

**J111    SST111**  
**J112    SST112**  
**J113    SST113**

## Product Summary

| Part Number | $V_{GS(off)}$ (V) | $r_{DS(on)}$ Max ( $\Omega$ ) | $I_{D(off)}$ Typ (pA) | $t_{ON}$ Typ (ns) |
|-------------|-------------------|-------------------------------|-----------------------|-------------------|
| J/SST111    | -3 to -10         | 30                            | 5                     | 4                 |
| J/SST112    | -1 to -5          | 50                            | 5                     | 4                 |
| J/SST113    | $\leq -3$         | 100                           | 5                     | 4                 |

J/SST111, For applications information see AN105, page 22.

## Features

- Low On-Resistance:  $111 < 30 \Omega$
- Fast Switching— $t_{ON}$ : 4 ns
- Low Leakage: 5 pA
- Low Capacitance: 3 pF
- Low Insertion Loss

## Benefits

- Low Error Voltage
- High-Speed Analog Circuit Performance
- Negligible “Off-Error,” Excellent Accuracy
- Good Frequency Response, Low Glitches
- Eliminates Additional Buffering

## Applications

- Analog Switches
- Choppers
- Sample-and-Hold
- Normally “On” Switches
- Current Limiters

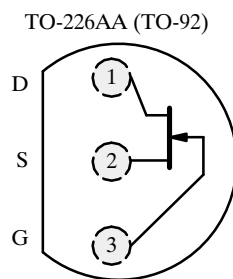
## Description

The J/SST111 series consists of all-purpose analog switches designed to support a wide range of applications. The J/SST113 are useful in a high-gain amplifier mode.

The J series, TO-226AA (TO-92) plastic package, provides low cost, while the SST series, TO236 (SOT-23) package,

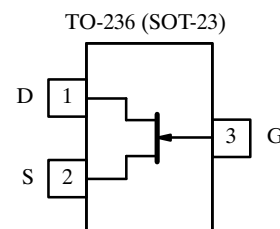
provides surface-mount capability. Both the J and SST series are available in tape-and-reel for automated assembly (see Packaging Information).

For similar products in TO-206AA(TO-18) packaging, see the 2N/PN/SST4391 series, 2N4856A/4857A/4858A, and 2N5564/5565/5566 (duals) data sheets.



Top View

J111  
J112  
J113



Top View

SST111 (C1)\*  
SST112 (C2)\*  
SST113 (C3)\*

\*Marking Code for TO-236

## Absolute Maximum Ratings

Gate-Drain, Gate-Source Voltage ..... -35 V  
 Gate Current ..... 50 mA  
 Lead Temperature ( $l_{16}$  from case for 10 seconds) ..... 300 °C  
 Storage Temperature ..... -55 to 150 °C  
 Operating Junction Temperature ..... -55 to 150 °C

