CMOS/DMOS Wideband Dual SPDT Analog Switch

calogic CORPORATION

CWB2269

FEATURES

- **High OFF Isolation**
- **Low Channel-to-Channel Crosstalk**
- **Wide Bandwidth**
- **Broad Analog Signal Range . . . . . +10V to -10V**
- **Low ON Resistance. . . . . 20ohms typical**
- **Low Capacitance**
- **Data Latches**

APPLICATIONS

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

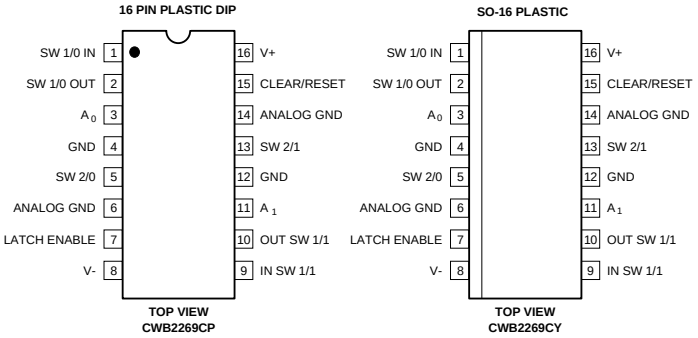
DESCRIPTION

The CWB2269 is a Precision Dual Single Pole, Double Throw Analog Switch for precision applications in instrumentation, communications and process control where low leakage and high speed switching are required. Designed on the Calogic CMOS/DMOS process this analog switch takes advantage of high speed DMOS switching FETs combined with low voltage CMOS technology in a monolithic structure.

ORDERING INFORMATION

Part	Package	Temperature Range
CWB2269CP	Plastic 16-Pin Dip	0 to +85°C
CWB2269CY	Plastic SO-16 Surface Mount	0 to +85°C
XCWB2269	Sorted Chips in Carriers	0 to +85°C

PIN CONFIGURATION



CWB

FUNCTION TABLE

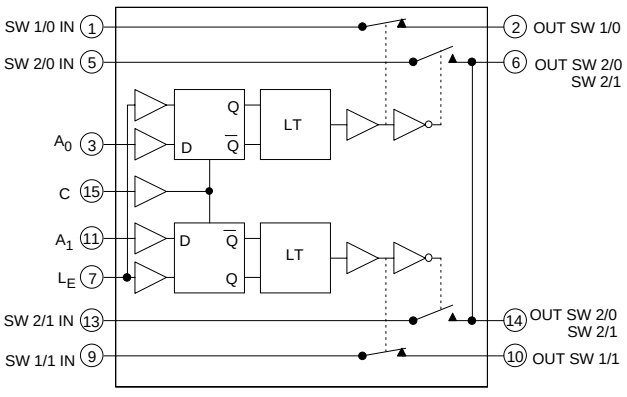
INPUT			SWITCH	
A	**L_E**	**C**	**SW_1**	**SW_2**
L	H	L	ON	OFF
H	H	L	OFF	ON
X	X	H	OFF	ON
L	L	L	*(1)	*(2)

X = undefined

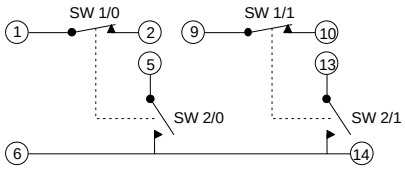
*(1) Hold input state one setup before L_E High to Low transaction. If Input state Low then Switch ON. If Input state High then Switch OFF.

*(2) $SW_1 = \overline{SW_2}$

FUNCTION DIAGRAM



SWITCHES SHOWN IN LOGIC '0' POSITION



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 Vcc 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	500mW

RECOMMENDED OPERATING CONDITIONS

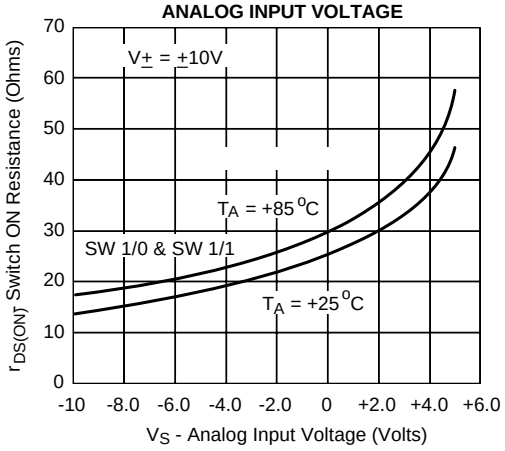
V-	Negative Supply Voltage	-8.0 to -15V
V+	Positive Supply Voltage	+8.0 to +15V
V_{IN}	Control Input Voltage Range	0 to +5V
T_{OP}	Operating Temperature	0 to 85°C

