

## C-MOS QUAD SPST ANALOG SWITCH

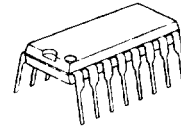
### GENERAL DESCRIPTION

The NJU211 is a quad break-before-make SPST analog switch protected up to 40V operating voltage.

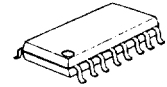
Each switch is controlled by TTL or C-MOS compatible input, and the input threshold level can be adjusted by external voltage supply control.

The NJU211 is functionally and pin-to-pin compatible with SILICONIX DG211A.

### PACKAGE OUTLINE



NJU211D

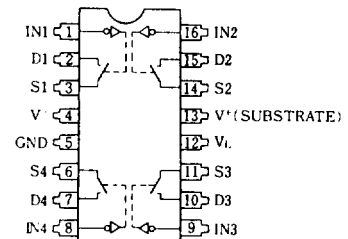


NJU211M

### FEATURES

- High Break Down Voltage -- 40V
- Input Threshold Voltage Adjustable
- Package Outline -- DIP/DMP 16
- C-MOS Technology

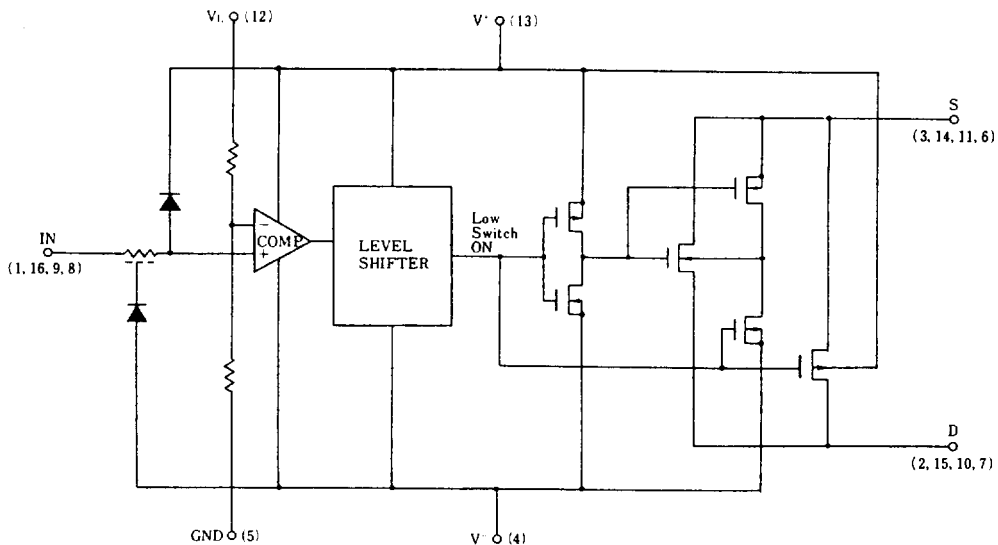
### PIN CONFIGURATION



### TRUTH TABLE

| Logic (In) | Switch |
|------------|--------|
| 0          | ON     |
| 1          | OFF    |

### EQUIVALENT CIRCUIT



\* Logic input threshold voltage  $V_{TH}$  is about  $V_L \times 0.384(V)$ .  
When the designing, enough margin is required.



## ■ TERMINAL DESCRIPTION

| No. | SYMBOL         | F U N C T I O N                            | No. | SYMBOL         | F U N C T I O N                            |
|-----|----------------|--------------------------------------------|-----|----------------|--------------------------------------------|
| 1   | IN1            | Control Signal Input                       | 9   | IN3            | Control Signal Input                       |
| 2   | D1             | Input/Output 1                             | 10  | D3             | Input/Output 3                             |
| 3   | S1             |                                            | 11  | S3             |                                            |
| 4   | V <sup>-</sup> | Negative (V <sup>-</sup> )<br>Power Supply | 12  | V <sub>L</sub> | Threshold Level<br>Control Voltage Supply  |
| 5   | GND            | Ground                                     | 13  | V <sup>+</sup> | Positive (V <sup>+</sup> )<br>Power Supply |
| 6   | S4             | Input/Output 4                             | 14  | S2             | Input/Output 2                             |
| 7   | D4             |                                            | 15  | D2             |                                            |
| 8   | IN4            | Control Signal Input                       | 16  | IN2            | Control Signal Input                       |

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## ■ ABSOLUTE MAXIMUM RATINGS

