

## LOW POWER SUPER SMALL-SIZED SINGLE C-MOS COMPARATOR

### ■GENERAL DESCRIPTION

The **NJU7119** is super small-sized package single C-MOS comparator with open drain output.

The operating voltage is from 1.8V to 5.5V. The output can drive TTL, C-MOS and various voltage levels.

The input offset voltage is lower than 7mV and the package is super small-sized SC88A. The **NJU7119** is suitable for battery use items and other portable items.

### ■PACKAGE INFORMATION



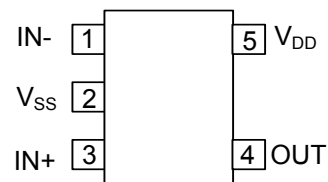
NJU7119F3

### ■FEATURES

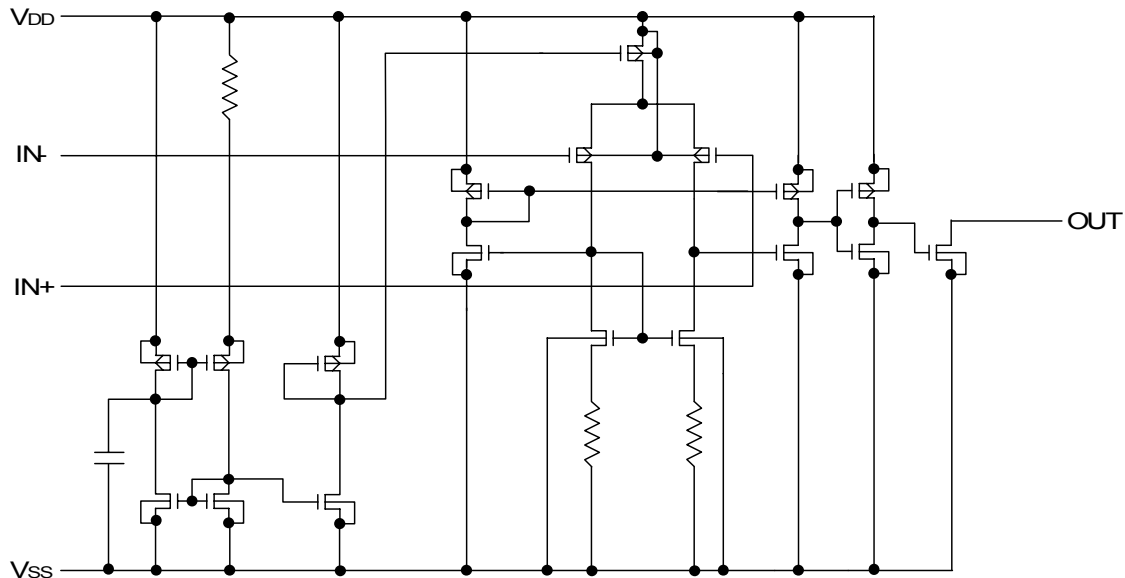
- Single Low Power Supply  $V_{DD}=1.8\sim 5.5V$
- Low Offset Voltage  $V_{IO}=7mV$  (max.)
- Low Operating Current  $I_{DD}=100\mu A$  (typ.)
- Propagation Delay ( $t_{PLH}/t_{PHL}$ ) 160/70ns (typ.)
- Output Signal Falling Time ( $t_{THL}$ ) 4ns (typ.)
- Open Drain Output
- Package Outline SC88A
- C-MOS Technology

### ■PIN CONFIGURATION

(Top View)



### ■EQUIVALENT CIRCUIT



## ■ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	$V_{DD}$	7.0	V
Differential Input Voltage	$V_{ID}$	±7.0 (Note1)	V
Common Mode Input Voltage	$V_{IC}$	-0.3~7.0	V
Power Dissipation	$P_D$	250 (Note3)	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 7.0V, the input voltage must not exceed the  $V_{DD}$  level though 7.0V is limit specified.

Note2) The output pull-up voltage must not over the  $V_{DD}$  level.

Note3) The power dissipation is value mounted on a glass epoxy board (FR-4) in size of 50x50x1.6 millimeters square.

Note4) Decoupling capacitor should be connected between  $V_{DD}$  and  $V_{SS}$  due to the stabilized operation for the circuit.

## ■RECOMMENDED OPERATING CONDITION

(Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{DD}$		1.8	-	5.5	V

## ■ELECTRICAL CHARACTERISTICS

### ●DC CHARACTERISTICS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	$V_{IO}$	$V_{IN}=V_{DD}/2$	-	-	7	mV
Input Offset Current	$I_{IO}$		-	1	-	pA
Input Bias Current	$I_{IB}$		-	1	-	pA
Input Common Mode Voltage Range	$V_{ICM}$		0~2.4	-	-	V
Low Level Output Voltage	$V_{OL}$	$I_{OL}=+5mA$	-	-	0.3	V
Operating Current	$I_{DD}$		-	100	200	μA

