

### Features

- ultra-low On Resistance:  $1.5\ \Omega$
- Supply voltage:  $1.5 \sim 5.5V$
- -3dB Bandwidth: 700MHz
- Rail-to-Rail Signal Range
- Break-Before-Make Switching
- Low quiescent current over an Expanded Control Input Range

### Applications

- Audio and Video Signal Routing
- Other electronics equipment
- LCD Monitor, TV and Set-Top Box
- Cell phones, PDA, Digital Camera and Notebook

### General Description

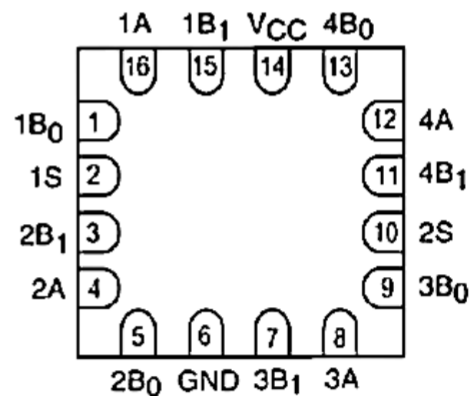
The is a high performance, quad, Single Pole Double Throw (SPDT) analog switch that features ultra-low  $R_{on}$  of  $0.5\ \Omega$  (typical) at  $3.0V$  VCC. The operates over a wide VCC range of  $2.3V$  to  $4.5V$  and is designed for break-before-make operation. The select input is TTL-level compatible.

The is also featured with smart circuitry to minimize VCC leakage current even when the control voltage is lower than VCC supply voltage. This feature suits mobile handset applications by allowing direct interface with baseband processor general-purpose IO with minimal battery consumption. In other word, there is no need of additional device to shift control level to be the same as that of VCC in real application.

The is available in QFN 3x3-16L package. Standard Products are Pb-free and halogen-free.

