

SINGLE-SUPPLY DUAL COMPARATOR

■ GENERAL DESCRIPTION

The NJM2903C consist of two independent voltage comparators that are designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. The NJM2903C has a unique characteristic: the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

Application areas include limit comparators, simple analog-to-digital converters; pulse, square-wave and time delay generators; wide range V_{CO} ; MOS clock timers; multivibrators and high voltage digital logic gates. The NJM2903C were designed to directly interface with TTL and MOS. When operated from both plus and minus power supplies, the NJM2903C will directly interface with MOS logic where their low power drain is a distinct advantage over standard comparators.

■ PACKAGE OUTLINE



NJM2903CG
(SOP8)



NJM2903CM
(DMP8)



NJM2903CRB1
(MSOP8(TVSP8))



NJM2903CV
(SSOP8)

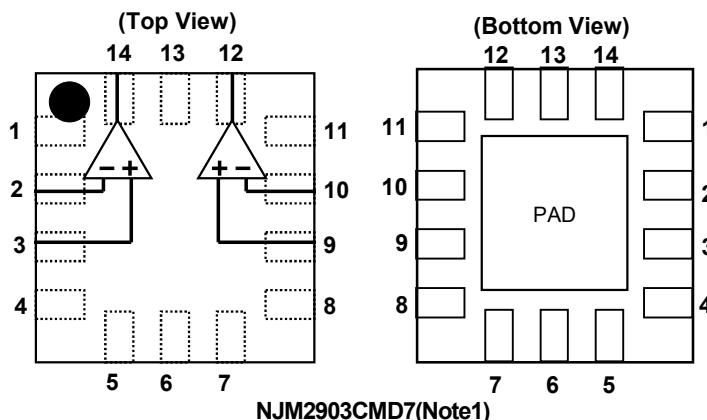
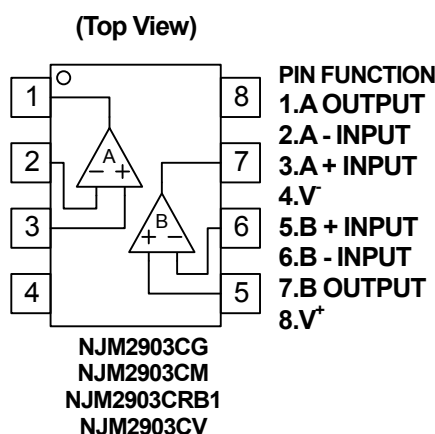


NJM2903CMD7
(EQFN14-D7)

■ FEATURES

- Operating Voltage +2V to +36V
 - Single Supply Operation
 - Open Collector Output
 - Package Outline SOP8,DMP8, SSOP8 ,EQFN14-D7, MSOP8 (TVSP8)*MEET JEDEC MO-187-DA/ THIN TYPE
 - Bipolar Technology
 - Internal ESD protection
 - Wide temperature range -40°C to +105°C
- Human body model (HBM) $\pm 2000V$ typ.

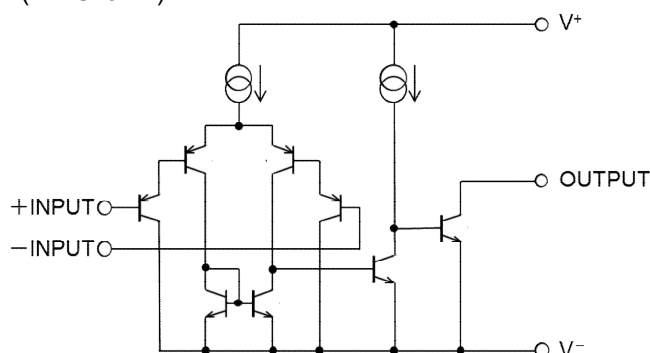
■ PIN CONFIGURATION



- PIN FUNCTION**
- 1. NC
 - 2. A -INPUT
 - 3. A +INPUT
 - 4. NC
 - 5. NC
 - 6. V^-
 - 7. NC
 - 8. NC
 - 9. B +INPUT
 - 10. B -INPUT
 - 11. NC
 - 12. B OUTPUT
 - 13. V^+
 - 14. A OUTPUT

(Note1) The NC pin and The PAD have to be wired as short as possible to connect with a V^- terminal.

