

### FEATURES

- Wide Bandwidth Switches ..... 0.9 x DC @ 100MHz
- High OFF Isolation. .... 66 dB @ 100MHz
- Low Channel-to-Channel Crosstalk. . . -80 dB @ 10MHz
- TTL Compatible
- Low ON Resistance
- High Speed
- Low Capacitance

### APPLICATIONS

- Glitch-Free Analog Switches
- RF & Video Switches
- Track-and-Hold Switches
- Sample-and-Hold Switches
- High Speed Data Routing

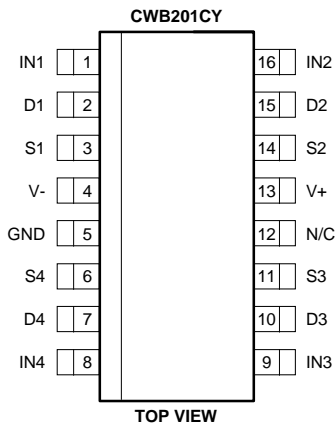
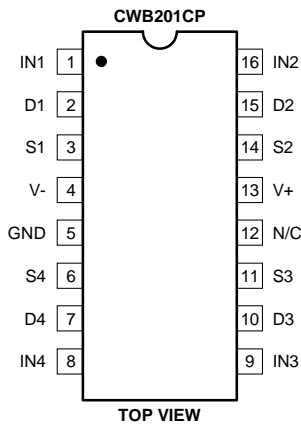
### DESCRIPTION

Designed for RF and Video Switching the CWB201 is manufactured using Calogic's high speed CMOS combined with DMOS transistors in a monolithic design resulting in superior performance characteristics. This quad SPST switch array has extensive applications where high frequency video, audio or digital signals are switched or routed. The CWB201 is TTL compatible which is of great benefit to designs that require constant logic switching over a wide range of supply voltages and temperature without a separate power supply.

### ORDERING INFORMATION

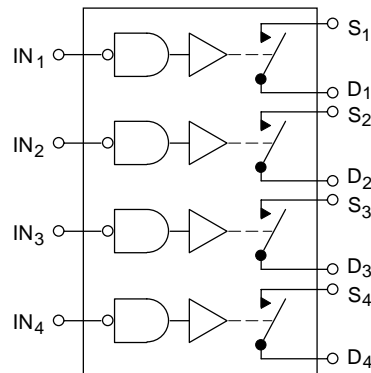
| Part     | Package                     | Temperature Range |
|----------|-----------------------------|-------------------|
| CWB201CP | Plastic 16-Pin Dip          | 0 to +85°C        |
| CWB201CY | Plastic SO-16 Surface Mount | 0 to +85°C        |
| XCWB201  | Sorted Chips in Carriers    | 0 to +85°C        |

### PIN CONFIGURATION



CWB

### FUNCTIONAL BLOCK DIAGRAM



Four SPST Switches per Package.  
Switches shown in Logic '1' Input Position.

### LOGIC TABLE

| Logic | Switch |                   |
|-------|--------|-------------------|
| 0     | ON     | Logic '0' ≤ 0.8V  |
| 1     | OFF    | Logic '1' ≥ 2.42V |

**NOTE:** All devices contain diodes to protect inputs against damage due to high static voltages or electric fields; however, it is advised that precautions be taken not to exceed the maximum recommended input voltages. All unused inputs must be connected to an appropriate logic level (V<sub>DD</sub> or GND).

**ABSOLUTE MAXIMUM RATINGS**

|                 |  |                      |
|-----------------|--|----------------------|
| V-              | Negative Supply Voltage                                | -20V                 |
| V+              | Positive Supply Voltage                                | +20V                 |
| V <sub>IN</sub> | Control Input Voltage Range                            | V+ +0.3V<br>V- -0.3V |
| I <sub>L</sub>  | Continuous Current, any Pin except S or D              | 20mA                 |
| I <sub>S</sub>  | Continuous Current, S or D                             | 30mA                 |
| I <sub>S</sub>  | Peak Pulsed Current, S or D, 80μsec, 1%,<br>Duty Cycle | 90mA                 |
| T <sub>J</sub>  | Junction Temperature Range                             | -55 to +125°C        |
| T <sub>S</sub>  | Storage Temperature Range                              | -55 to +125°C        |
| P <sub>D</sub>  | Power Dissipation (derate at 5.5mW/°C,<br>above +85°C) | 500mW                |