### PIN CONFIGURATIONS

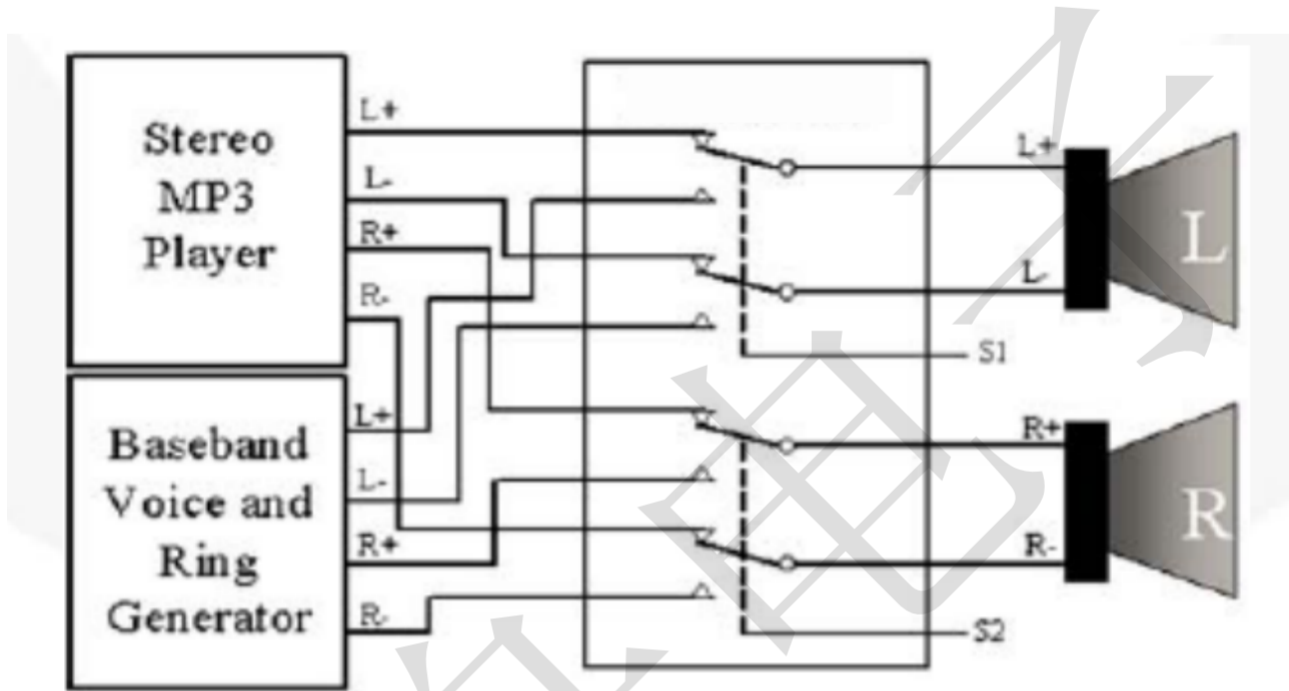
(TOP VIEW)  
QFN3X3-16L



### PIN DESCRIPTION

| Name                                  | Function      |
|---------------------------------------|---------------|
| nA, nB <sub>0</sub> , nB <sub>1</sub> | Data Ports    |
| nS                                    | Control Input |

### BLOCK DIAGRAM



### Function Table

| Control Inputs | Function                        |
|----------------|---------------------------------|
| LOW            | nB <sub>0</sub> Connected to nA |
| HIGH           | nB <sub>1</sub> Connected to nA |

### Absolute Maximum Ratings

(Unless otherwise specified)

| Parameter                                   | Symbol      | Value      | Unit |
|---------------------------------------------|-------------|------------|------|
| Supply Voltage                              | $V_{CC}$    | -0.3 ~ 6.5 | V    |
| Control Input Voltage                       | $V_{IN}$    | -0.3 ~ 6.5 | V    |
| DC Input Voltage                            | $V_{INPUT}$ | -0.3 ~ 6.5 | V    |
| Continuous Current                          |             | ±100       | mA   |
| Peak Current (pulsed at 1ms 50% duty cycle) |             | ±200       | mA   |
| Peak Current (pulsed at 1ms 10% duty cycle) |             | ±200       | mA   |
| Storage Temperature Range                   | $T_{STG}$   | -65 ~ 150  | °C   |
| Junction Temperature under Bias             | $T_J$       | 150        | °C   |
| Lead Temperature (Soldering, 10 seconds)    | $T_L$       | 260        | °C   |
| Power Dissipation                           | $P_D$       | 250        | mW   |

Note: Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.

### Recommend operating ratings

(Unless otherwise specified)

| Parameter                                                      | Symbol          | Value          | Unit |
|----------------------------------------------------------------|-----------------|----------------|------|
| Supply Voltage Operating                                       | $V_{CC}$        | 1.5 ~ 5.5      | V    |
| Control Input Voltage                                          | $V_{IN}$        | 0.0 ~ $V_{CC}$ | V    |
| Input Signal Voltage                                           | $V_{IS}$        | 0.0 ~ $V_{CC}$ | V    |
| Operating Temperature                                          | $T_A$           | -40 ~ 85       | °C   |
| Input Raise and Fall Time(Control Input $V_{CC}=2.3\sim3.6V$ ) | $t_r, t_f$      | 0 ~ 10         | ns/V |
| Thermal Resistance                                             | $R_{\theta JA}$ | 350            | °C/W |

Note:Control input must be held high or Low, it must not float.

### DC Electrical Characteristics

(TA = 25°C, VC = +4.5V, unless otherwise specified)

