100MHz CMOS/DMOS Wideband Quad Analog Switch

CWB201

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 Capaciatance**

APPLICATIONS

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

DESCRIPTION

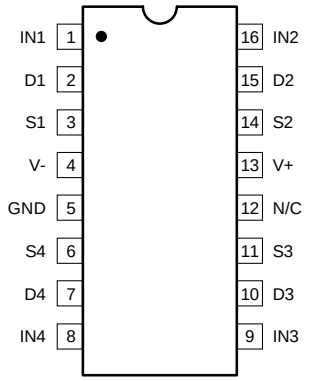
Designed for RF and Video Switching the CWB201 is manufactured using Calogic's high speed CMOS combined with DMOS transistors in a monolithic design resulting in superior performance characteristics. This quad SPST switch array has extensive applications where high frequency video, audio or digital signals are switched or routed. The CWB201 is TTL compatible which is of great benefit to 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

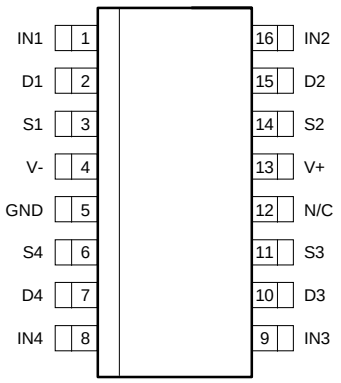
PIN CONFIGURATION

CWB201CP



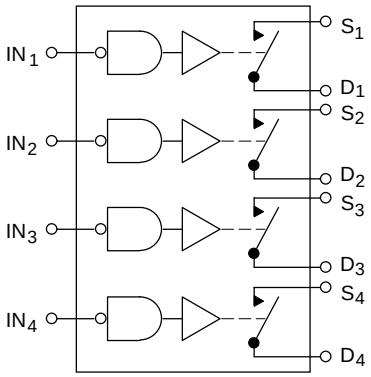
TOP VIEW

CWB201CY



TOP VIEW

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_{DD} or GND).

calogic CORPORATION

ABSOLUTE MAXIMUM RATINGS

V-	Negative Supply Voltage	-20V
V+	Positive Supply Voltage	+20V
V_{IN}	Control Input Voltage Range	V+ +0.3V V- -0.3V
I_L	Continuous Current, any Pin except S or D	20mA
I_S	Continuous Current, S or D	30mA
I_S	Peak Pulsed Current, S or D, 80µsec, 1%, Duty Cycle	90mA
T_J	Junction Temperature Range	-55 to +125°C
T_S	Storage Temperature Range	-55 to +125°C
P_D	Power Dissipation (derate at 5.5mW/ °C, above +85°C)	500mW

RECOMMENDED OPERATING CONDITIONS

V-	Negative Supply Voltage	-8.0 to -15V
V+	Positive Supply Voltage	+8.0 to +15V
V_{IN}	Control Input Voltage Range	0 to +5V
T_{OP}	Operating Temperature	0 to 85°C

ELECTRICAL CHARACTERISTICS (T_A = +25°C, V- = -15V, V+ = +15V unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS	
STATIC							
V_{ANALOG}	Analog Signal Range	-10		+10	V		
$r_{DS(ON)}$	Channel ON Resistance		40	80	Ω	V_S = -10V	V_{IN} = 0
			45	80		V_S = +2.0V	
			100	160		V_S = +10V	
V_{IH}	High Level Input Voltage	2.4			V		
V_{IL}	Low Level Input Voltage			0.8			
I_{IN}	Logic Input Leakage Current		0.01	0.1	µA	V_{IN} = +2.4V	
			0.02	0.1		V_{IN} = +15V	
$I_{D(OFF)}$	Switch OFF Leakage Current		0.2	5.0	nA	V_D = +10V, V_S = -10V	V_{IN} = +2.4V
$I_{S(OFF)}$			0.4	5.0		V_S = +10V, V_D = -10V	
I-	Negative Supply Quiescent Current		-0.3	-1.0	mA	V_{IN} = 0 or +2.4V	
I+	Positive Supply Quiescent Current		0.6	2.0			
DYNAMIC							
t_{ON}	Switch Turn-ON Time		400	600	nsec	See Switching Times Test Circuit	
t_{OFF}	Switch Turn-OFF Time		70	300			
O_{IRR}	OFF Isolation Rejection Ratio	60	66		dB	f = 10MHz, R_L = 50Ω	
C_{CRR}	Cross Coupling Rejection Ratio		80				
C_d	Drain-Node Capacitance		0.3		pF	V_D = VS = 0 f = 1MHz	V_{IN} = +2.4V
C_s	Source-Node Capacitance		3.0				