Power Dissipation<sup>a</sup> (TO-236) ..... 350 mW  
 (TO-226AA) ..... 360 mW

### Notes

a. Derate 2.8 mW/°C above 25 °C

## Specifications<sup>a</sup>

| Parameter                                  | Symbol               | Test Conditions                                                           | Typ <sup>b</sup> | Limits   |     |          |     |          |     | Unit       |
|--------------------------------------------|----------------------|---------------------------------------------------------------------------|------------------|----------|-----|----------|-----|----------|-----|------------|
|                                            |                      |                                                                           |                  | J/SST111 |     | J/SST112 |     | J/SST113 |     |            |
|                                            |                      |                                                                           |                  | Min      | Max | Min      | Max | Min      | Max |            |
| Static                                     |                      |                                                                           |                  |          |     |          |     |          |     |            |
| Gate-Source Breakdown Voltage              | V <sub>(BR)GSS</sub> | I <sub>G</sub> = −1 μA , V <sub>DS</sub> = 0 V                            | −55              | −35      |     | −35      |     | −35      |     | V          |
| Gate-Source Cutoff Voltage                 | V <sub>GS(off)</sub> | V <sub>DS</sub> = 5 V, I <sub>D</sub> = 1 μA                              |                  | −3       | −10 | −1       | −5  |          | −3  |            |
| Saturation Drain Current <sup>c</sup>      | I <sub>DSS</sub>     | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V                             |                  | 20       |     | 5        |     | 2        |     | mA         |
| Gate Reverse Current                       | I <sub>GSS</sub>     | V <sub>GS</sub> = −15 V, V <sub>DS</sub> = 0 V                            | −0.005           |          | −1  |          | −1  |          | −1  | nA         |
|                                            |                      | T <sub>A</sub> = 125°C                                                    | −3               |          |     |          |     |          |     |            |
| Gate Operating Current                     | I <sub>G</sub>       | V <sub>DG</sub> = 15 V, I <sub>D</sub> = 10 mA                            | −5               |          |     |          |     |          |     | pA         |
| Drain Cutoff Current                       | I <sub>D(off)</sub>  | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = −10 V                            | 0.005            |          | 1   |          | 1   |          | 1   | nA         |
|                                            |                      | T <sub>A</sub> = 125°C                                                    | 3                |          |     |          |     |          |     |            |
| Drain-Source On-Resistance                 | r <sub>DS(on)</sub>  | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 0.1 V                            |                  |          | 30  |          | 50  |          | 100 | Ω          |
| Gate-Source Forward Voltage                | V <sub>GS(F)</sub>   | I <sub>G</sub> = 1 mA , V <sub>DS</sub> = 0 V                             | 0.7              |          |     |          |     |          |     | V          |
| Dynamic                                    |                      |                                                                           |                  |          |     |          |     |          |     |            |
| Common-Source Forward Transconductance     | g <sub>fs</sub>      | V <sub>DS</sub> = 20 V, I <sub>D</sub> = 1 mA<br>f = 1 kHz                | 6                |          |     |          |     |          |     | mS         |
| Common-Source Output Conductance           | g <sub>os</sub>      |                                                                           | 25               |          |     |          |     |          |     | μS         |
| Drain-Source On-Resistance                 | r <sub>ds(on)</sub>  | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 0 mA , f = 1 kHz                  |                  |          | 30  |          | 50  |          | 100 | Ω          |
| Common-Source Input Capacitance            | C <sub>iss</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = −10 V<br>f = 1 MHz               | 7                |          | 12  |          | 12  |          | 12  | pF         |
| Common-Source Reverse Transfer Capacitance | C <sub>rss</sub>     |                                                                           | 3                |          | 5   |          | 5   |          | 5   |            |
| Equivalent Input Noise Voltage             | e <sub>n</sub>       | V <sub>DG</sub> = 10 V, I <sub>D</sub> = 1 mA<br>f = 1 kHz                | 3                |          |     |          |     |          |     | nV/<br>√Hz |
| Switching                                  |                      |                                                                           |                  |          |     |          |     |          |     |            |
| Turn-On Time                               | t <sub>d(on)</sub>   | V <sub>DD</sub> = 10 V, V <sub>GS(H)</sub> = 0 V<br>See Switching Circuit | 2                |          |     |          |     |          |     | ns         |
|                                            | t <sub>r</sub>       |                                                                           | 2                |          |     |          |     |          |     |            |
| Turn-Off Time                              | t <sub>d(off)</sub>  |                                                                           | 6                |          |     |          |     |          |     |            |
|                                            | t <sub>f</sub>       |                                                                           | 15               |          |     |          |     |          |     |            |

