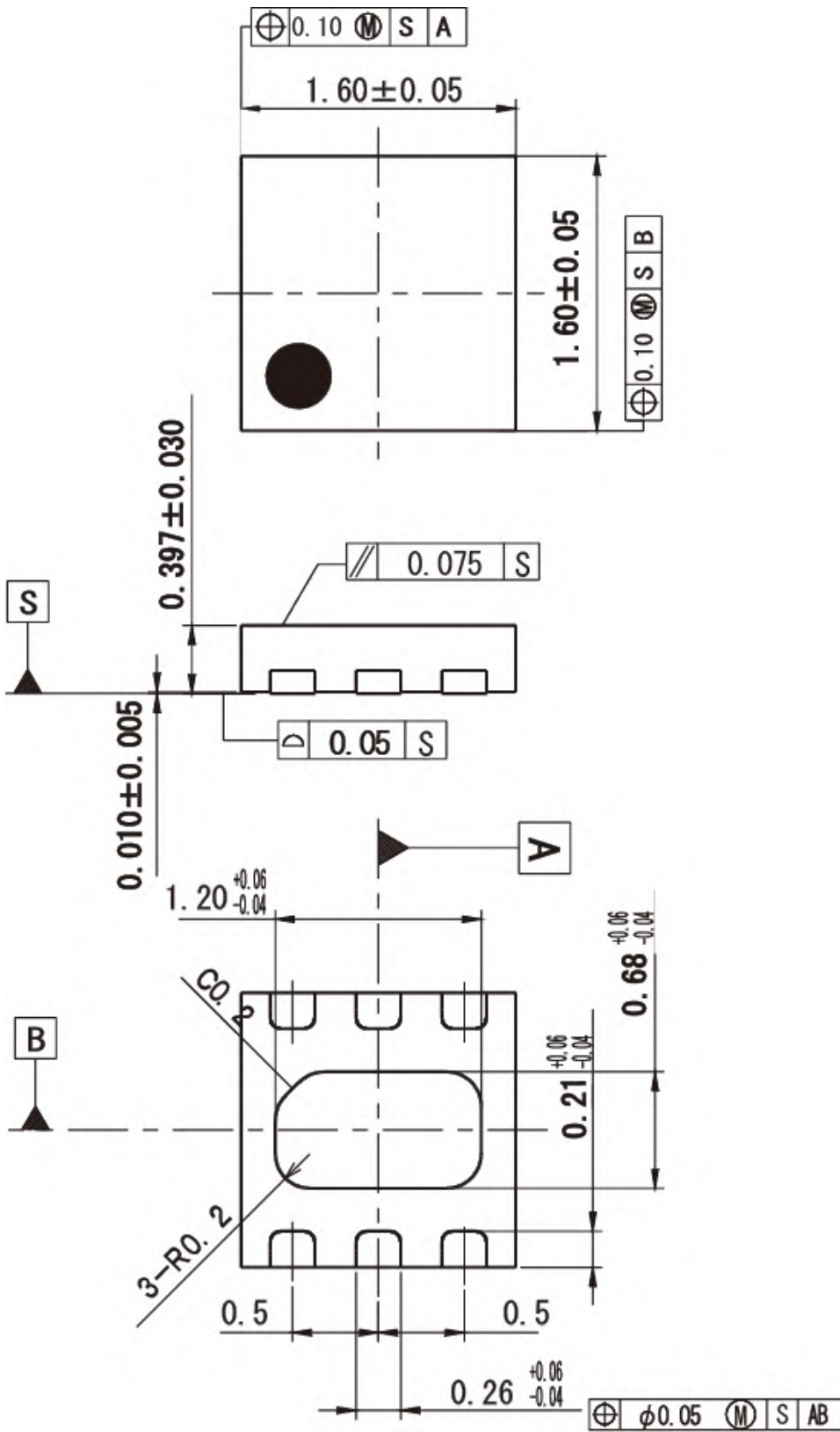
## ■ PACKAGE DIMENSIONS



Unit: mm

SOT-23-5 Package

■ PACKAGE DIMENSIONS



Unit: mm

DFN6-G1 Package

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