**RECOMMENDED OPERATING CONDITIONS**

|                 |                             |              |
|-----------------|-----------------------------|--------------|
| V-              | Negative Supply Voltage     | -8.0 to -15V |
| V+              | Positive Supply Voltage     | +8.0 to +15V |
| V <sub>IN</sub> | Control Input Voltage Range | 0 to +5V     |
| T <sub>OP</sub> | Operating Temperature       | 0 to 85°C    |

**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = +25°C, V- = -15V, V+ = +15V unless otherwise noted)

| SYMBOL              | PARAMETER                         | MIN | TYP             | MAX             | UNITS | TEST CONDITIONS   |
|---------------------|-----------------------------------|-----|-----------------|-----------------|-------|---|
| <b>STATIC</b>       |                                   |     |                 |                 |       |   |
| V <sub>ANALOG</sub> | Analog Signal Range               | -10 |                 | +10             | V     |   |
| r <sub>D(S)ON</sub> | Channel ON Resistance             |     | 40<br>45<br>100 | 80<br>80<br>160 | Ω     | V <sub>S</sub> = -10V<br>V <sub>S</sub> = +2.0V<br>V <sub>S</sub> = +10V<br>V <sub>IN</sub> = 0                         |
| V <sub>IH</sub>     | High Level Input Voltage          | 2.4 |                 |                 | V     |   |
| V <sub>IL</sub>     | Low Level Input Voltage           |     |                 | 0.8             |       |   |
| I <sub>IN</sub>     | Logic Input Leakage Current       |     | 0.01<br>0.02    | 0.1<br>0.1      | μA    | V <sub>IN</sub> = +2.4V<br>V <sub>IN</sub> = +15V   |
| I <sub>D(OFF)</sub> | Switch OFF Leakage Current        |     | 0.2             | 5.0             | nA    | V <sub>D</sub> = +10V, V <sub>S</sub> = -10V<br>V <sub>S</sub> = +10V, V <sub>D</sub> = -10V<br>V <sub>IN</sub> = +2.4V |
| I <sub>S(OFF)</sub> |                                   |     | 0.4             | 5.0             |       |   |
| I-                  | Negative Supply Quiescent Current |     | -0.3            | -1.0            | mA    | V <sub>IN</sub> = 0 or +2.4V  |
| I+                  | Positive Supply Quiescent Current |     | 0.6             | 2.0             |       |   |
| <b>DYNAMIC</b>      |                                   |     |                 |                 |       |   |
| t <sub>ON</sub>     | Switch Turn-ON Time               |     | 400             | 600             | nsec  | See Switching Times Test Circuit  |
| t <sub>OFF</sub>    | Switch Turn-OFF Time              |     | 70              | 300             |       |   |
| O <sub>I</sub> RR   | OFF Isolation Rejection Ratio     | 60  | 66              |                 | dB    | f = 10MHz, R <sub>L</sub> = 50Ω   |
| C <sub>C</sub> RR   | Cross Coupling Rejection Ratio    |     | 80              |                 |       |   |
| C <sub>d</sub>      | Drain-Node Capacitance            |     | 0.3             |                 | pF    | V <sub>D</sub> = V <sub>S</sub> = 0<br>f = 1MHz<br>V <sub>IN</sub> = +2.4V  |
| C <sub>s</sub>      | Source-Node Capacitance           |     | 3.0             |                 |       |   |

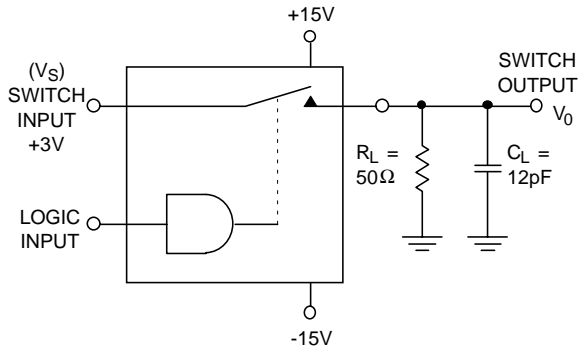
**ELECTRICAL CHARACTERISTICS** (V- = -15V, V+ = +15V unless otherwise noted)