### Notes

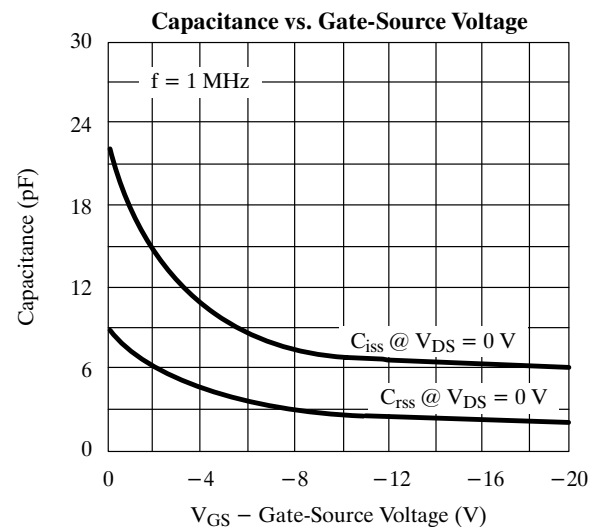
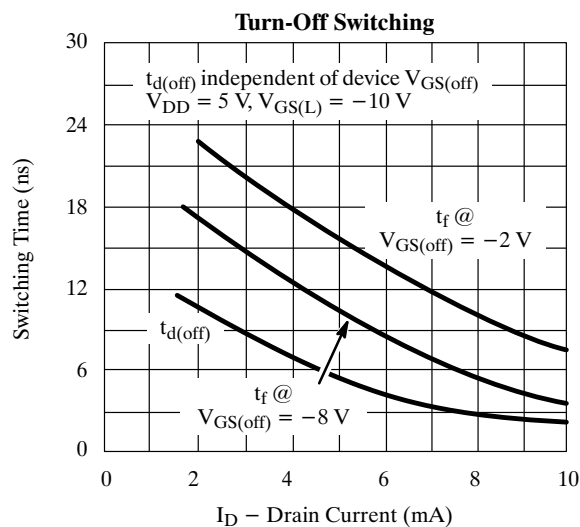
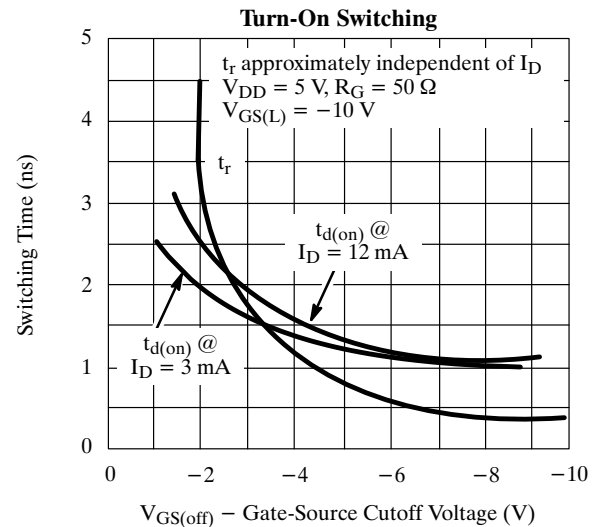
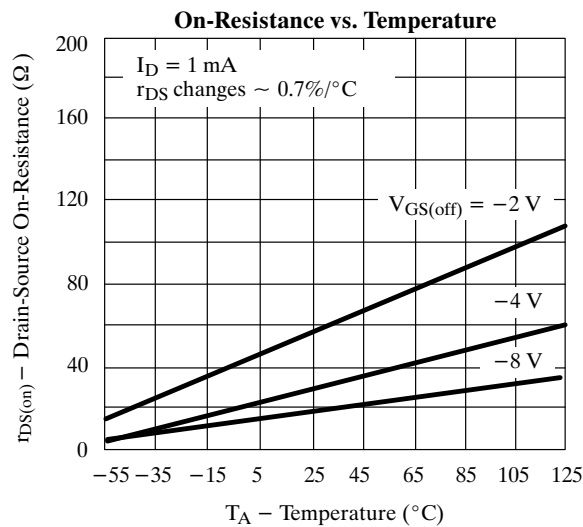
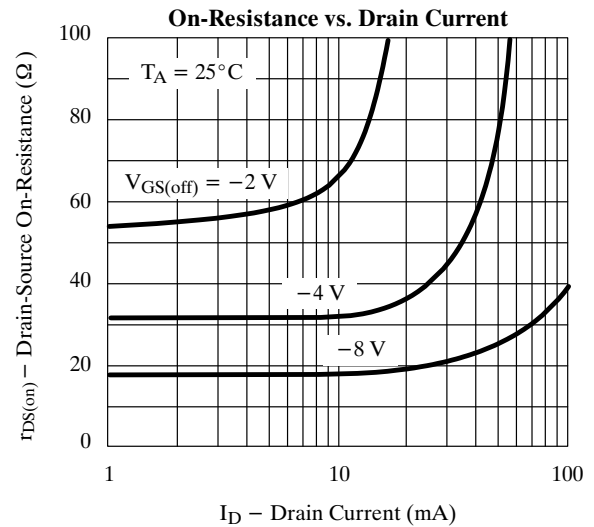
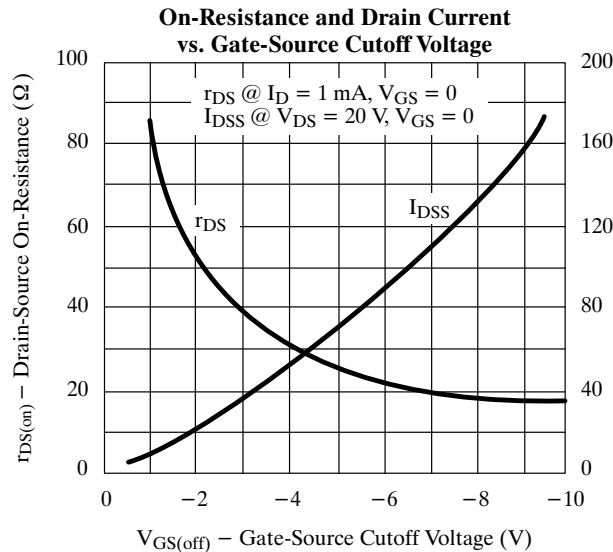
a.  $T_A = 25^\circ C$  unless otherwise noted.