■ EQUIVALENT CIRCUIT (1/2 Shown)



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NJM2903C

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	+36	V
Differential Input Voltage (Note2)	V_{ID}	±36	V
Input Voltage (Note3)	V_{IN}	$V^- - 0.3$ to $V^+ + 36$	V
Output Terminal Input Voltage (Note4)	V_O	$V^- - 0.3$ to $V^+ + 36$	V
Power Dissipation	P_D	SOP : 690 (Note5) 1000 (Note6) DMP : 470 (Note5) 600 (Note6) MSOP : 510 (Note5) 680 (Note6) SSOP : 430 (Note5) 540 (Note6) EQFN : 440 (Note5) 770 (Note6)	mW
Operating Temperature Range	T_{opr}	-40 to +105	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

(Note2) Differential voltage is the voltage difference between +INPUT and -INPUT.

(Note3) Input voltage is the voltage should be allowed to apply to the input terminal independent of the magnitude of V^+

(Note4) Output voltage is the voltage should be allowed to apply to the output terminal independent of the magnitude of V^+ .

(Note5) EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 2layers, FR-4) mounting

(Note6) EIA/JEDEC STANDARD Test board (76.2 x 114.3 x 1.6mm, 4layers, FR-4) mounting

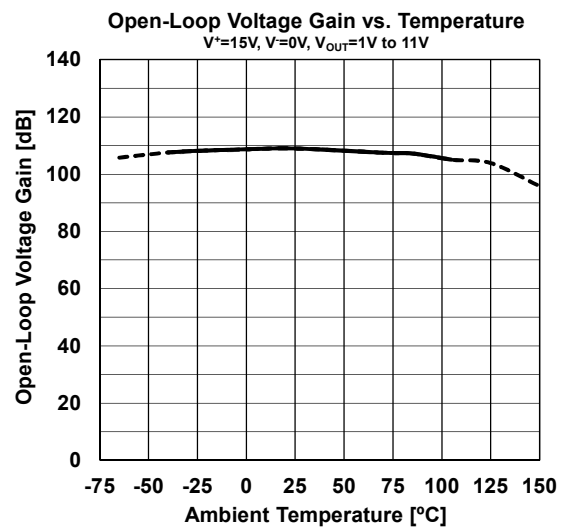
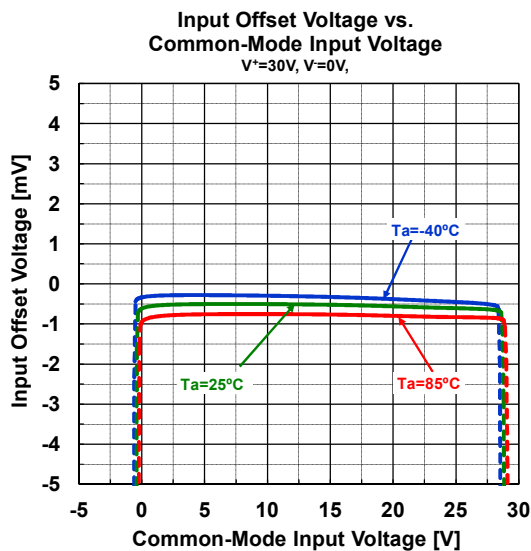
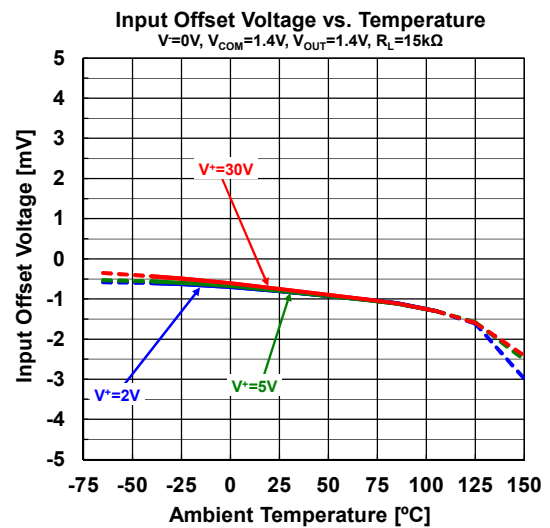
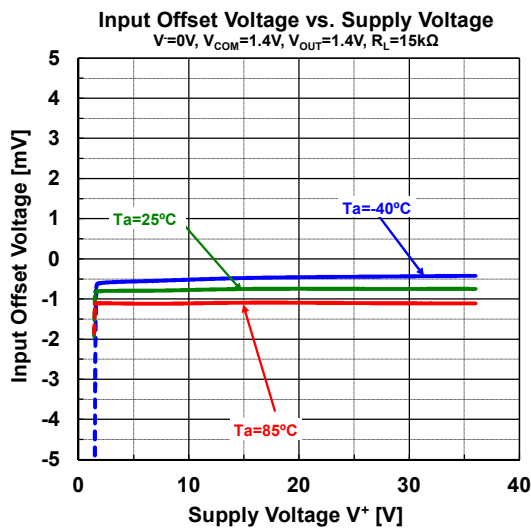
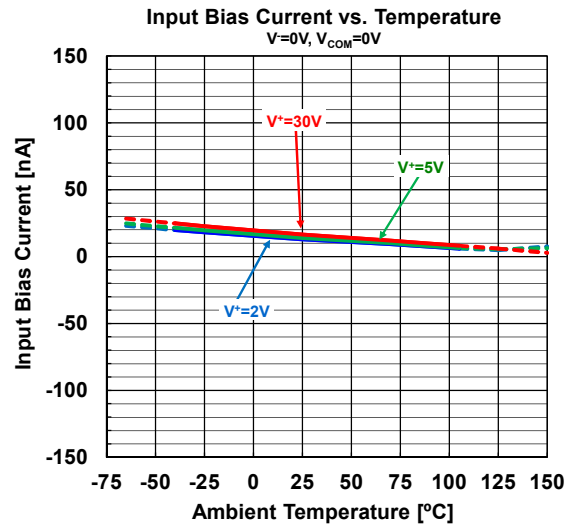
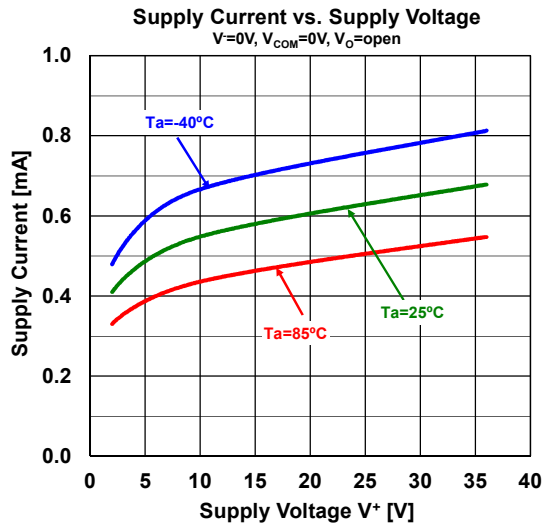
(Note7) The PAD of EQFN package is electronically connected to the backside of the die. but, This PAD cannot be used as V^- pin.

