TOPAZ SEMICONDUCTOR

CDG5341

DUAL MONOLITHIC SPST CMOS/D-MOS T-CONFIGURATION ANALOG SWITCH

ORDERING INFORMATION

Dual SPST 'T' Switch, Logic '0' OFF, Break-before-make	14-Pin Plastic DIP	14-Pin Ceramic DIP
Commercial Temp. Range	CDG5341CJ	—
Industrial Temp. Range	CDG5341BJ	CDG5341BK
Military Temp. Range	—	CDG5341AK

FEATURES

- Ultra High OFF Isolation, > 80 dB @ 10MHz
- Low Channel-to-Channel Crosstalk, > 80 dB @ 10MHz
- CMOS Compatible Inputs
- Low ON Resistance, <110Ω
- Wide Bandwidth, -1.0dB @ 50MHz

APPLICATIONS

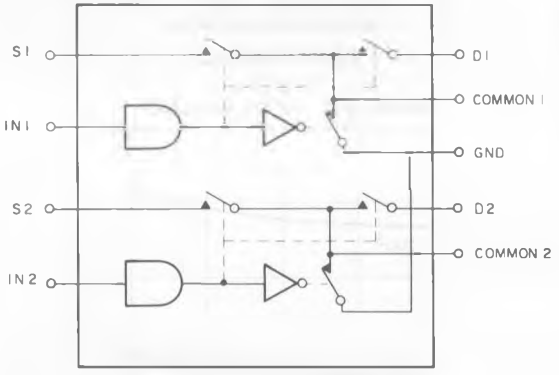
- RF & Video Switches
- Data Acquisition

DESCRIPTION

Topaz Semiconductor CMOS/D-MOS Analog Switches feature high-speed, low-power 5V 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.

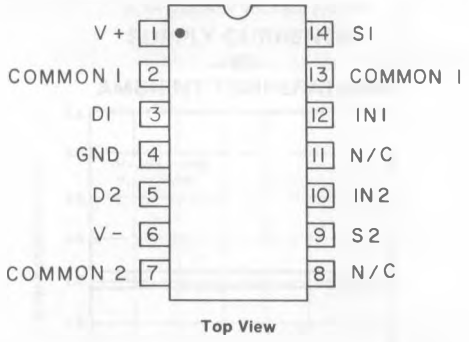
All devices contain diodes to protect inputs against damage due to high static voltages or electric fields; however, it is advised that precautions be taken not to exceed the maximum recommended input voltages. All unused inputs must be connected to an appropriate logic level (either V_{cc} or GND).

FUNCTIONAL BLOCK DIAGRAM



Two SPST 'T' Switches per Package.
Switches shown in Logic '0' Input Position.
Compensation Networks can be connected to Common 1 and Common 2.

PIN CONFIGURATION



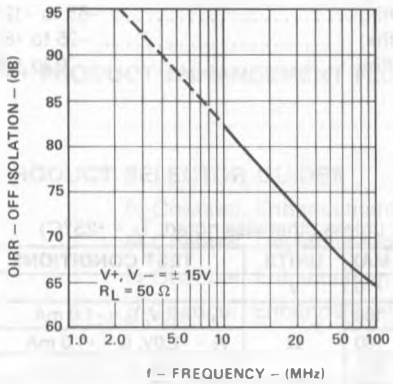
Top View

CDG5341AK
CDG5341BK
(See Package 14)

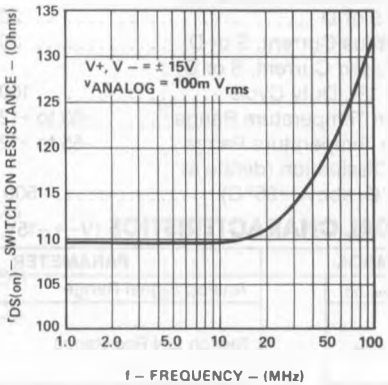
CDG5341BJ
CDG5341CJ
(See Package 9)

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

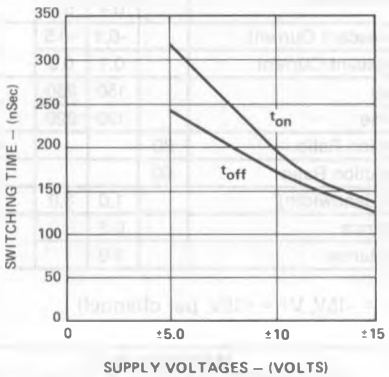
OFF ISOLATION REJECTION RATIO —VS— FREQUENCY



SWITCH ON RESISTANCE —VS— FREQUENCY



SWITCHING TIMES —VS— SUPPLY VOLTAGES



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 ..... 20 mA
I_S Continuous Current, S or D ..... 30 mA
I_S Peak Pulsed Current, S or D, 80μsec, 1%, Duty Cycle ..... 100 mA
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) ..... 500 mW

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
V_S Analog Switch Voltage Range ..... -10 to +10V
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	$r_{DS(on)}$	STATIC	Switch ON Resistance		100	160	Ω	V_S = -10V, I_S = -1.0 mA
3					110	160		V_S = +2.0V, I_S = +1.0 mA
4					200	320		V_S = +10V, I_S = -1.0 mA
5	V_{IH}		High Level Input Voltage	4.5	3.4		V	
6	V_{IL}		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		-0.1	-0.5	μA	V_{IN} = 0 or V+
12	I+		Positive Supply Quiescent Current		0.1	0.5		
13	t_{ON}	DYNAMIC	Switch Turn-On Time		150	250	nsec	V_{IN} = 5.0V
14	t_{OFF}		Switch Turn-OFF Time		120	220		
15	O_{IRR}		OFF Isolation, Rejection Ratio	80			dB	f = 10 MHz, R_L = 50Ω
16	C_{CRR}		Cross-Coupling Rejection Ratio	80			dB	f = 10 MHz, R_L = 50Ω
17			Frequency Roll-Off (Bandwidth)		1.0	3.0	dB	f = 50 MHz, R_L = 50Ω
18	C_d		Drain-Node Capacitance		0.3		pF	V_D = 0, f = 1MHz, V_{IN} = 0
19	C_s		Source-Node Capacitance		3.0			V_S = 0, f = 1MHz, V_{IN} = 0

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

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	$r_{DS(on)}$	STATIC	Switch On Resistance	160	160	240	240	300	Ω	V_S = -10V, I_S = -1.0 mA
3				160	160	240	240	300		V_S = +2.0V, I_S = +1.0 mA
4				320	320	480	480	600		V_S = +10V, I_S = -1.0 mA
5	I_{IN}		Logic Input Leakage Current	0.1	0.1	1.0	1.0	10	μA	V_{IN} = +5.0V
6				0.1	0.1	2.0	2.0	20		V_{IN} = +15V
7	$I_{D(OFF)}$		Switch OFF Leakage Current	5.0	5.0	100	100	1000	nA	V_D = +10V, V_S = -10V
8	$I_{S(OFF)}$			5.0	5.0	100	100	1000		V_S = +10V, V_D = -10V
9	I-		Supply Quiescent Currents	-0.5	-0.5	-20	-20	-100	μA	V_{IN} = 0 or V+
10	I+			0.5	0.5	20	20	100		