b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

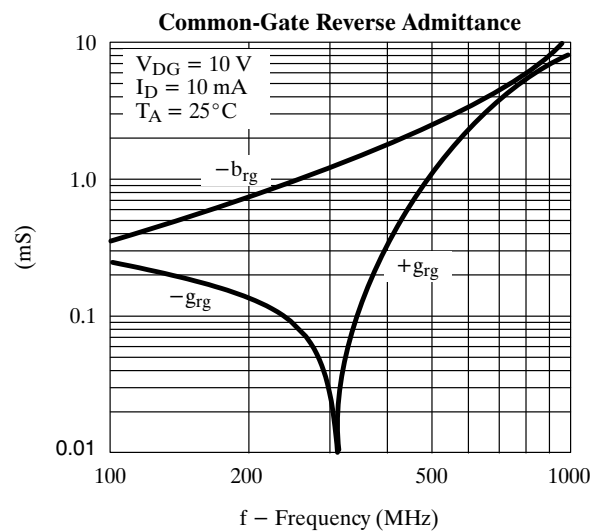
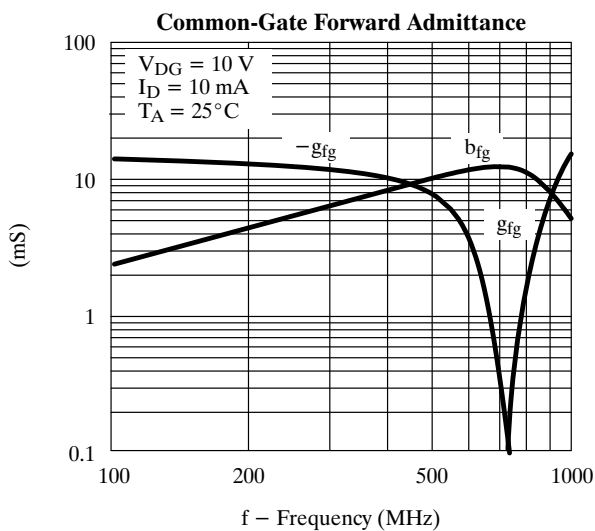
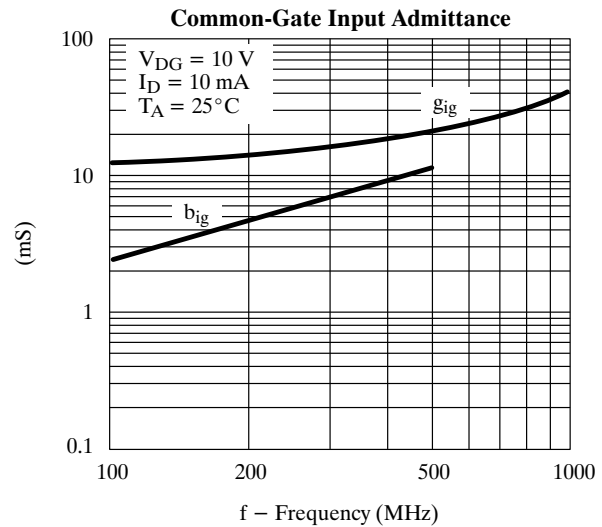
