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

■ GENERAL DESCRIPTION

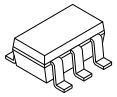
The NJU7116 is a super low operating current and low offset voltage tiny single CMOS comparator with CMOS output.

The operating current is 1μA (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

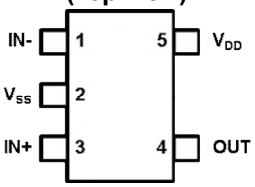
NJU7116KG1

■ FEATURES

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

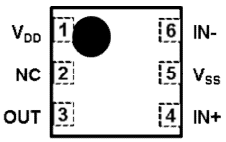
■ PIN CONFIGURATION

(Top View)



NJU7116F

(Top View)



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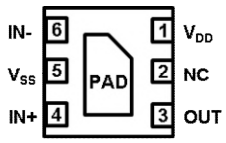
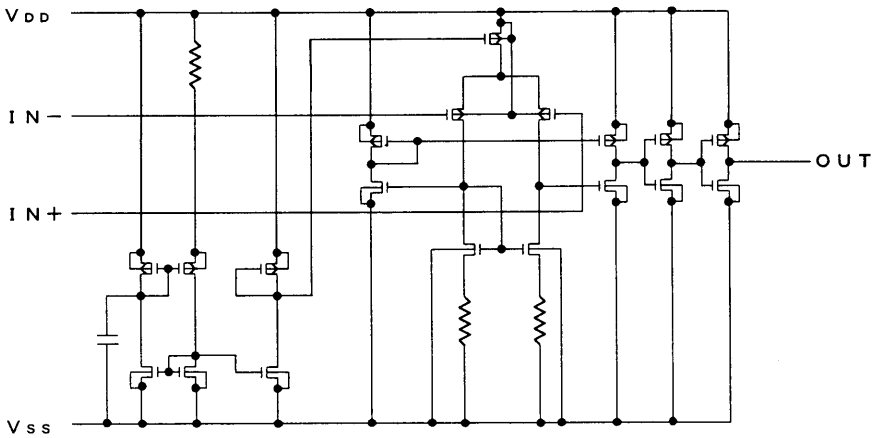
(Bottom View)



NJU7116KG1

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

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25˚C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	7	V
Differential Input Voltage	V_{ID}	±7 (note1)	V
Common Mode Input Voltage	V_{IC}	-0.3 to 7(note1)	V
Power Dissipation SOT-23-5 DFN6-G1	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. (101.5×114.5×1.6mm: 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_{DD}=3.0V,R_L=∞)

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}=1.8~3.6V	50	-	-	dB
Operating Current	I_{DD}	No Load,V_O=0V	-	1	1.5	μA

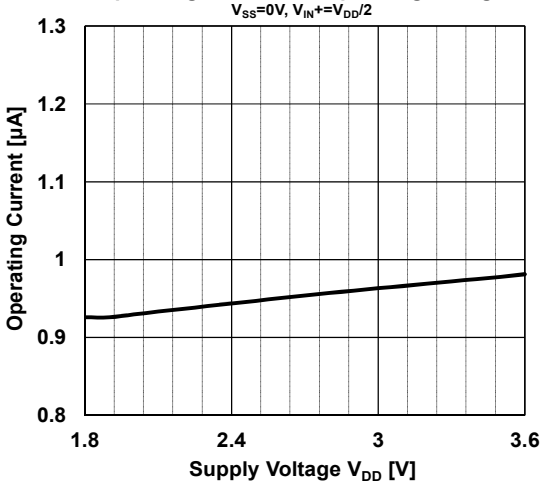
■ SWITCHING CHARACTERISTICS

(Ta=25˚C,V_{DD}=3.0V,f=1kHz,C_L=15pF)

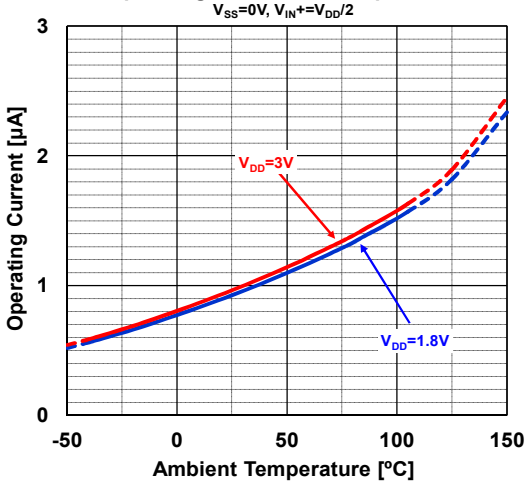
PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Propagation Delay High to Low	t_{PHL}	Over Drive=100mV	V_{IC}=0V	-	1.2	2.0	μs
		TTL Level Step In.		-	0.37	-	
Propagation Delay Low to High	t_{PLH}	Over Drive=100mV	V_{IC}=0V	-	3.3	5.0	μs
		TTL Level Step In.		-	2.6	-	
Propagation Delay Time Lag	t_{PD}	t_{PLH}-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