**LIMITS AT TEMPERATURE EXTREMES**

| SYMBOL              | PARAMETER                   | MAXIMUM @ T <sub>A</sub> = |     | UNITS | TEST CONDITIONS   |
|---------------------|-----------------------------|----------------------------|-----|-------|---|
|                     |                             | +85°C                      |     |       |   |
| <b>STATIC</b>       |                             |                            |     |       |   |
| V <sub>ANALOG</sub> | Analog Signal Range         | ±10                        |     | V     |   |
| r <sub>D(S)ON</sub> | Switch ON Resistance        | 120                        |     | Ω     | V <sub>S</sub> = -10V<br>V <sub>S</sub> = +2.0V<br>V <sub>S</sub> = +10V<br>V <sub>IN</sub> = 0                         |
|                     |                             | 120                        |     |       |   |
|                     |                             | 240                        |     |       |   |
| I <sub>IN</sub>     | Logic Input Leakage Current | 1.0                        |     | μA    | V <sub>IN</sub> = +2.4V<br>V <sub>IN</sub> = +15V   |
|                     |                             | 2.0                        |     |       |   |
| I <sub>D(OFF)</sub> | Switch OFF Leakage Current  | 100                        |     | nA    | V <sub>D</sub> = +10V, V <sub>S</sub> = -10V<br>V <sub>S</sub> = +10V, V <sub>D</sub> = -10V<br>V <sub>IN</sub> = +2.4V |
| I <sub>S(OFF)</sub> |                             |                            | 100 |       |   |
| I-                  | Supply Quiescent Current    | -1.0                       |     | mA    | V <sub>IN</sub> = 0 or +2.4V  |
| I+                  |                             |                            | 2.0 |       |   |

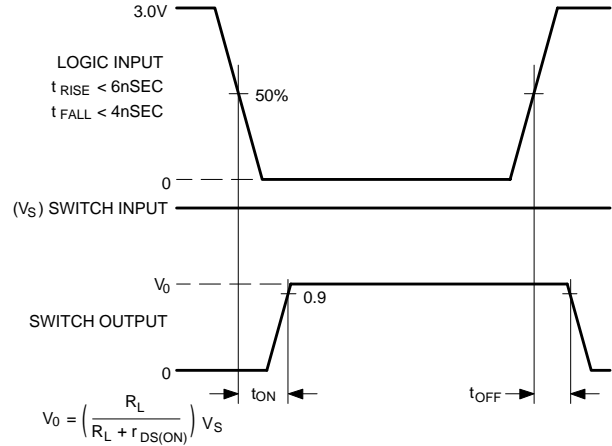
**TYPICAL PERFORMANCE CHARACTERISTICS** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

