CMOS/DMOS Wideband High-Frequency Multiplexer

calogic CORPORATION

CWB4500

FEATURES

- **High OFF Isolation. . . . . > 62dB @ 10MHz**
- **Low Channel-to-Channel Crosstalk. . . > 80dB @ 10MHz**
- **TTL Capatible Inputs 5V**
- **Low ON Resistance . . . . . 40ohm typical**
- **Wide Bandwidth. . . . . -3.0dB @ 100MHz**
- **High Speed Logic Control**

APPLICATIONS

- **RF and Video Switching**
- **High Speed Precision Data Acquisition**
- **ATE**

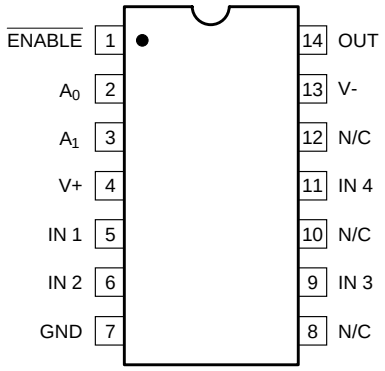
DESCRIPTION

The CWB4500 is a very high performance Monolithic 4 Channel Wideband/Video Multiplexer designed for switching wide bandwidth analog and digital signals. The high speed, low ON resistance and low capacitance is achieved through Calogic's proprietary CMOS/DMOS process that combines low-power CMOS control logic with very fast DMOS switching FETs.

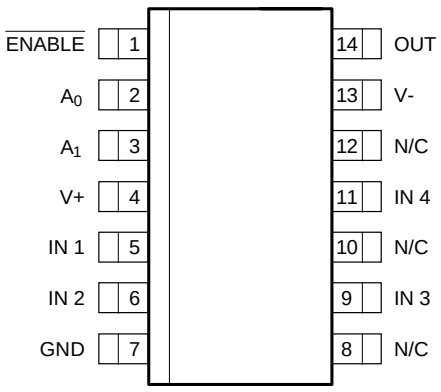
ORDERING INFORMATION

Part	Package	Temperature Range
CWB4500CP	Plastic 14-Pin Dip	0 to +85°C
CWB4500CY	Plastic SO-14 Surface Mount	0 to +85°C
XCWB4500	Sorted Chips in Carriers	0 to +85°C

PIN CONFIGURATION

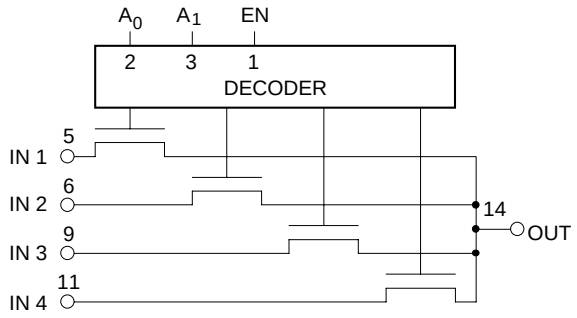


CWB4500CP



CWB4500CY

FUNCTION DIAGRAM



FUNCTION TABLE

$\overline{\text{ENABLE}}$	A_0	A_1	CHANNEL
H	x	x	OFF
L	L	L	S_1
L	H	L	S_2
L	L	H	S_3
L	H	H	S_4

X = Undefined

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 (either V_{cc} or GND).

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	100mA
T_J	Junction Temperature Range	-55 to +125°C
T_S	Storage Temperature Range	-55 to +125°C
P_D	Power Dissipation (derate at 12mW/ °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 (V- = -15V, V+ = +15v unless otherwise noted, T_A = +25°C)

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
			45	80		V_S = +2.0V
			100	160		V_S = +10V
V_{IH}	Logic High Level Input Voltage	4.5	3.4		V	
V_{IL}	Logic Low Level Input Voltage			1.0		
I_{IN}	Logic Input Leakage Current		0.01	0.1	µA	V_{IN} = +5.0V
			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
$I_{S(OFF)}$			0.4	5.0		V_S = +10V, V_D = -10V
I-	Negative Supply Quiescent Current		-1.4	-4.0	mA	V_{IN} = 0 or V+
I+	Positive Supply Quiescent Current		1.6	4.0		
DYNAMIC						
t_{ON}	Switch Turn-ON Time (All inputs)		150	250	nsec	V_{IN} = 5.0V
t_{OFF}	Switch Turn-OFF Time (All inputs)		120	220		
C_{CRR}	All Crosstalk	62			dB	f = 10MHz, R_L = 50Ω
	Single Channel Crosstalk	80				
	Frequency Roll-OFF (Bandwidth)		1.0	3.0		f = 100MHz, R_L = 50Ω
C_d	Output Node Capacitance		8.0	12.0	pF	V_D = 0
C_s	Input Node Capacitance		2.5	4.0		V_S = 0

f = 1MHz, V_{IN} = 0

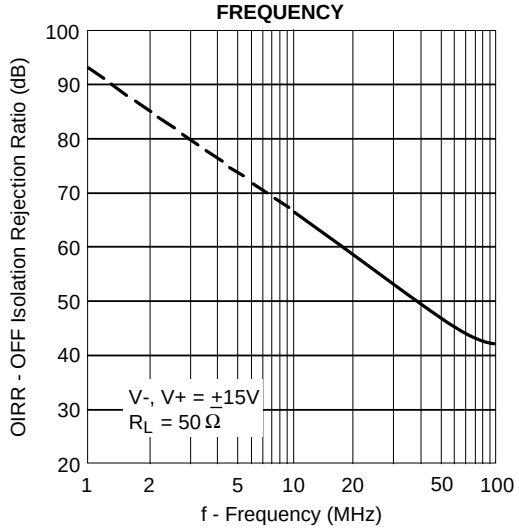
ELECTRICAL CHARACTERISTICS (V- = -15V, V+ = +15V unless otherwise noted)