| Parameter                               | Symbol                | Conditions                                                                   | Min. | Typ. | Max. | Unit |
|-----------------------------------------|-----------------------|------------------------------------------------------------------------------|------|------|------|------|
| Input logic high level                  | V <sub>IH</sub>       | VCC: 3.0 ~ 4.5                                                               | 1.6  | --   | --   | V    |
|                                         |                       | VCC: 2.3 ~ 3.0                                                               | 1.4  | --   | --   | V    |
| Input logic low level                   | V <sub>IL</sub>       | VCC: 3.0 ~ 4.5                                                               | --   | --   | 0.6  | V    |
|                                         |                       | VCC: 2.3 ~ 3.0                                                               | --   | --   | 0.4  | V    |
| Supply quiescent current                | I <sub>CC</sub>       | I <sub>OUT</sub> =0,<br>V <sub>IN</sub> =0 or V <sub>IN</sub> =VCC           | --   | --   | 1.0  | uA   |
| Increase in I <sub>CC</sub> per input   | I <sub>CCT</sub>      | I <sub>OUT</sub> =0, VCC=4.5<br>V <sub>IN</sub> >1.8 or V <sub>IN</sub> <0.5 | --   | --   | 2.0  | uA   |
| Input leakage current                   | I <sub>IN</sub>       | V <sub>SEL</sub> =VCC                                                        | --   | --   | ±1.0 | uA   |
| Off state switch leakage current        | I <sub>OFF</sub>      |                                                                              | --   | --   | ±1.0 | uA   |
| On state switch leakage current         | I <sub>ON</sub>       |                                                                              | --   | --   | ±1.0 | uA   |
| On-Resistance                           | R <sub>ON</sub>       | VCC=4.5V,<br>V <sub>IS</sub> =0~4.5V,<br>I <sub>ON</sub> =100mA,             | --   | 1.5  | --   | Ω    |
|                                         |                       | VCC=3.0V,<br>V <sub>IS</sub> =0~3.0V,<br>I <sub>OUT</sub> =100mA,            | --   | 1.8  | --   | Ω    |
| On-Resistance Matching Between Channels | Δ R <sub>ON</sub>     | VCC=4.5V,<br>V <sub>IS</sub> =0.8V,<br>I <sub>OUT</sub> =100mA,              | --   | 0.1  | --   | Ω    |
|                                         |                       | VCC=3.0V,<br>V <sub>IS</sub> =0.8V,<br>I <sub>OUT</sub> =100mA,              | --   | 0.14 | --   | Ω    |
| On-Resistance Flatness                  | R <sub>FLAT(ON)</sub> | VCC=4.5V,<br>V <sub>IS</sub> =0~4.5V,<br>I <sub>OUT</sub> =100mA,            | --   | --   | 0.5  | Ω    |
|                                         |                       | VCC=3.0V,<br>V <sub>IS</sub> =0~3.0V,<br>I <sub>OUT</sub> =100mA,            | --   | --   | 0.8  | Ω    |

### AC Electronics Characteristics

(Ta=25°C, VCC=+4.5V, unless otherwise noted)

| Parameter                      | Symbol           | Conditions                                                                       | Min. | Typ. | Max. | Unit |
|--------------------------------|------------------|----------------------------------------------------------------------------------|------|------|------|------|
| Turn-On Time                   | T <sub>ON</sub>  | VCC=4.5V,<br>V <sub>IS</sub> =1.5V,<br>C <sub>L</sub> =35pF, R <sub>L</sub> =50Ω | --   | 200  | --   | ns   |
| Turn-Off Time                  | T <sub>OFF</sub> | VCC=4.5V,<br>V <sub>IS</sub> =1.5V,<br>C <sub>L</sub> =35pF, R <sub>L</sub> =50Ω | --   | 200  | --   | ns   |
| Break-Before-Make time         | T <sub>BBM</sub> | Generate by design                                                               | --   | 100  | --   | ns   |
| -3dB Bandwidth                 | BW               | R <sub>L</sub> =50Ω, C <sub>L</sub> =0pF                                         | --   | 700  | --   | MHz  |
| Off isolation (Per Channel)    | OIRR             | F=100KHz, R <sub>L</sub> =50Ω                                                    | --   | -50  | --   | dB   |
| Crosstalk (Channel to Channel) | Xtalk            | F=100KHz, R <sub>L</sub> =50Ω                                                    | --   | -50  | --   | dB   |
| Total Harmonic Distortion      | THD              | F=20Hz to 20KHz<br>R <sub>L</sub> =32Ω, V <sub>IS</sub> =0.5Vp-p                 | --   | -80  | --   | dB   |