(T<sub>a</sub>=25°C)

| P A R A M E T E R           | SYMBOL                                           | R A T I N G S                               | UNIT |
|-----------------------------|--------------------------------------------------|---------------------------------------------|------|
| Supply Voltage              | V <sup>+</sup> - V <sup>-</sup>                  | 40                                          | V    |
|                             | V <sup>+</sup> - GND                             | 19                                          |      |
|                             | GND - V <sup>-</sup>                             | 25                                          |      |
| Threshold Control Voltage   | V <sub>L</sub> - GND                             | -0.5 ~ V <sup>+</sup> +0.5 *                |      |
| Input Voltage               | V <sub>I</sub> , V <sub>S</sub> , V <sub>D</sub> | V <sup>-</sup> -0.5 ~ V <sup>+</sup> +0.5 * | V    |
| Input Current               | I <sub>I</sub>                                   | 30                                          | mA   |
|                             | I <sub>S</sub> , I <sub>D</sub> Continuous       | 20                                          |      |
|                             | Peak Value<br>(PW=1ms, Duty0.1)                  | 70                                          |      |
| Power Dissipation           | P <sub>D</sub>                                   | 500 (DIP) 200 (DMP)                         | mW   |
| Operating Temperature Range | T <sub>opr</sub>                                 | 0 ~ + 70                                    | °C   |
| Storage Temperature Range   | T <sub>stg</sub>                                 | - 65 ~ + 125                                | °C   |

\* V<sup>+</sup>+0.5V must be 40V or less.



# ELECTRICAL CHARACTERISTICS (DC CHARACTERISTICS)

 $(V^+=15V, V^-=-15V, GND=0V, V_L=5V)$ 

| PARAMETER                  | SYMBOL       | CONDITIONS               |                     | TYP      | MAX |          |          | UNIT     |
|----------------------------|--------------|--------------------------|---------------------|----------|-----|----------|----------|----------|
|                            |              |                          |                     | 25°C     | 0°C | 25°C     | 70°C     |          |
| Analog Signal Range        | $V_{ANALOG}$ |                          |                     | $\pm 15$ |     | $\pm 15$ | $\pm 15$ | V        |
| On-state Resistance        | $R_{ON}$     | $V_{IN}=0.8V$            | $V_D=10V$           | 105      |     | 175      |          | $\Omega$ |
|                            |              | $I_S=-1mA$               | $V_D=-10V$          | 115      |     | 175      |          |          |
| Source-off Leakage Current | $I_{S(off)}$ | $V_I=2.4V$               | $V_S=14V, V_D=-14V$ | 0.01     |     | 5        |          | nA       |
|                            |              |                          | $V_S=-14V, V_D=14V$ | -0.02    |     | - 5      |          |          |
| Drain-off Leakage Current  | $I_{D(off)}$ | $V_I=2.4V$               | $V_D=14V, V_S=-14V$ | 0.01     |     | 5        |          | nA       |
|                            |              |                          | $V_D=-14V, V_S=14V$ | -0.02    |     | - 5      |          |          |
| Drain-on Leakage Current   | $I_{D(on)}$  | $V_I=0.8V$               | $V_D=V_S=14V$       | 0.1      |     | 5        |          | nA       |
|                            |              |                          | $V_D=V_S=-14V$      | -0.15    |     | - 5      |          |          |
| Input Current              | $I_{IH}$     | $V_I=2.4V$               |                     | -0.0004  |     | - 1      |          | $\mu A$  |
|                            |              | $V_I=15V$                |                     | 0.003    |     | 1        |          |          |
|                            | $I_{IL}$     | $V_I=0V$                 |                     | -0.0004  |     | - 1      |          |          |
| Quiescent Current          | $I^+$        | $V_I=0 \text{ or } 2.4V$ |                     | 0.35     |     | 0.68     |          | mA       |
|                            | $I^-$        |                          |                     | 0.30     |     | 0.68     |          |          |
|                            | $I_L$        |                          |                     | 0.5      |     | 1.2      |          |          |

# SWITCHING CHARACTERISTICS

 $(V^+=15V, V^-=-15V, GND=0V, V_L=5V)$ 

| PARAMETER                    | SYMBOL                  | CONDITIONS                                |                              | TYP  | MAX |      |      | UNIT |
|------------------------------|-------------------------|-------------------------------------------|------------------------------|------|-----|------|------|------|
|                              |                         |                                           |                              | 25°C | 0°C | 25°C | 70°C |      |
| Turn-on Time                 | $t_{on}$                | $R_L=1k\Omega, C_L=35pF$                  |                              | 460  |     | 1000 |      | ns   |
| Turn-off Time                | $t_{off}$               |                                           |                              | 360  |     | 500  |      |      |
| Charge Injection             | $Q$                     | $C_L=1000pF, V_{GEN}=0V, R_{GEN}=0\Omega$ |                              | 20   |     |      |      | pC   |
| Source-Off Capacit.          | $C_{S(off)}$            | $f=100kHz$                                | $V_S=0V, V_I=5V$             | 5    |     |      |      | pF   |
| Drain-Off Capacit.           | $C_{D(off)}$            |                                           | $V_D=0V, V_I=5V$             | 5    |     |      |      |      |
| Channel-On Capacitance       | $C_{D(on)} + C_{S(on)}$ |                                           | $V_D=V_S=0V, V_I=0V$         | 16   |     |      |      |      |
| Off Isolation                | OIRR                    |                                           | $V_S=2V_{P-P}, R_L=75\Omega$ | 70   |     |      |      | dB   |
| Channel-to-channel Crosstalk | CCRR                    |                                           |                              | 90   |     |      |      |      |