### ●TRANSIENT CHARACTERISTICS

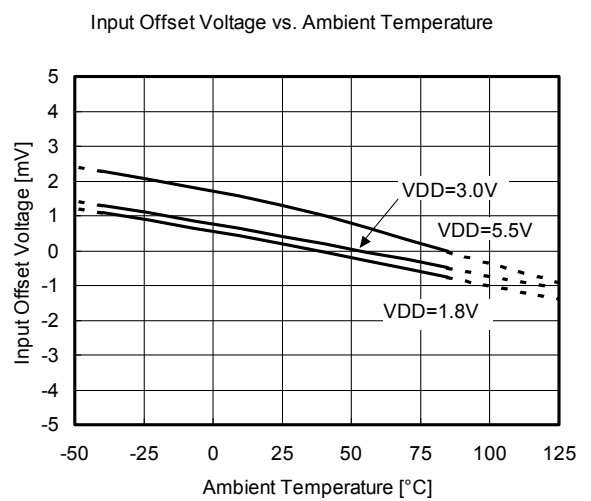
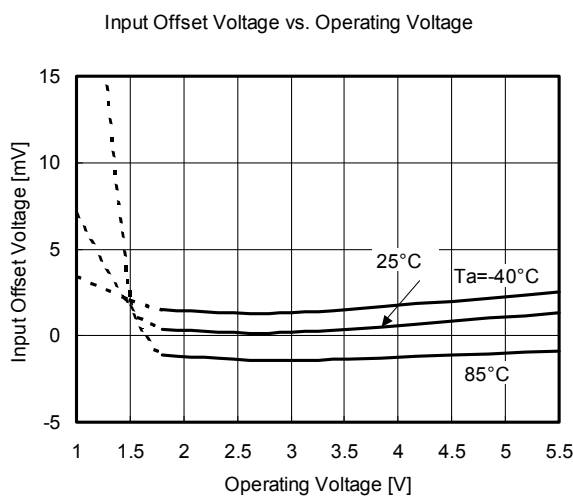
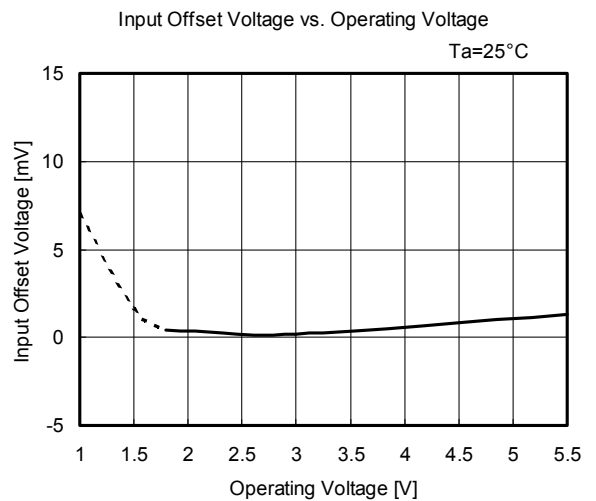
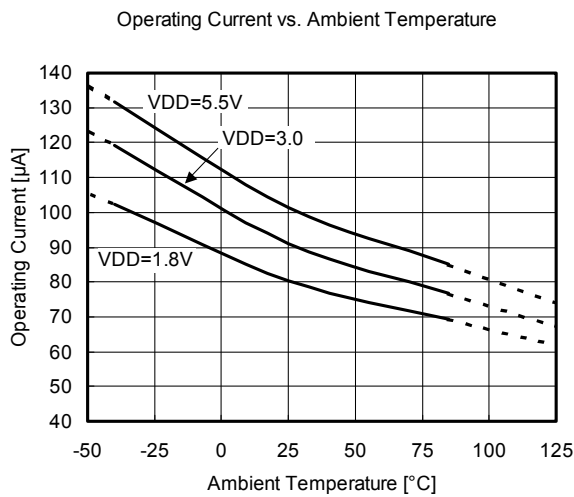
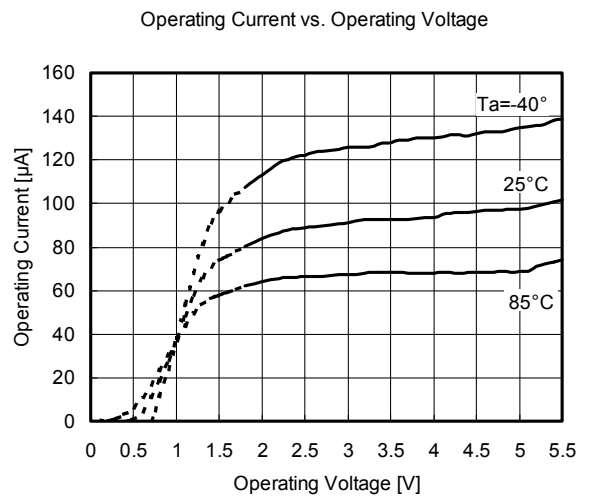
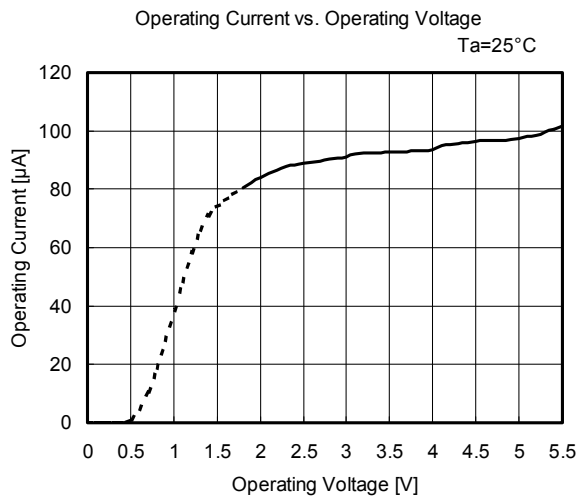
( $V_{DD}=3.0V, f=10kHz, C_L=15pF, Ta=25^\circ C$ )