■ TYPICAL CHARACTERISTICS

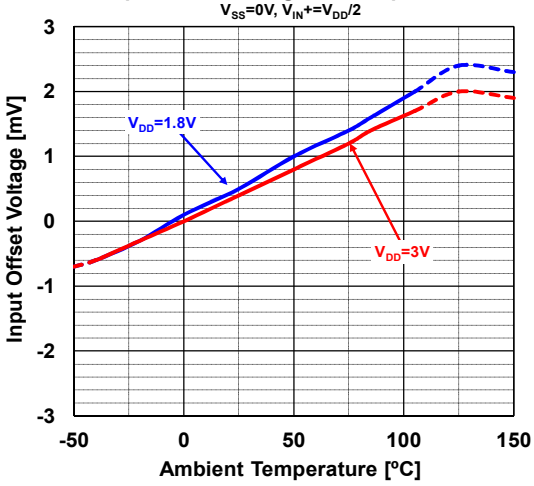
Operating Current vs. Operating Voltage
V_{SS}=0V, V_{IN}+=V_{DD}/2



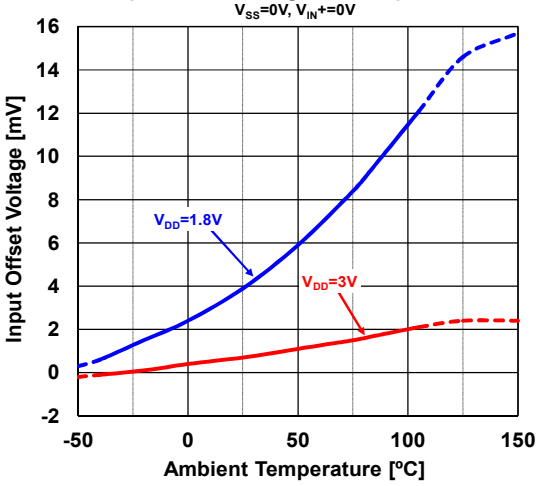
Operating Current vs. Temperature
V_{SS}=0V, V_{IN}+=V_{DD}/2



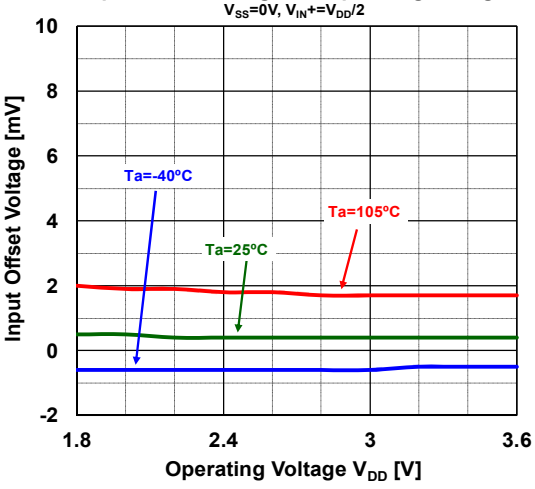
Input Offset Voltage vs. Temperature
V_{SS}=0V, V_{IN}+=V_{DD}/2



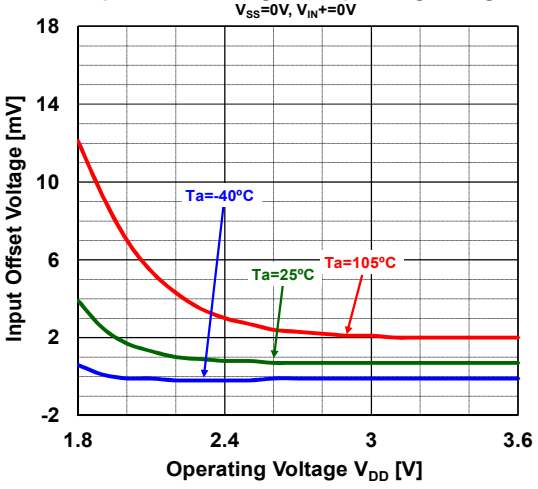
Input Offset Voltage vs. Temperature
V_{SS}=0V, V_{IN}+=0V