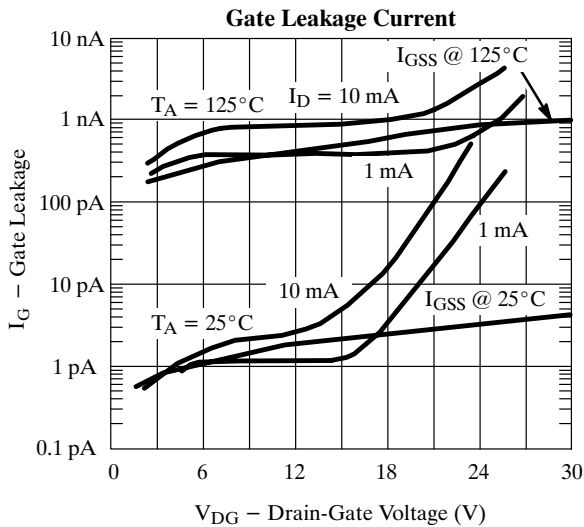
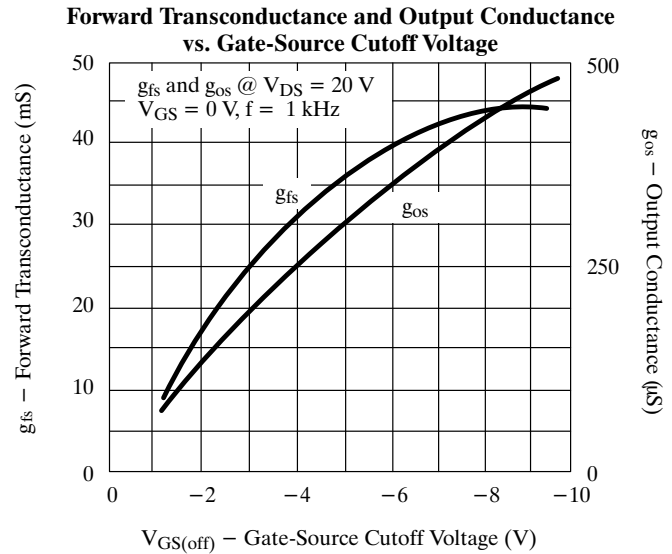
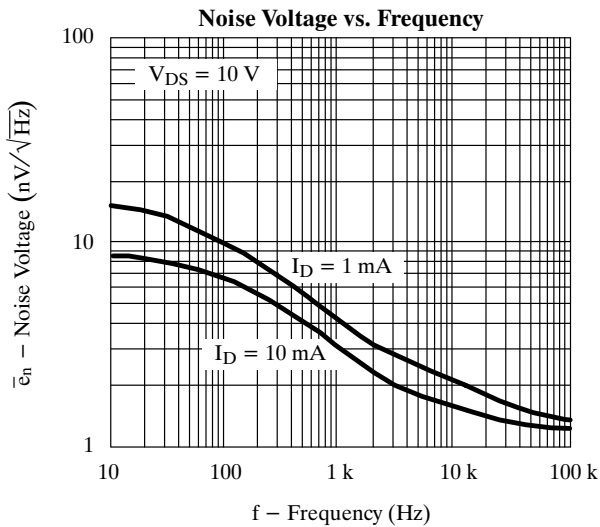
c. Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 3\%$ .