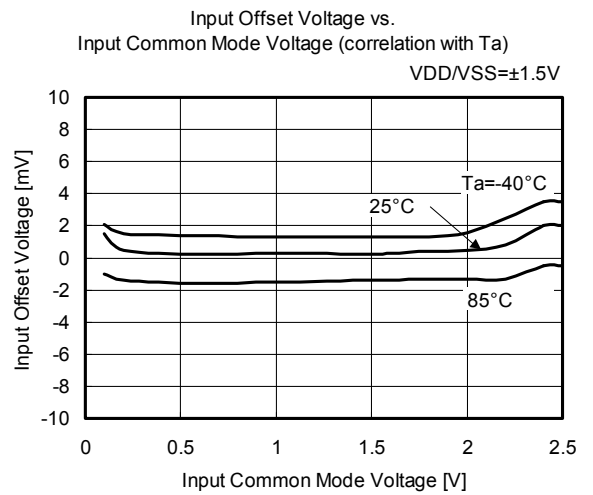
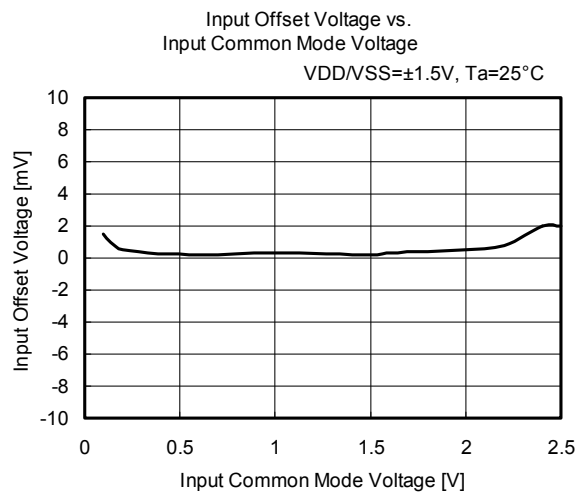
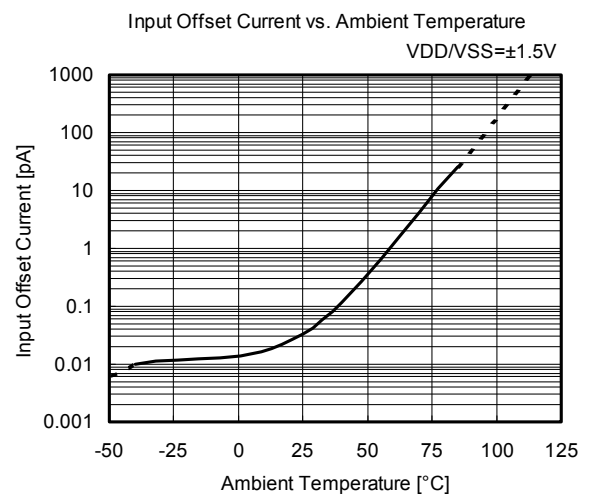
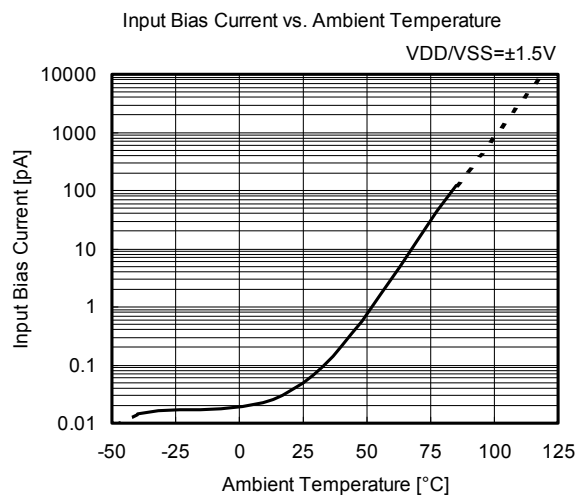
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay Low to High	$t_{PLH}$	Over Drive=100mV	-	160	-	ns
Propagation Delay High to Low	$t_{PHL}$	Over Drive=100mV	-	70	-	ns
Output Signal Falling Time	$t_{THL}$	Over Drive=100mV	-	4	-	ns