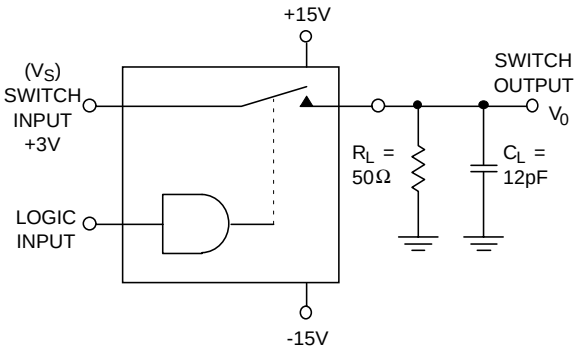
ELECTRICAL CHARACTERISTICS (V- = -15V, V+ = +15V unless otherwise noted)

LIMITS AT TEMPERATURE EXTREMES

SYMBOL	PARAMETER	MAXIMUM @ T_A = +85°C	UNITS	TEST CONDITIONS	
STATIC					
V_{ANALOG}	Analog Signal Range	±10	V		
$r_{DS(ON)}$	Switch ON Resistance	120	Ω	V_S = -10V	V_{IN} = 0
		120		V_S = +2.0V	
		240		V_S = +10V	
I_{IN}	Logic Input Leakage Current	1.0	µA	V_{IN} = +2.4V	
		2.0		V_{IN} = +15V	
$I_{D(OFF)}$	Switch OFF Leakage Current	100	nA	V_D = +10V, V_S = -10V	V_{IN} = +2.4V
$I_{S(OFF)}$		100		V_S = +10V, V_D = -10V	
I-	Supply Quiescent Current	-1.0	mA	V_{IN} = 0 or +2.4V	
I+		2.0			

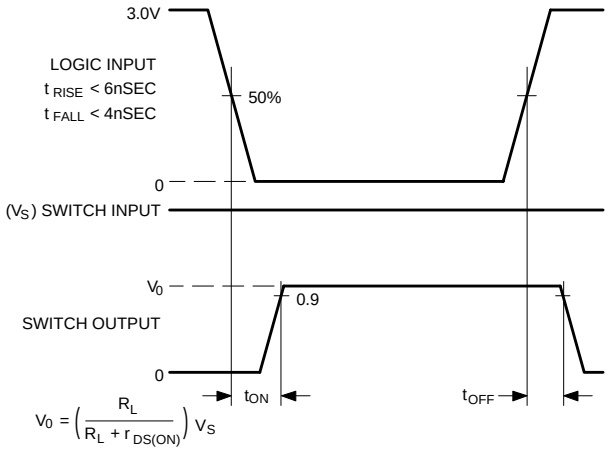
TYPICAL PERFORMANCE CHARACTERISTICS (T_A = +25°C unless otherwise specified)