■ ELECTRICAL CHARACTERISTICS

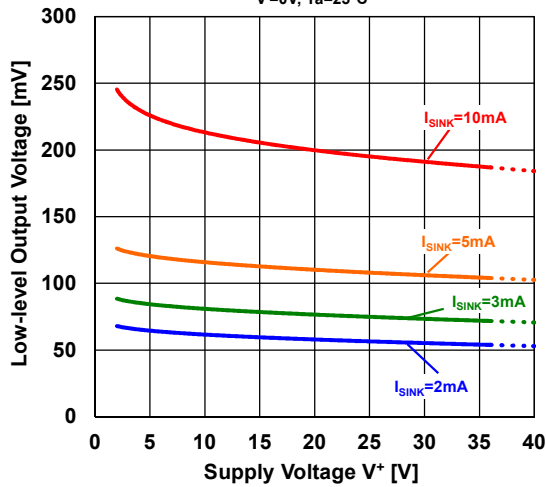
($V^+ = 5V, V^- = 0V, T_a = 25^\circ C$ unless otherwise noted.)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input Offset Voltage	V_{IO}	$R_S = 0\Omega, V_O = 1.4V$	-	0.5	5	mV
Input Offset Current	I_{IO}		-	0.5	50	nA
Input Bias Current	I_B		-	20	250	nA
Large Signal Voltage Gain	A_V	$V^+ = 15V, R_L = 15k\Omega, V_O = 1V$ to 11V	94	106	-	dB
Common Mode Input Voltage Range	V_{ICM}		0	-	3.5	V
Supply Current (all comparators)	I_{SUPPLY}	no load	-	0.45	1	mA
		$V^+ = +30V$, no load	-	0.6	2.5	
Low-level Output Voltage	V_{OL}	$V_{IN+} = 0V, V_{IN-} = 1V, I_{SINK} = 4mA$	-	80	400	mV
Output Leakage Current	I_{LEAK}	$V^+ = V_O = 30V, V_{IN+} = 1V, V_{IN-} = 0V$	-	-	1	uA
Output Sink Current	I_{SINK}	$V_{IN+} = 0V, V_{IN-} = 1V, V_O = 1.5V$	6	16	-	mA
Response Time	t_{re}	$R_L = 5.1k\Omega$ to V^+	-	1.3	-	μs
Large Signal Response Time	t_{rel}	$R_L = 5.1k\Omega$ to V^+ , $V_{ref} = +1.4V$, TTL input	-	250	-	ns

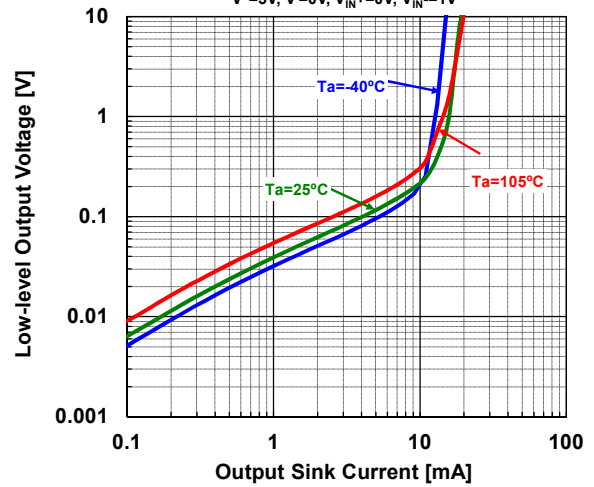
TYPICAL CHARACTERISTICS



Low-level Output Voltage vs. Supply Voltage
 $V^*=0V$, $T_a=25^\circ C$

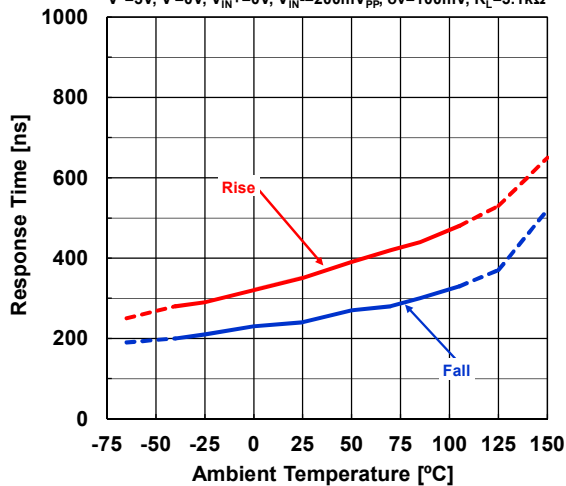


Low-level Output Voltage vs. Output Sink Current
 $V^*=5V$, $V=0V$, $V_{IN+}=0V$, $V_{IN-}=1V$