## ■ TERMINAL EQUIVALENT CIRCUIT

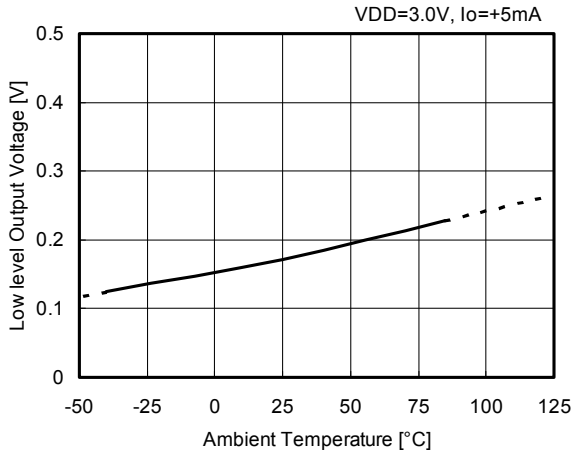
No.	Symbol	Equivalent Circuit	Typ. DC Voltage(V)	Function
1	IN-	<p>The diagram shows a differential pair of transistors. The input terminal is connected to the base of the left transistor through a resistor. The bases of both transistors are biased by a current source connected to <math>V_{DD}</math>. The emitters are connected to <math>V_{SS}</math> through resistors. Diodes are connected from the input terminal to <math>V_{DD}</math> and <math>V_{SS}</math> for protection.</p>	-	inverting input
3	IN+	<p>The diagram shows a differential pair of transistors. The input terminal is connected to the base of the right transistor through a resistor. The bases of both transistors are biased by a current source connected to <math>V_{DD}</math>. The emitters are connected to <math>V_{SS}</math> through resistors. Diodes are connected from the input terminal to <math>V_{DD}</math> and <math>V_{SS}</math> for protection.</p>	-	non-inverting input
4	OUT	<p>The diagram shows a single transistor with its emitter connected to <math>V_{SS}</math> and its base biased by a current source connected to <math>V_{DD}</math>. The output terminal is connected to the collector through a diode. Protection diodes are also connected from the output terminal to <math>V_{DD}</math> and <math>V_{SS}</math>.</p>	-	output

## TYPICAL CHARACTERISTICS

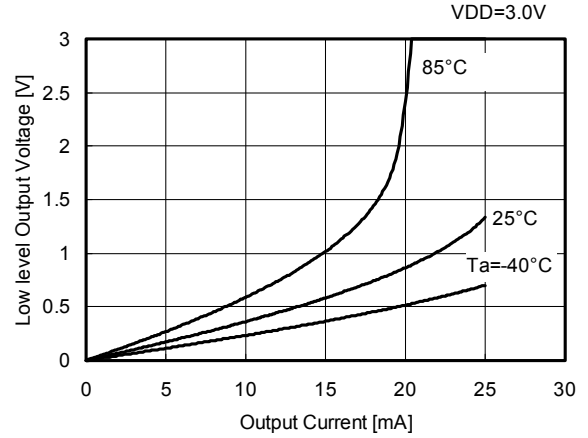




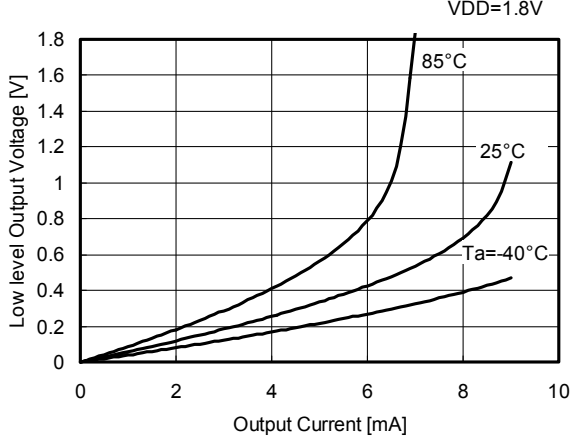
Low level Output Voltage vs. Ambient Temperature



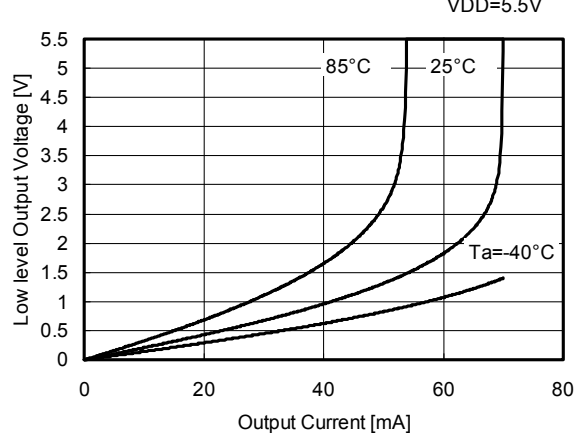
Low level Output Voltage vs. Output Current (correlation with T<sub>a</sub>)