LIMITS AT TEMPERATURE EXTREMES

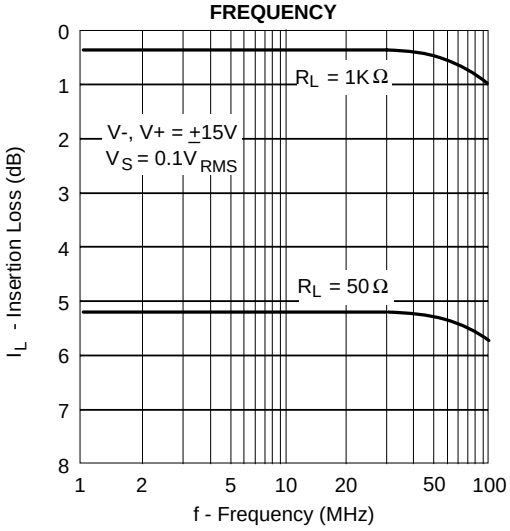
SYMBOL	PARAMETER	MAXIMUM @ T_A = +85°C	UNITS	TEST CONDITIONS
STATIC				
V_{ANALOG}	Analog Signal Range	±10	V	
$r_{DS(ON)}$	Channel ON Resistance	120	Ω	V_S = -10V, I_S = -1.0mA
		120		V_S = +2.0V, I_S = +1.0mA
		240		V_S = +10V, I_S = +1.0mA
I_{IN}	Logic Input Leakage Current	1.0	µA	V_{IN} = +5.0V
		2.0		V_{IN} = +15V
$I_{D(OFF)}$	Switch OFF Leakage Currents	100	nA	V_D = +10V, V_S = -10V
$I_{S(OFF)}$		100		V_S = +10V, V_D = -10V
I-	Supply Quiescent Currents	-4.0	mA	V_{IN} = 0 or V+
I+		4.0		

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

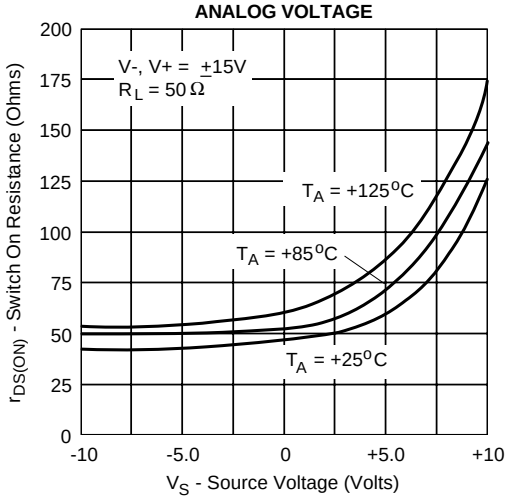
SWITCH OFF ISOLATION REJECTION RATIO -VS- FREQUENCY



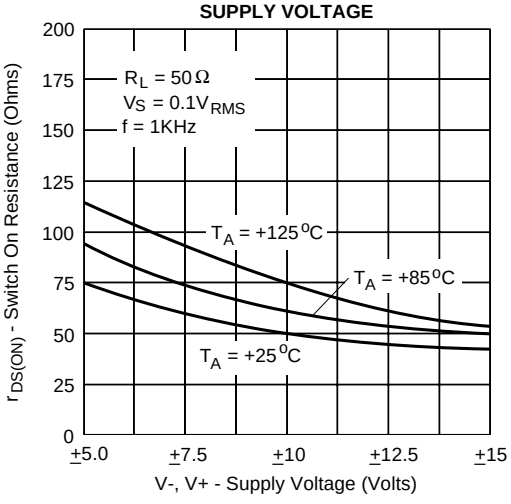
INSERTION LOSS -VS- FREQUENCY



SWITCH ON RESISTANCE -VS- ANALOG VOLTAGE

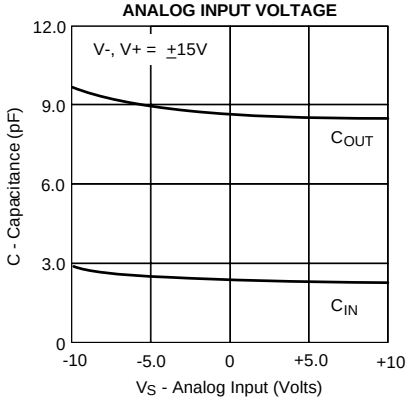


SWITCH ON RESISTANCE -VS- SUPPLY VOLTAGE



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

CAPACITANCE -VS- ANALOG INPUT VOLTAGE



SUPPLY CURRENTS -VS- AMBIENT TEMPERATURE