

4-CHANNEL CMOS/D-MOS HIGH-FREQUENCY MULTIPLEXER

ORDERING INFORMATION

4-Channel Multiplexer with Enable	14-Pin Plastic DIP	14-Pin Ceramic DIP
Commercial Temp. Range	CDG4500 CJ	—
Industrial Temp. Range	CDG4500 BJ	CDG4500 BK
Military Temp. Range	—	CDG4500 AK

FEATURES

- High OFF Isolation, >62dB @ 10 MHz
- Low Channel-to-Channel Crosstalk, >80dB @ 10 MHz
- 5 Volt CMOS Compatible Inputs
- Low ON Resistance, 40 Ω typ.
- Wide Bandwidth, -3.0dB @ 100 MHz
- Wide Analog Signal Range +10V to -10V
- High Speed Logic Control

APPLICATIONS

- RF & Video Switches
- High Speed Precision Data Acquisition

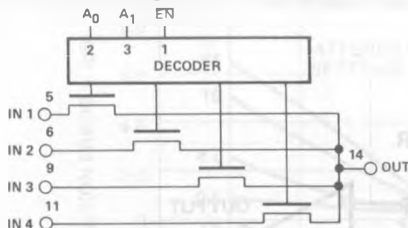
DESCRIPTION

Topaz Semiconductor CMOS/D-MOS Analog Multiplexer feature high-speed, low-power 5 volt CMOS input logic and level translation circuitry and high speed, low capacitance Lateral D-MOS switches. CMOS and Lateral D-MOS circuitry are fabricated together on a single silicon chip. This part is designed for applications where high "off" isolation at high frequencies is needed. The 14 pin configuration gives a compact board layout without

impacting "off" isolation and by use of the enable allows higher levels of multiplexing.

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).

FUNCTION DIAGRAM

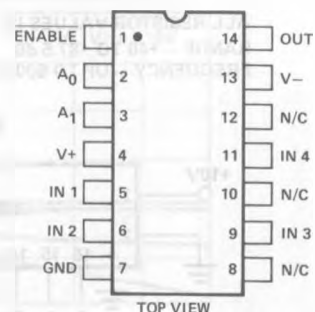


FUNCTION TABLE

ENABLE	A ₁	A ₀	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

PIN CONFIGURATION



CDG4500AK
CDG4500BK
(See Package 14)

CDG4500BJ
CDG4500CJ
(See Package 9)

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	
	(A Suffix)	-55 to +125°C
	(B Suffix)	-25 to +85°C
	(C Suffix)	0 to +70°C

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

#	SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
1	V _{ANALOG}	Analog Signal Range	-10		+10	V	
2	r _{DS(on)}	Channel On Resistance		40	80	Ω	V _S = -10V
3				45	80		V _S = +2.0V
4				100	160		V _S = +10V
5	V _{IH}	Logic High Level Input Voltage	4.5	3.4		V	
6	V _{IL}	Logic Low Level Input Voltage			1.0		
7	I _{IN}	Logic Input Leakage Current		0.01	0.1	μA	V _{IN} = +5.0V
8				0.02	0.1		V _{IN} = +15V
9	I _{D(OFF)}	Switch OFF Leakage Current		0.2	5.0	nA	V _D = +10V, V _S = -10V
10	I _{S(OFF)}			0.4	5.0		V _S = +10V, V _D = -10V
11	I-	Negative Supply Quiescent Current	-1.4	-4.0		mA	V _{IN} = 0 or V+
12	I+	Positive Supply Quiescent Current		1.6	4.0		
13	t _{ON}	Switch Turn-On Time (All inputs)		150	250	nsec	V _{IN} = 5.0V
14	t _{OFF}	Switch Turn-OFF Time (All inputs)		120	220		
15	C _{CR}	All crosstalk	62			dB	f = 10 MHz, R _L = 50Ω
16		Single Channel Crosstalk	80				
17		Frequency Roll-Off (Bandwidth)		1.0	3.0		f = 100 MHz, R _L = 50Ω
18	C _d	Output Node Capacitance		8.0	12.0	pF	V _D = 0
19	C _s	Input Node Capacitance		2.5	4.0		V _S = 0