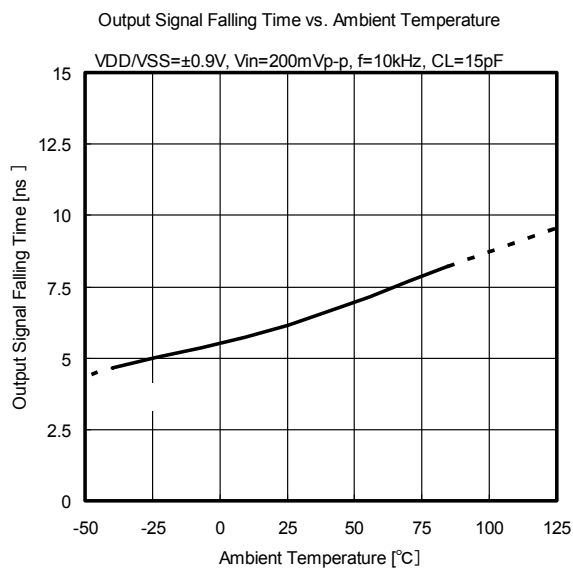
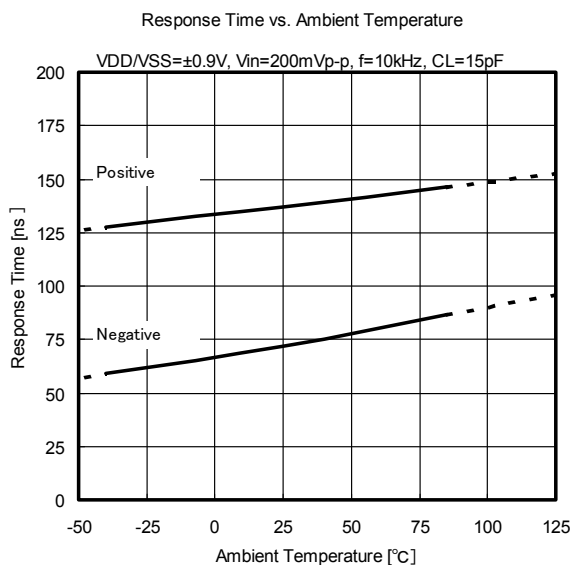
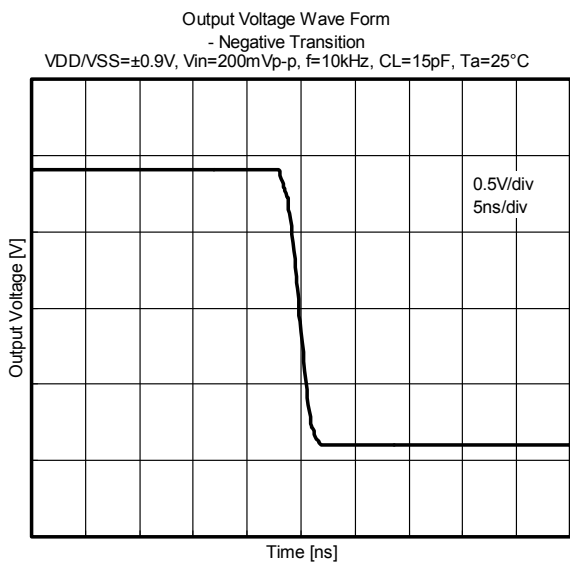
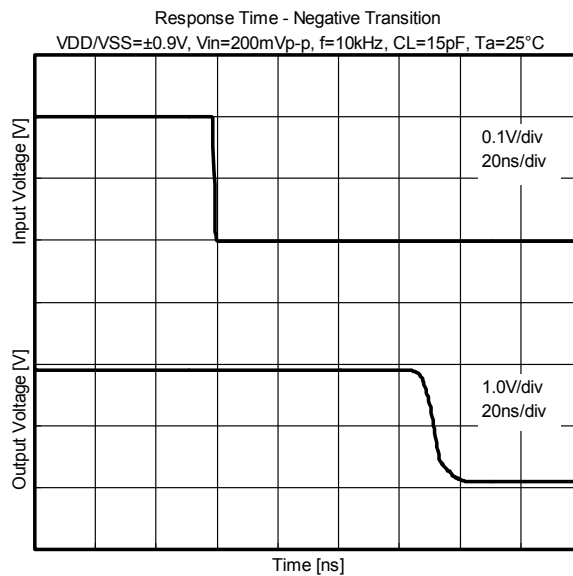
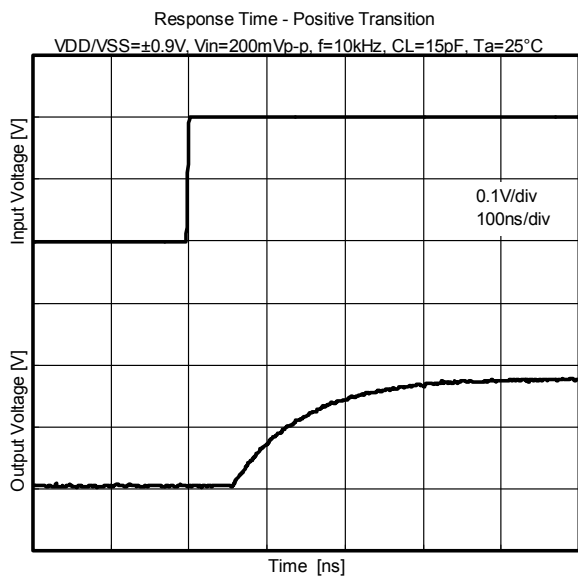