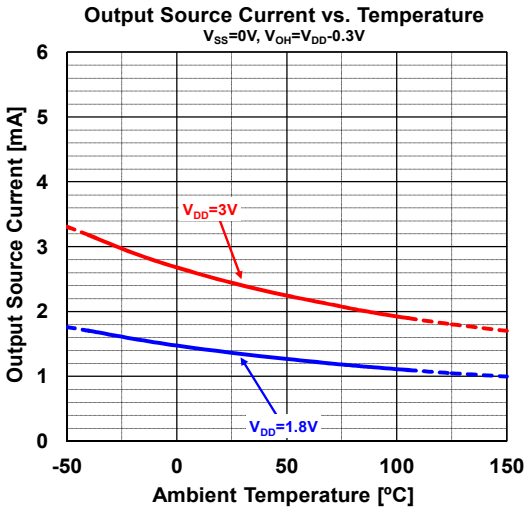
Input Offset Voltage vs. Operating Voltage
V_{SS}=0V, V_{IN}+=V_{DD}/2

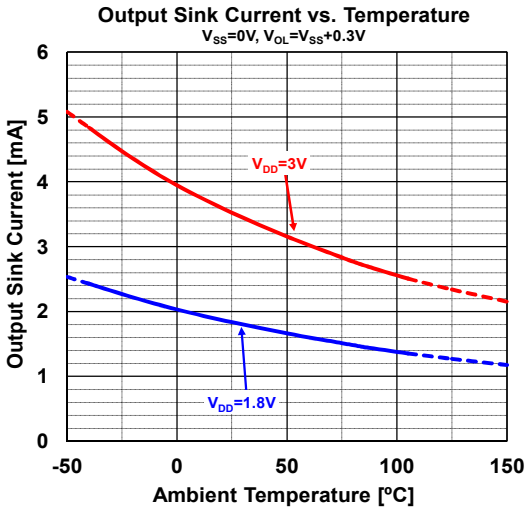


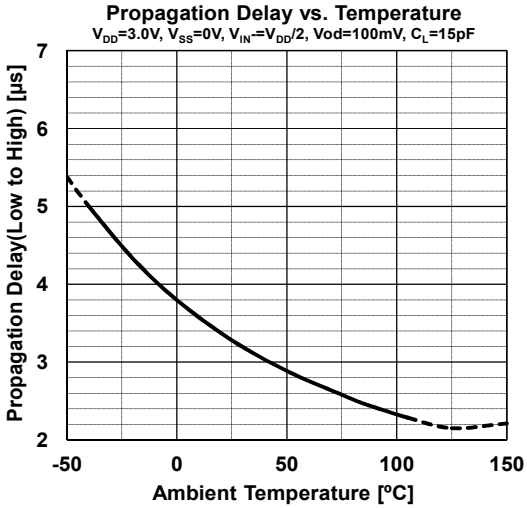
Input Offset Voltage vs. Operating Voltage
V_{SS}=0V, V_{IN}+=0V