SWITCHING TIMES TEST CIRCUIT

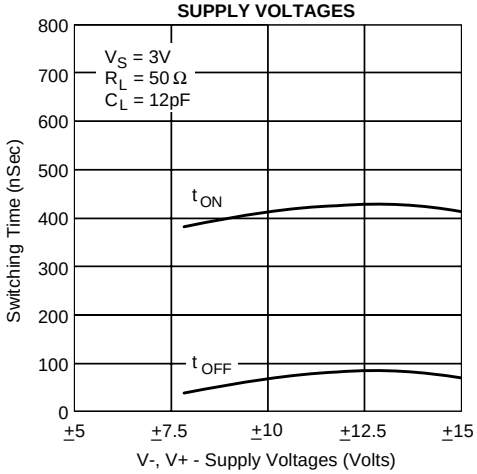


SWITCH ILLUSTRATED IN LOGIC '1',
SWITCH OFF, POSITION

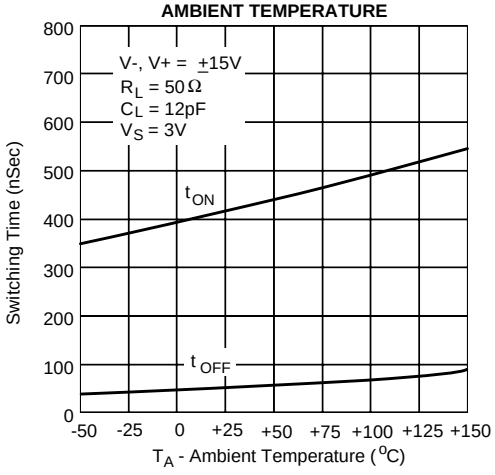
TEST WAVEFORMS



SWITCHING TIMES -VS- SUPPLY VOLTAGES

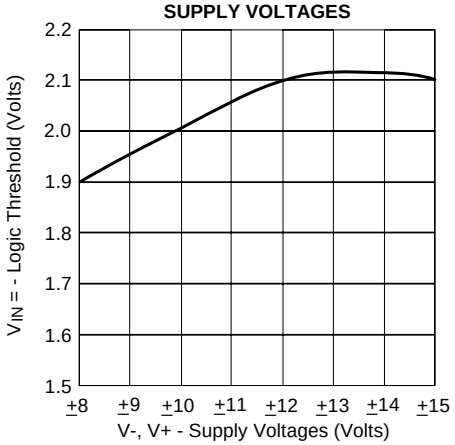


SWITCHING TIMES -VS- AMBIENT TEMPERATURE

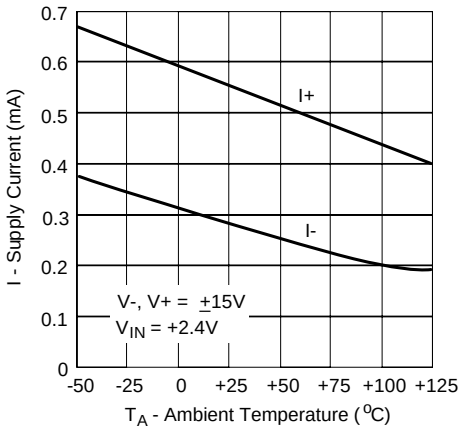


TYPICAL PERFORMANCE CHARACTERISTICS (T_A = +25°C unless otherwise specified)

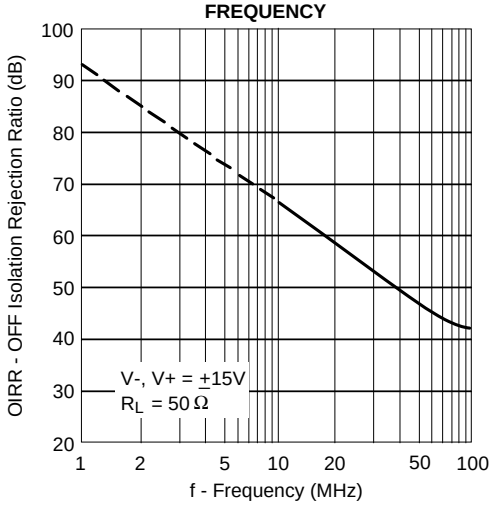
LOGIC THRESHOLD -VS- SUPPLY VOLTAGES



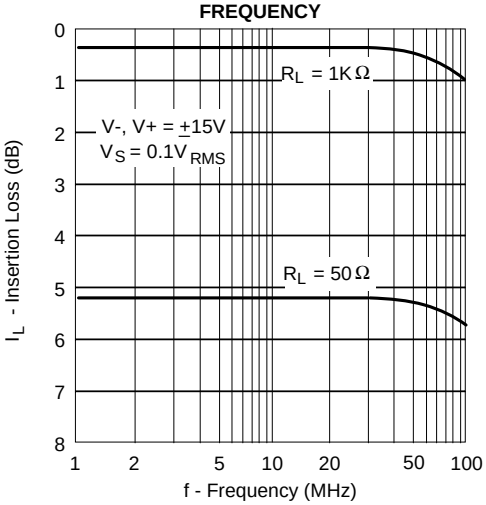
SUPPLY CURRENTS -VS- AMBIENT TEMPERATURE