NCB

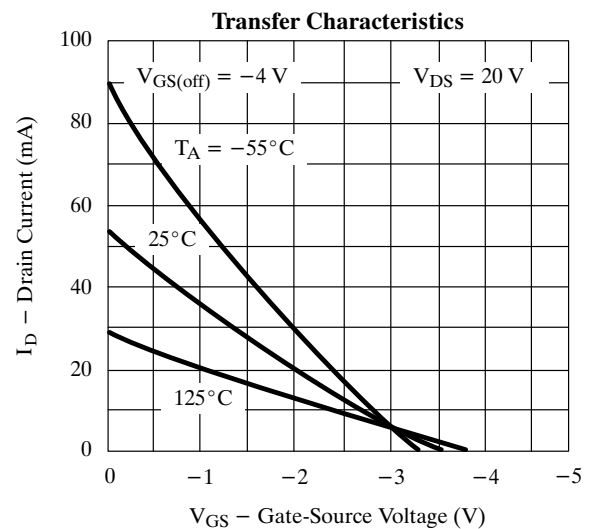
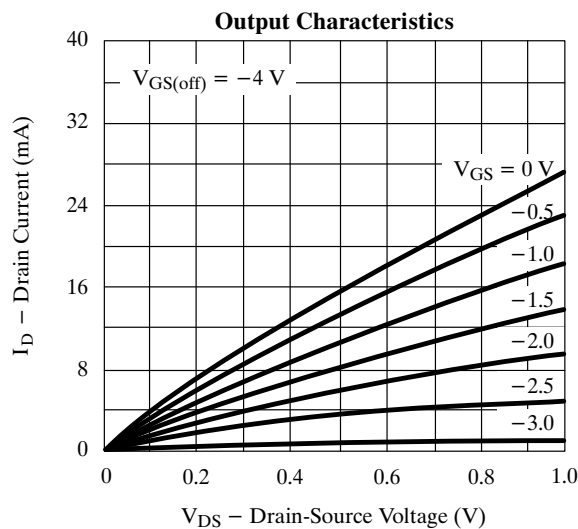
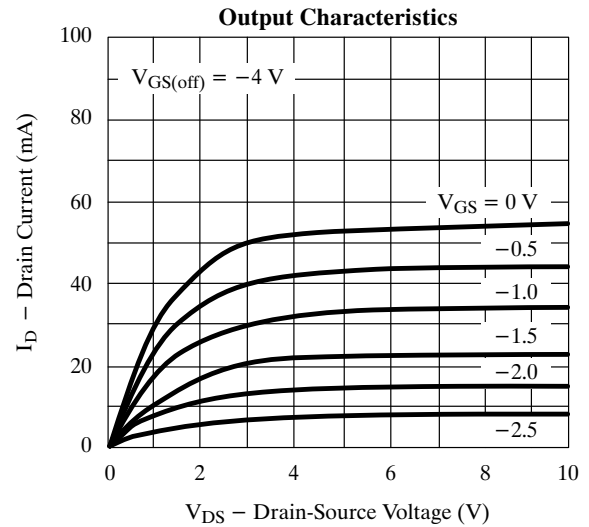
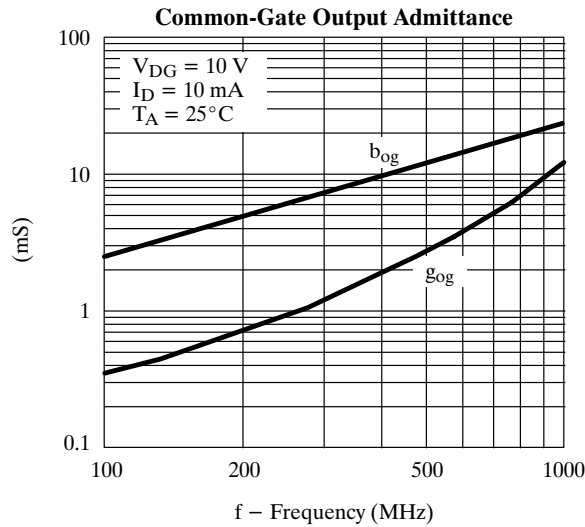
## Typical Characteristics



### Typical Characteristics (Cont'd)



## Typical Characteristics (Cont'd)



## Switching Time Test Circuit

|             | J/SST111     | J/SST112      | J/SST113      |
|-------------|--------------|---------------|---------------|
| $V_{GS(L)}$ | -12 V        | -7 V          | -5 V          |
| $R_L^*$     | 800 $\Omega$ | 1600 $\Omega$ | 3200 $\Omega$ |
| $I_{D(on)}$ | 12 mA        | 6 mA          | 3 mA          |

\*Non-inductive

### Input Pulse

Rise Time < 1 ns  
 Fall Time < 1 ns  
 Pulse Width 100 ns  
 PRF 1 MHz

### Sampling Scope

Rise Time 0.4 ns  
 Input Resistance 10 M $\Omega$   
 Input Capacitance 1.5 pF