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

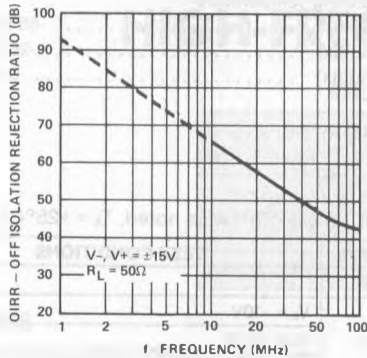
LIMITS AT TEMPERATURE EXTREMES

#	SYMBOL	PARAMETER	MAXIMUM @ T _A =					UNITS	TEST CONDITIONS
			-55°C	-25°C	+70°C	+85°C	+125°C		
1	V _{ANALOG}	Analog Signal Range	±10	±10	±10	±10	±10	V	
2	r _{DS(on)}	Channel On Resistance	80	80	120	120	150	Ω	V _S = -10V, I _S = -1.0 mA
3			80	80	120	120	150		V _S = +2.0V, I _S = +1.0 mA
4			160	160	240	240	300		V _S = +10V, I _S = -1.0 mA
5	I _{IN}	Logic Input	0.1	0.1	1.0	1.0	10	μA	V _{IN} = +5.0V
6		Leakage Currents	0.1	0.1	2.0	2.0	20		V _{IN} = +15V
7	I _{D(OFF)}	Switch OFF	5.0	5.0	100	100	1000	nA	V _D = +10V, V _S = -10V
8	I _{S(OFF)}	Leakage Currents	5.0	5.0	100	100	1000		V _S = +10V, V _D = -10V
9	I-	Supply	-4.0	-4.0	-4.0	-4.0	-4.0	mA	V _{IN} = 0 or V+
10	I+	Quiescent Currents	4.0	4.0	4.0	4.0	4.0		

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

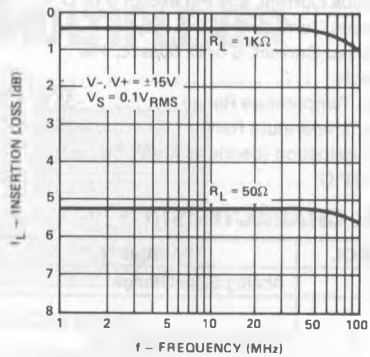
SWITCH-OFF ISOLATION REJECTION RATIO

—VS—
FREQUENCY



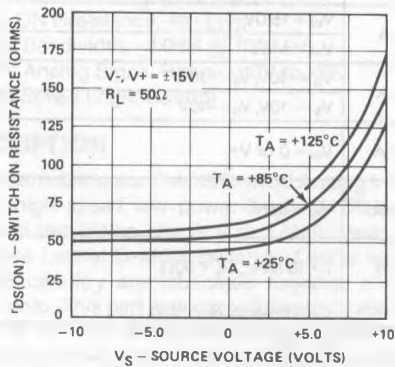
INSERTION LOSS

—VS—
FREQUENCY



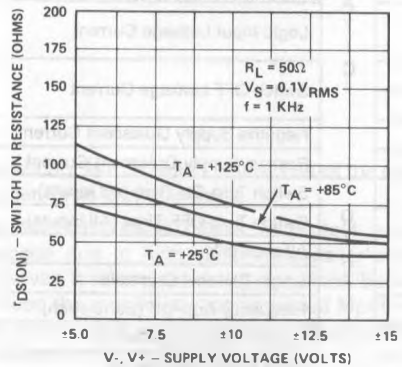
SWITCH ON RESISTANCE

—VS—
ANALOG VOLTAGE



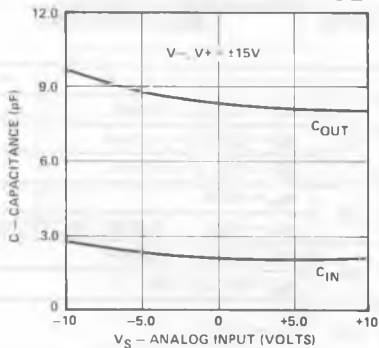
SWITCH-ON RESISTANCE

—VS—
SUPPLY VOLTAGES



CAPACITANCE

—VS—
ANALOG INPUT VOLTAGE



SUPPLY CURRENTS

—VS—
AMBIENT TEMPERATURE