**SWITCHING TIMES TEST CIRCUIT**

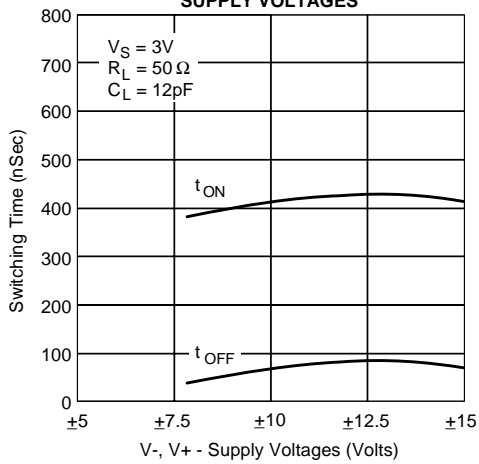


SWITCH ILLUSTRATED IN LOGIC '1',  
SWITCH OFF, POSITION

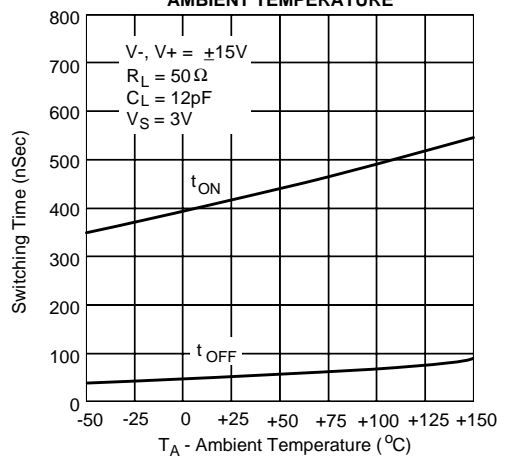
**TEST WAVEFORMS**



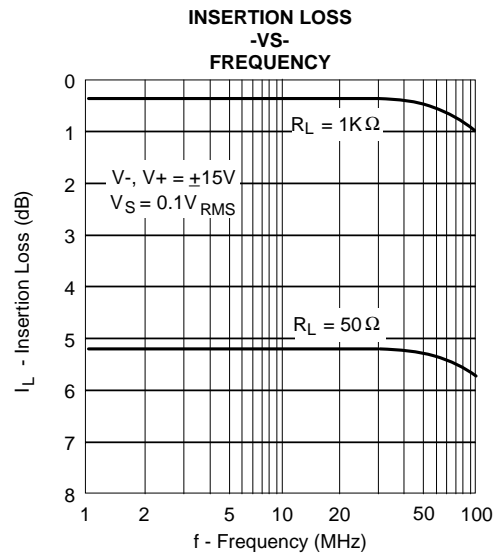
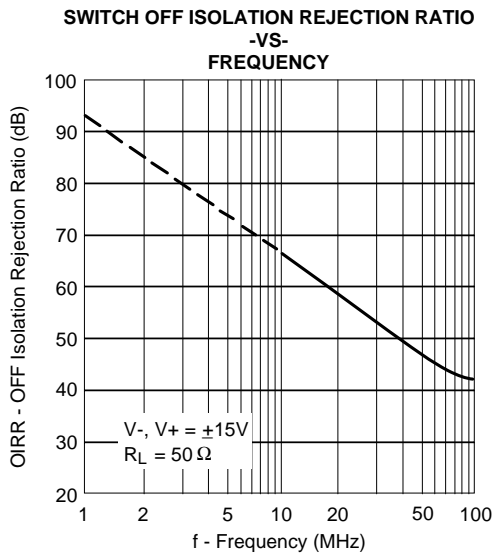
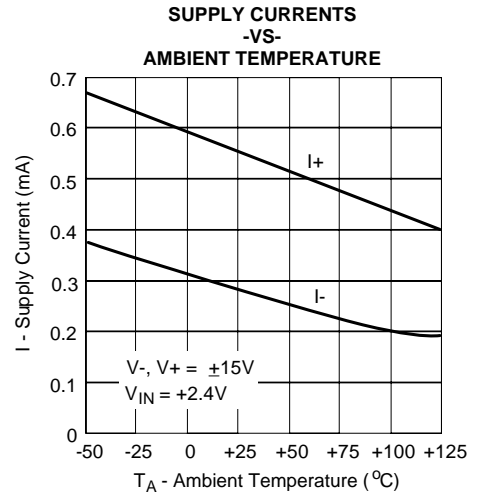
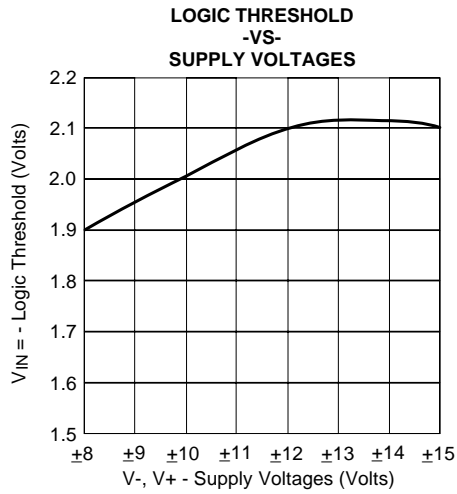
**SWITCHING TIMES  
-VS-  
SUPPLY VOLTAGES**



**SWITCHING TIMES  
-VS-  
AMBIENT TEMPERATURE**



**TYPICAL PERFORMANCE CHARACTERISTICS** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)



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