SWITCH OFF ISOLATION REJECTION RATIO -VS- FREQUENCY

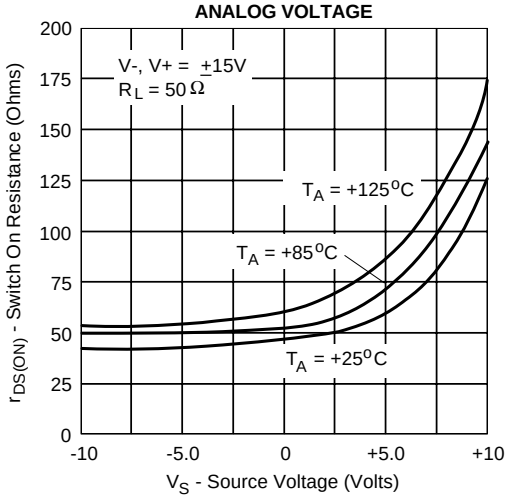


INSERTION LOSS -VS- FREQUENCY

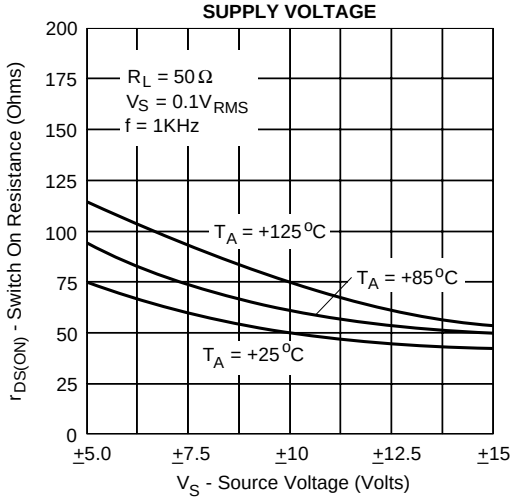


TYPICAL PERFORMANCE CHARACTERISTICS (T_A = +25°C unless otherwise specified)

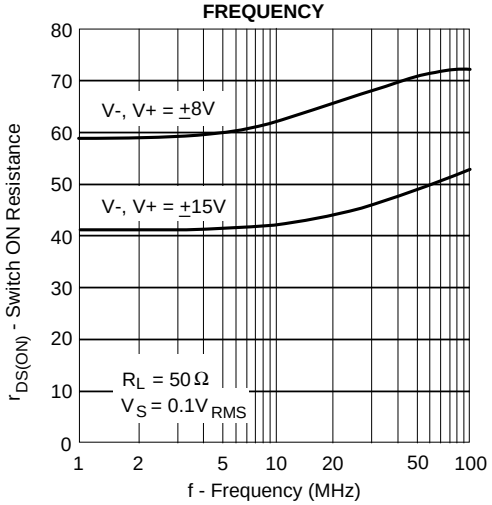
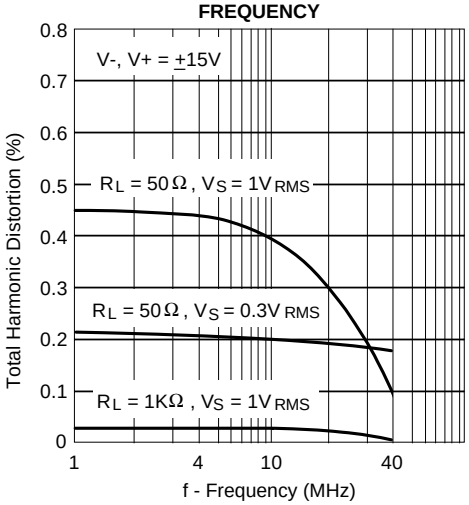
SWITCH ON RESISTANCE -VS- ANALOG VOLTAGE



SWITCH ON RESISTANCE -VS- SUPPLY VOLTAGE



SWITCH ON RESISTANCE -VS- FREQUENCY



TOTAL HARMONIC DISTORTION -VS- FREQUENCY