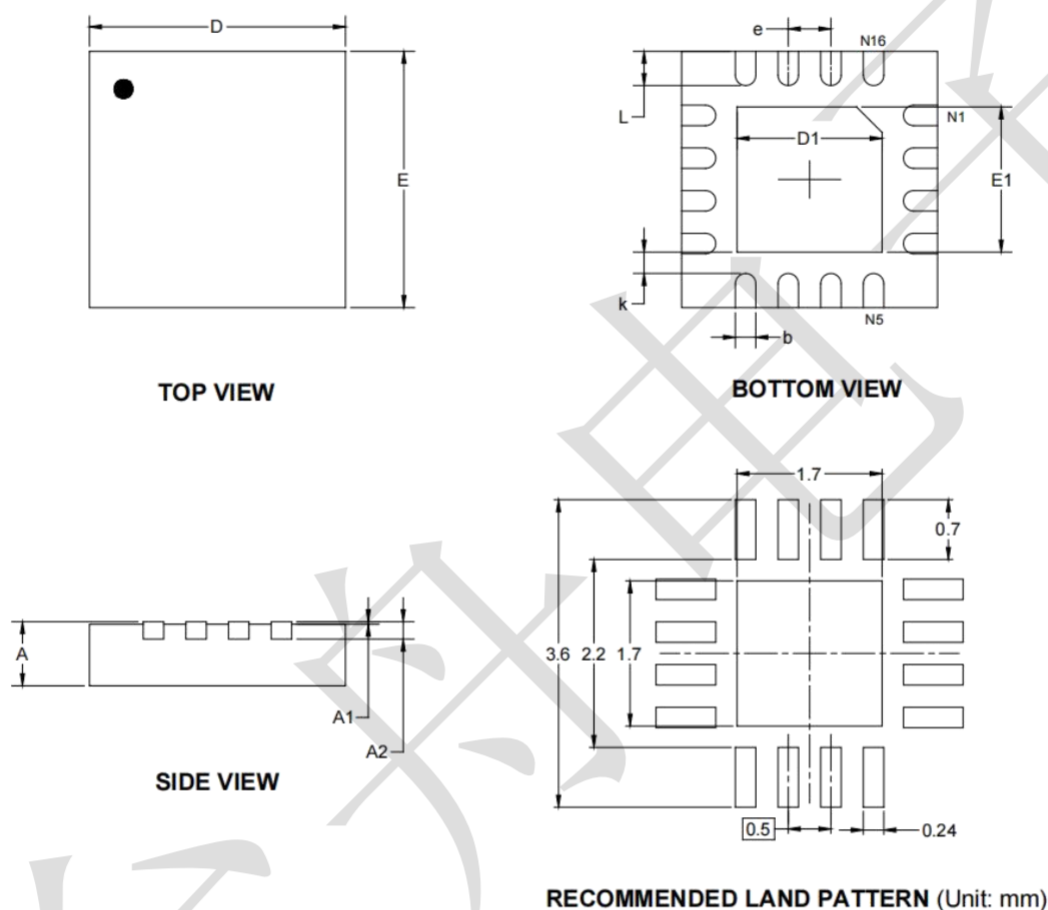
### Capacitance

(Ta=25°C, unless otherwise noted)

| Parameter       | Symbol           | Conditions       | Min. | Typ. | Max. | Unit |
|-----------------|------------------|------------------|------|------|------|------|
| Off capacitance | C <sub>OFF</sub> | F=1MHz, VCC=3.3V | --   | 5    | --   | pF   |
| On capacitance  | C <sub>ON</sub>  | F=1MHz, VCC=3.3V | --   | 8    | --   | pF   |

### Package information

QFN3X3-16L



| Symbol | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|--------|------------------------------|-------|-------------------------|-------|
|        | MIN                          | MAX   | MIN                     | MAX   |
| A      | 0.700                        | 0.800 | 0.028                   | 0.031 |
| A1     | 0.000                        | 0.050 | 0.000                   | 0.002 |
| A2     | 0.203 REF                    |       | 0.008 REF               |       |
| D      | 2.900                        | 3.100 | 0.114                   | 0.122 |
| D1     | 1.600                        | 1.800 | 0.063                   | 0.071 |
| E      | 2.900                        | 3.100 | 0.114                   | 0.122 |
| E1     | 1.600                        | 1.800 | 0.063                   | 0.071 |
| k      | 0.200 MIN                    |       | 0.008 MIN               |       |
| b      | 0.180                        | 0.300 | 0.007                   | 0.012 |
| e      | 0.500 TYP                    |       | 0.020 TYP               |       |
| L      | 0.300                        | 0.500 | 0.012                   | 0.020 |