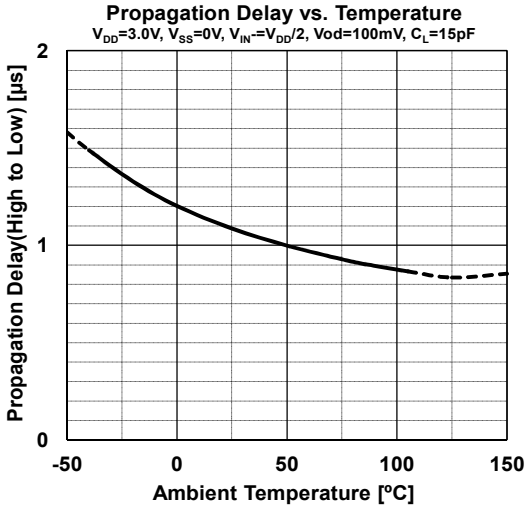


■ TYPICAL CHARACTERISTICS

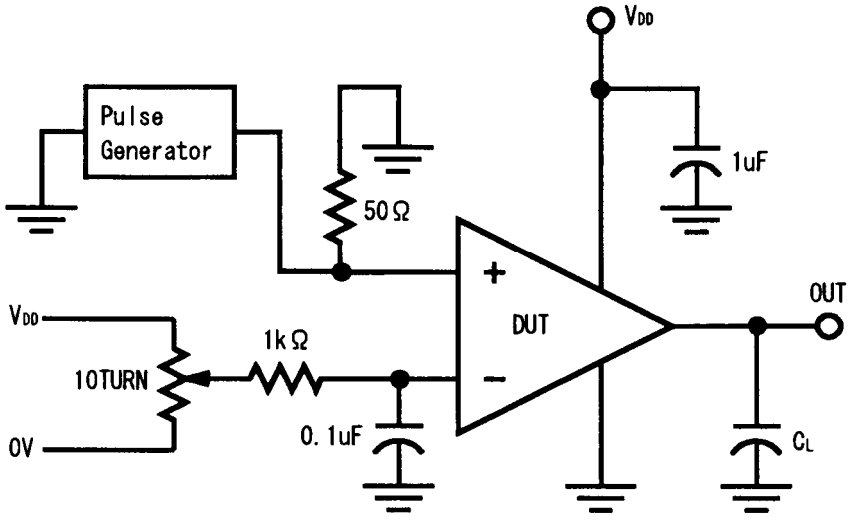




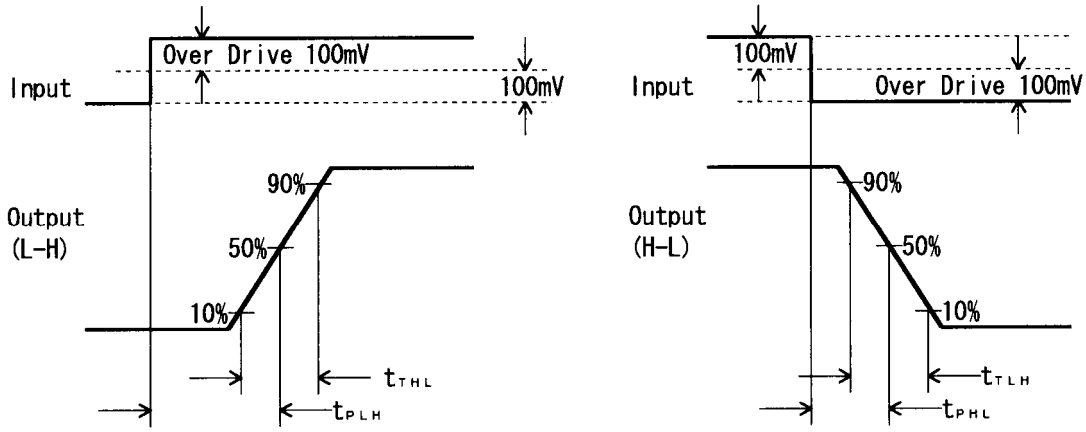




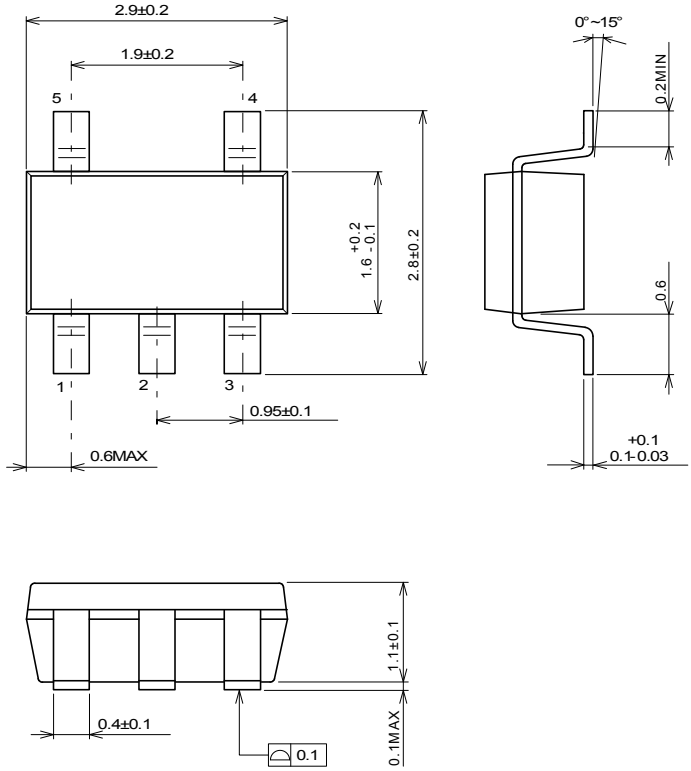
■ SWITCHING CHARACTERISTICS MEASUREMENT CIRCUIT