Low level Output Voltage vs. Output Current (correlation with T<sub>a</sub>)

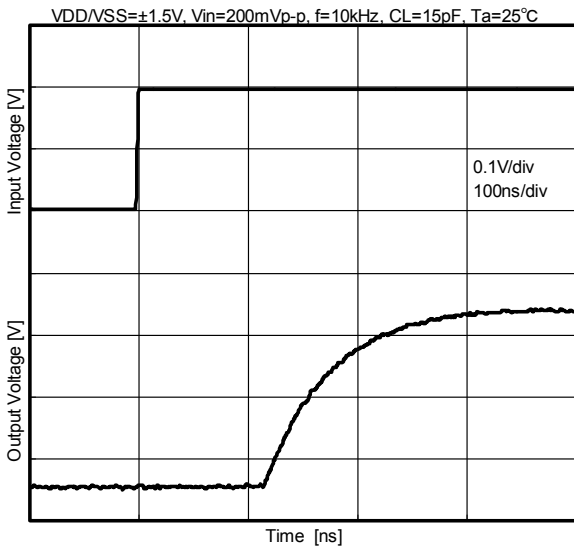


Low level Output Voltage vs. Output Current (correlation with T<sub>a</sub>)

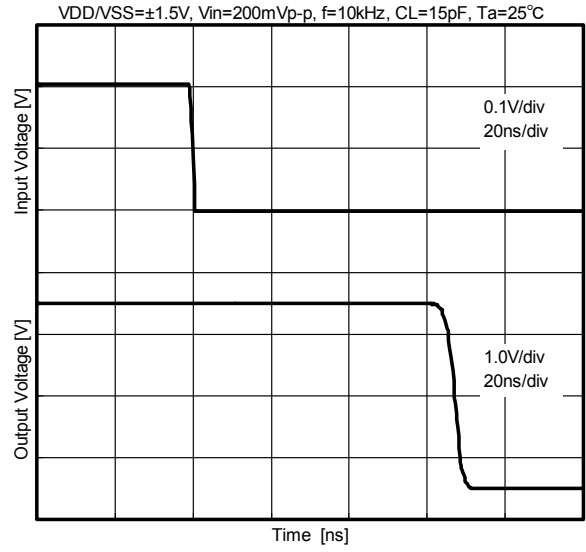




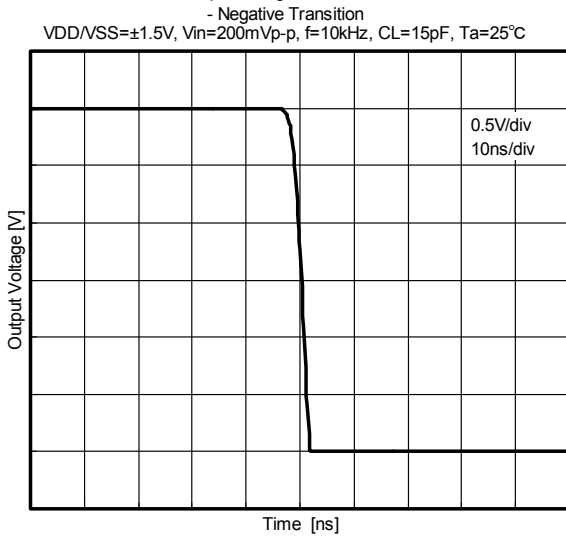
Response Time - Positive Transition



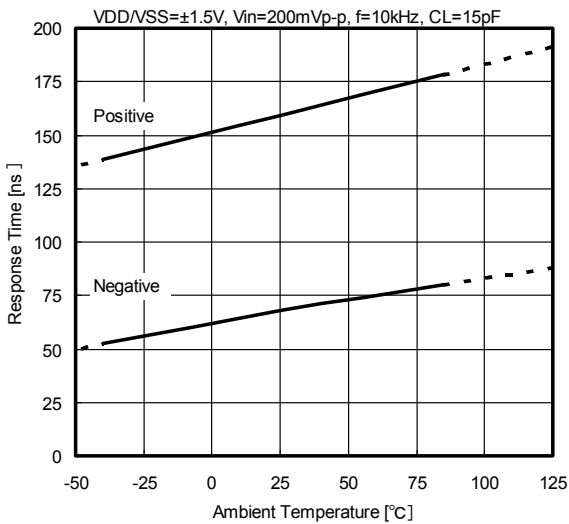