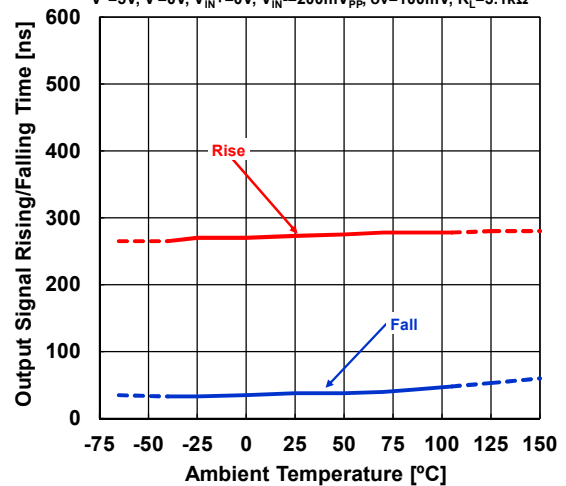
Response Time vs. Temperature

$V^*=5V$, $V=0V$, $V_{IN+}=0V$, $V_{IN-}=200mV_{pp}$, $ov=100mV$, $R_L=5.1k\Omega$



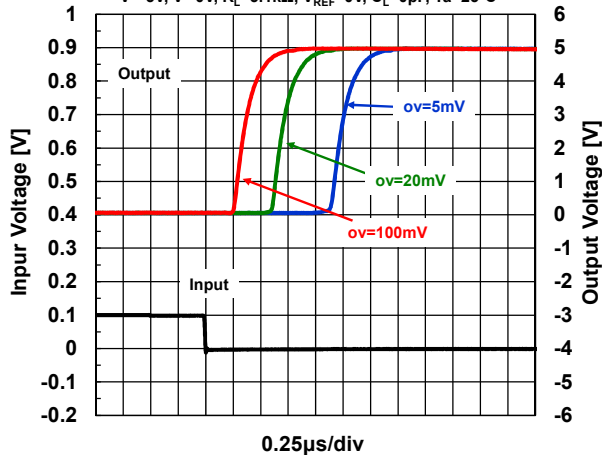
Output Signal Rising/Falling Time vs. Temperature

$V^*=5V$, $V=0V$, $V_{IN+}=0V$, $V_{IN-}=200mV_{pp}$, $ov=100mV$, $R_L=5.1k\Omega$



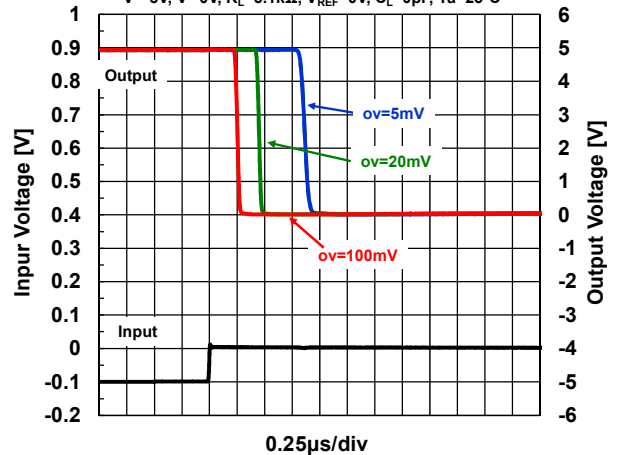
Response Time

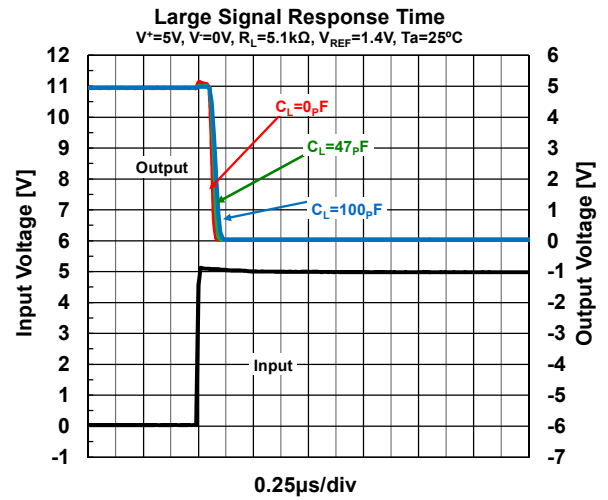
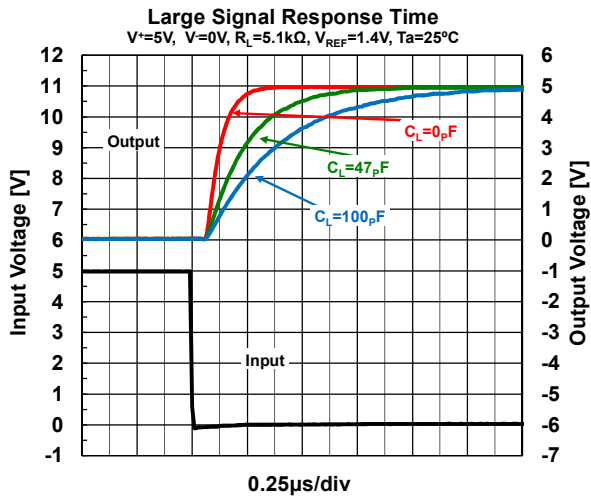
$V^*=5V$, $V=0V$, $R_L=5.1k\Omega$, $V_{REF}=0V$, $C_L=0pF$, $T_a=25^\circ C$