■ TIMING WAVEFORM



■ PACKAGE DIMENSIONS



Unit: mm

SOT-23-5 Package

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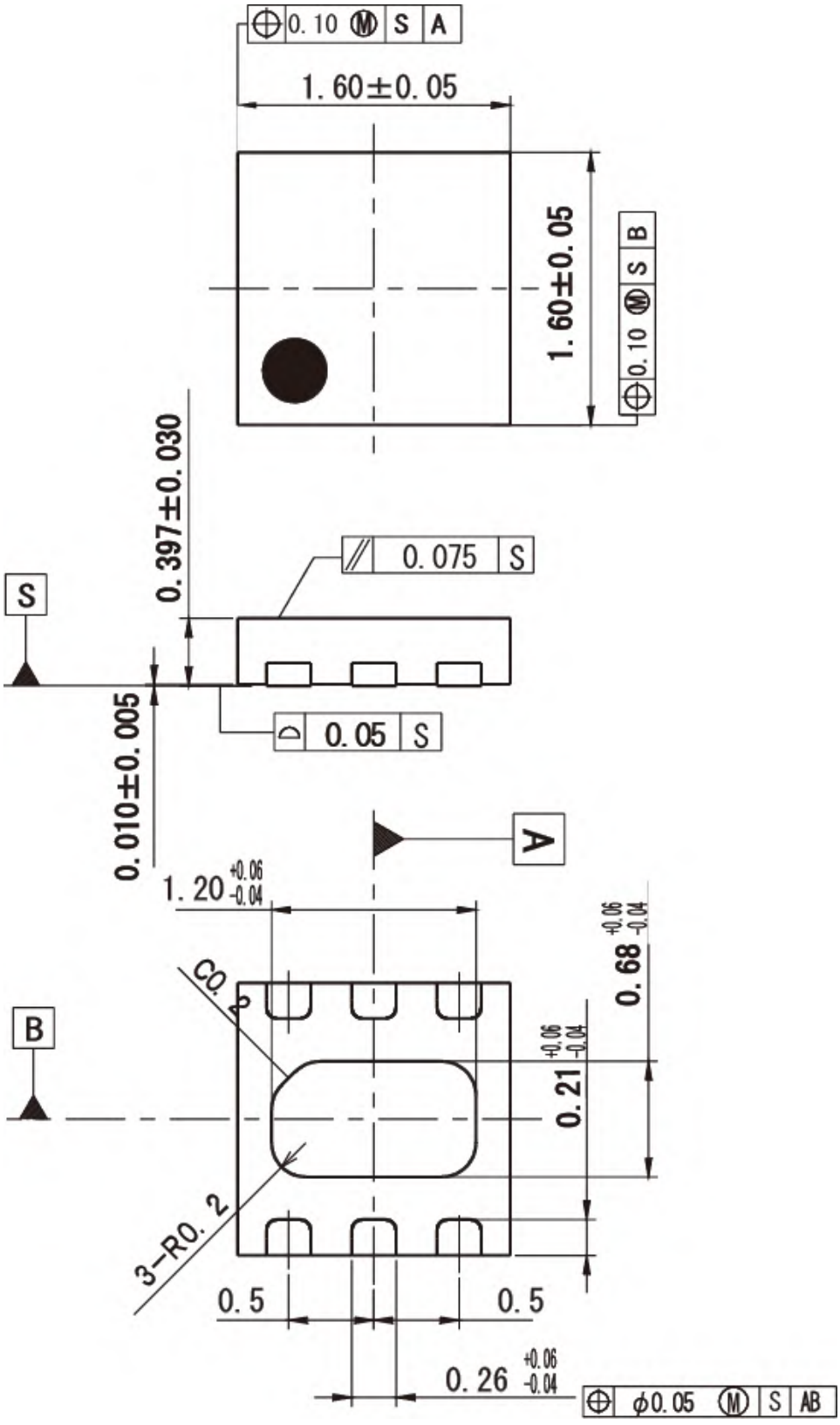

Unit: mm

DFN6-G1 Package

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