Response Time - Negative Transition



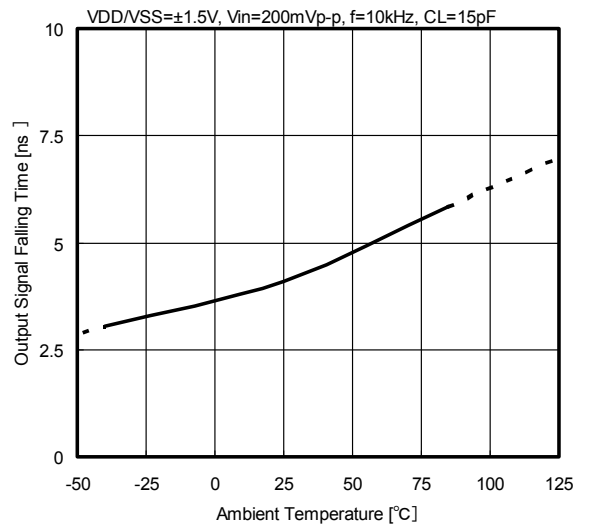
Output Voltage Wave Form



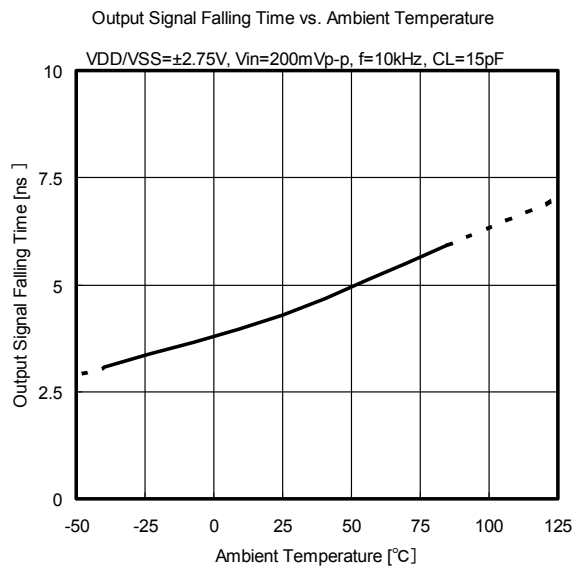
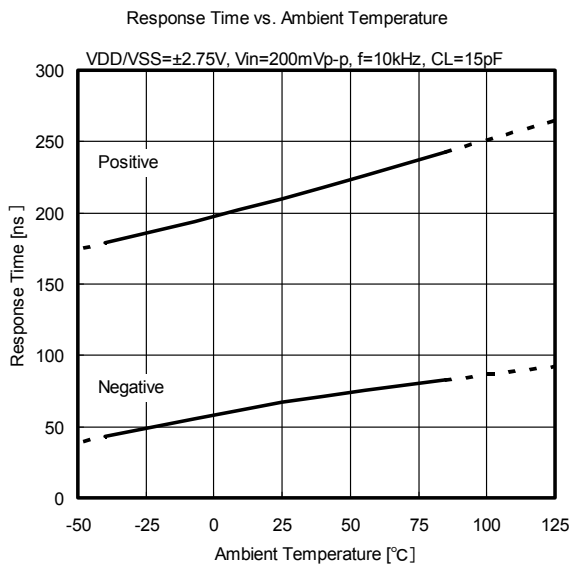
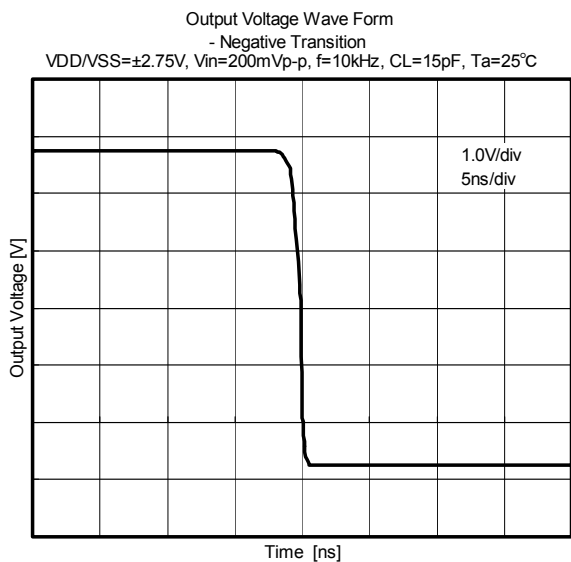
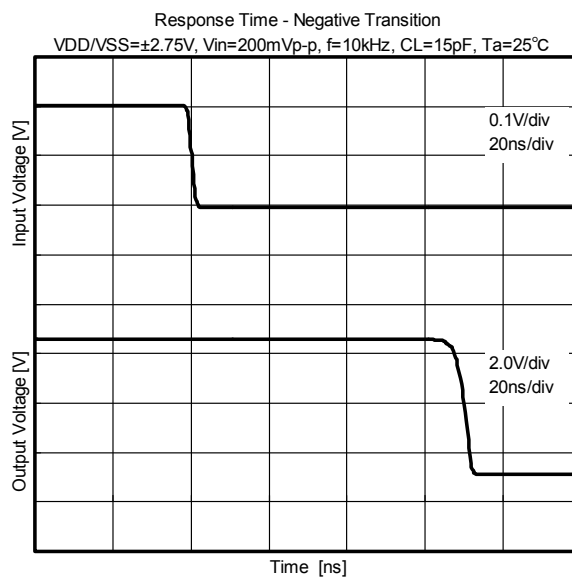
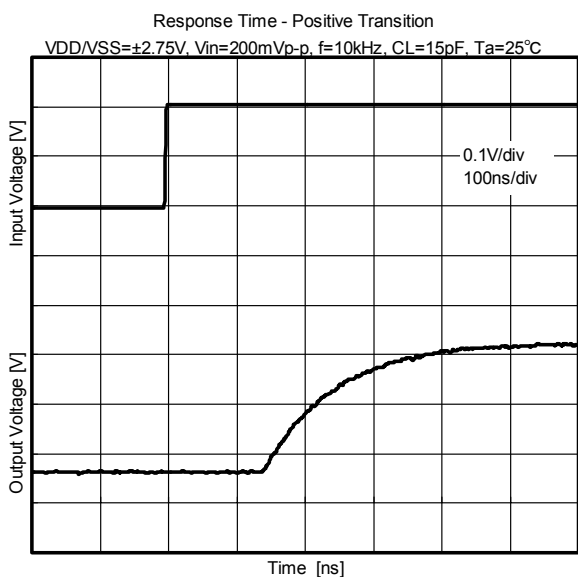
Response Time vs. Ambient Temperature