Response Time

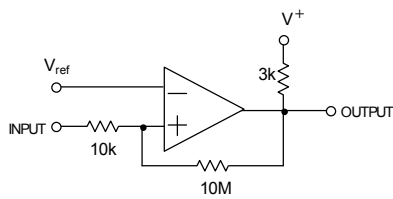
$V^*=5V$, $V=0V$, $R_L=5.1k\Omega$, $V_{REF}=0V$, $C_L=0pF$, $T_a=25^\circ C$



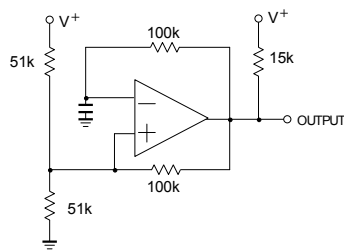


■ TYPICAL APPLICATIONS

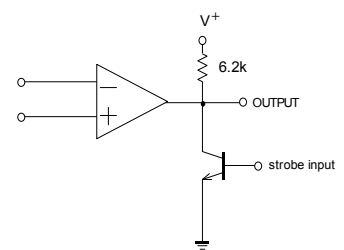
Comparator With Hysteresis



Pulse Generator

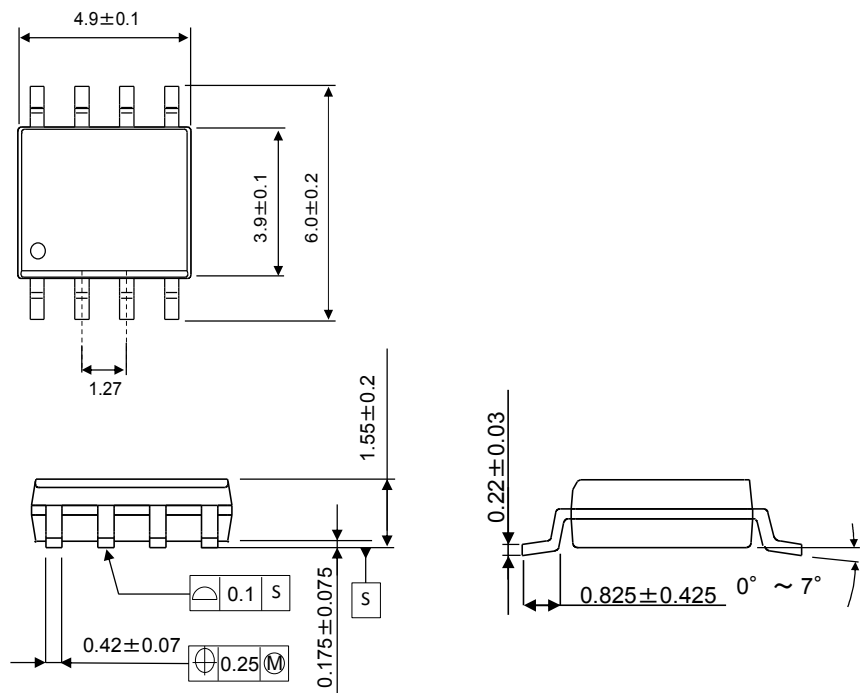


Output Strobing Circuit

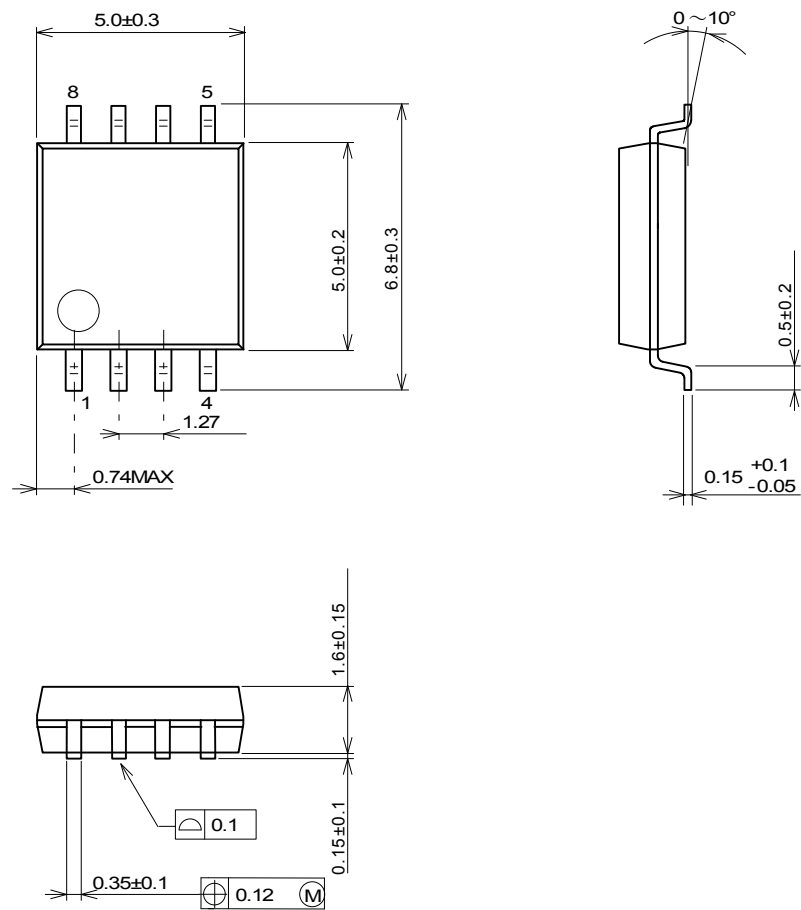


NJM2903C

■PACKAGE OUTLINE UNIT : mm
SOP8



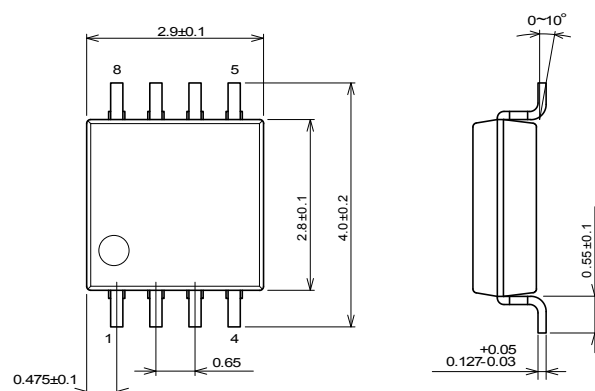
DMP8



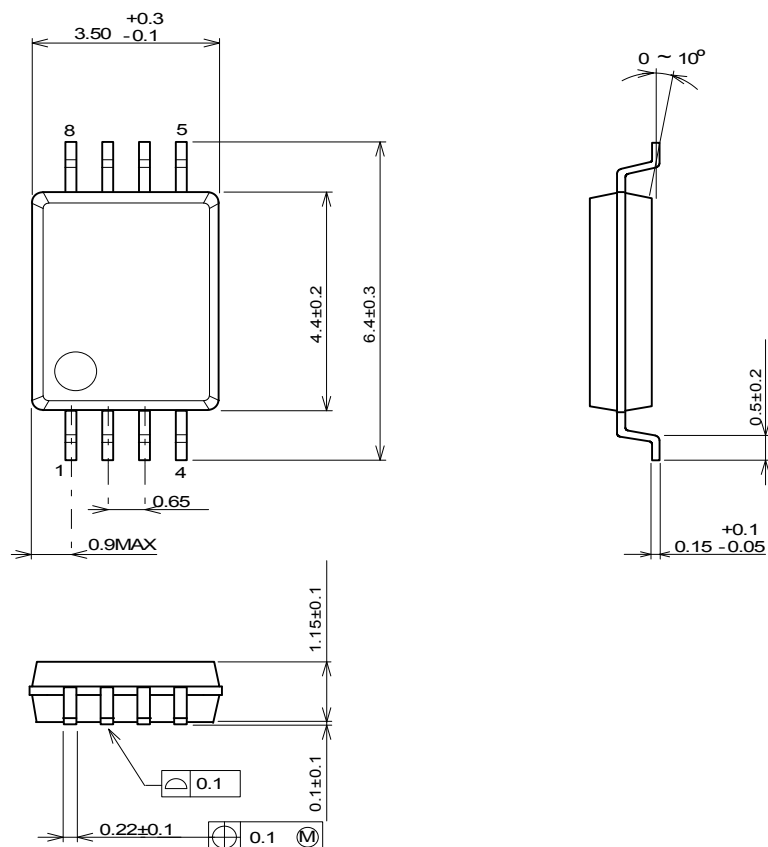
■PACKAGE OUTLINE UNIT : mm

MSOP8 (TVSP8)*

*MEET JEDEC MO-187-DA/ THIN TYPE

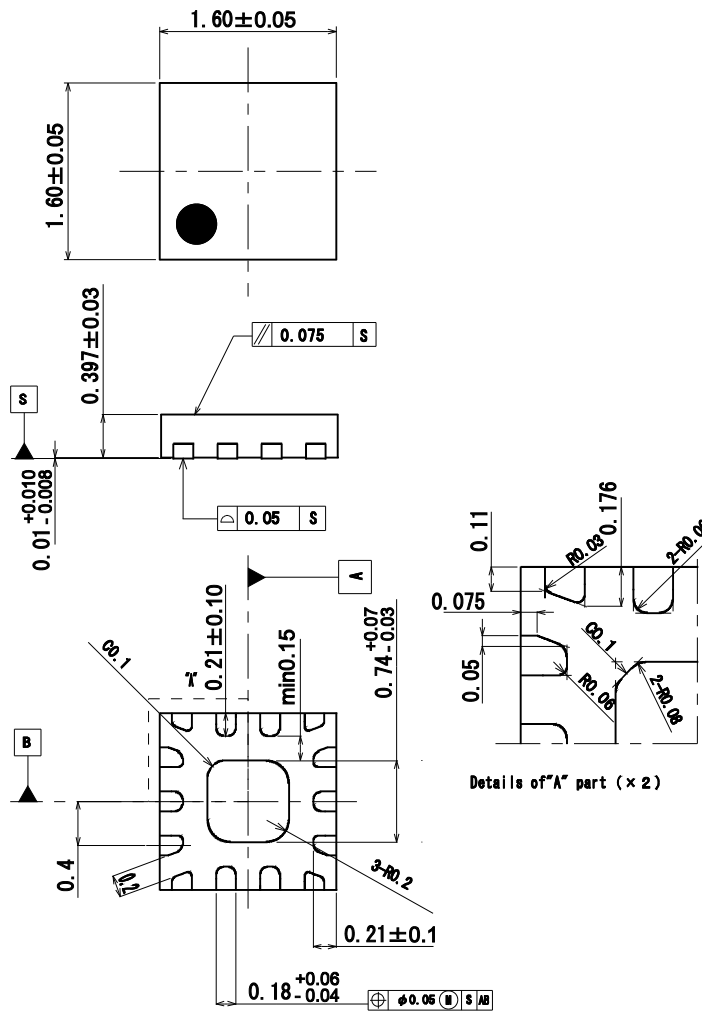


SSOP8



NJM2903C

■PACKAGE OUTLINE UNIT : mm EQFN14-D7



[CAUTION]

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