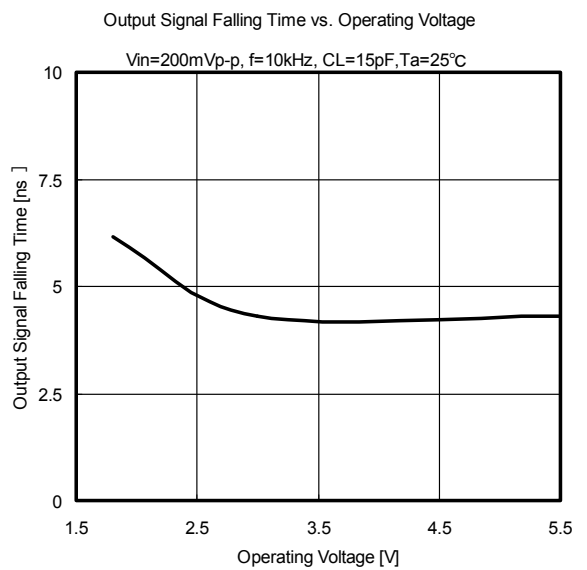
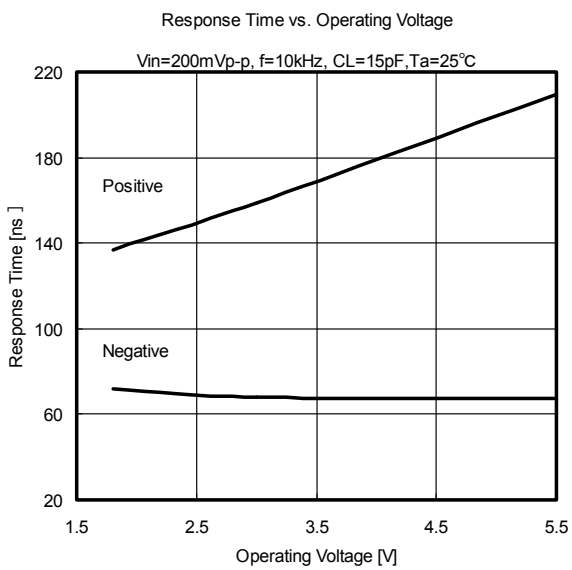


Output Signal Falling Time vs. Ambient Temperature

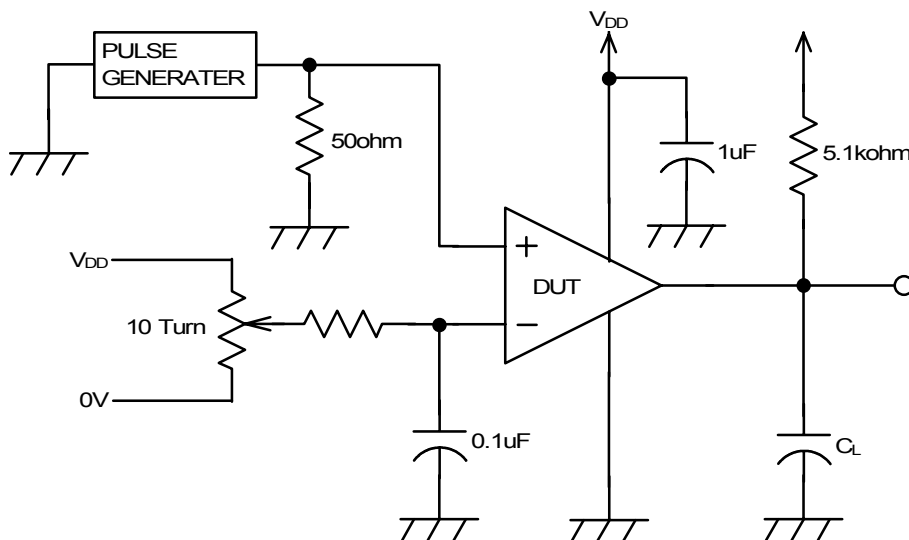








## SWITCHING CHARACTERISTICS MEASUREMENT CIRCUIT



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