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 (Switches 2/0 &2/1)			29	80	Ω	V_S = -10V, I_S = -1.0mA	
				40	80		V_S = +2.0V, I_S = +1.0mA	
				100	160		V_S = +10V, I_S = +1.0mA	
$r_{DS(ON)}$	Channel ON Resistance (Switches 1/0 &1/1)			13	40		V_S = -10V, I_S = -1.0mA	
				20	40		V_S = +2.0V, I_S = +1.0mA	
				50	80		V_S = +10V, I_S = +1.0mA	
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	(Switches 2/0 &2/1)		0.4	5.0	nA	V_D = +10V, V_S = -10V	
$I_{S(OFF)}$				4.0	20		V_S = +10V, V_D = -10V	
$I_{D(OFF)}$		(Switches 1/0 &1/1)		0.4	5.0		V_S = +10V, V_S = -10V	
$I_{S(OFF)}$				4.0	20		V_S = +10V, V_D = -10V	
I-	Negative Supply Quiescent Current			-.05	-0.5	µA	V_{IN} = 0 or V+	
I+	Positive Supply Quiescent Current			.03	0.5			
DYNAMIC								
	Propagation Delay	Data to Switch ON		180	250	nSec		
		Data to Switch OFF		100	200			
		Latch Enable to Sw. ON		180	250			
		Latch Enable to Sw. OFF		140	200			
		Clear to Switch ON		180	250			
		Clear to Switch OFF		90	150			
t_S	Set Up Time		150	120				
t_H	Hold Time		150	90				
P_W	Pulse Width		50	40				
O_{IRR}	OFF Isolation Rejection Ratio (Switches 1/0 & 1/1)		42	45		dB	f = 10MHz	R_L = 50Ω
			12	15			f = 200MHz	
	Frequency Roll-Off (Bandwidth)			1.0	3.0		f = 200MHz, R_L = 50Ω	
I_L	Insertion Loss (Switches 1/0 & 1/1)			2.0			f = 10MHz	R_L = 50Ω
				3.0			f = 200MHz	
Cd	Drain-Node Capacitance			0.6		pF	V_D = 0	f = 1MHz, V_{IN} = 0
Cs	Source-Node Capacitance			6.0			V_S = 0	

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

SWITCH ON RESISTANCE -VS- ANALOG INPUT VOLTAGE



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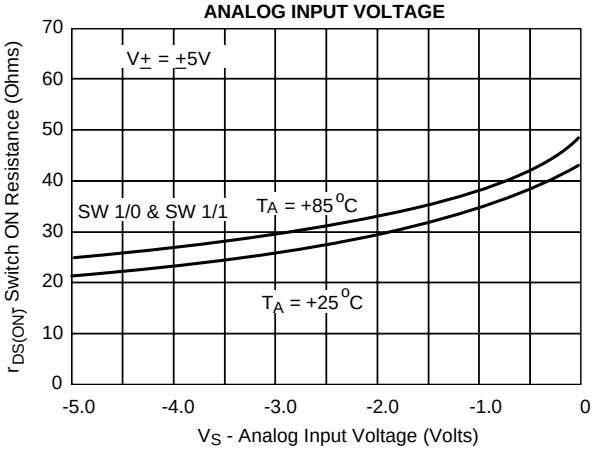

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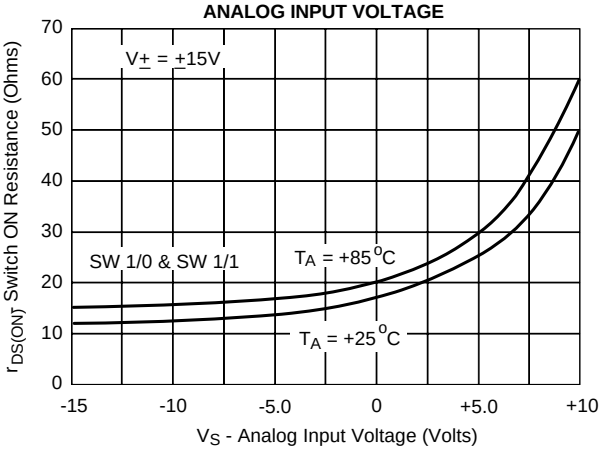
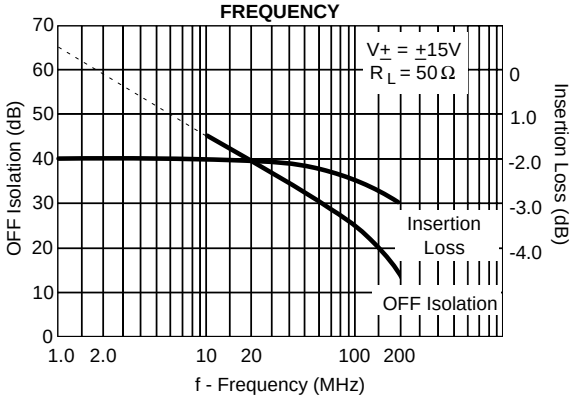
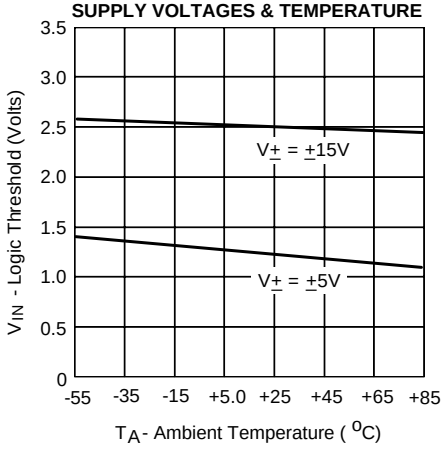


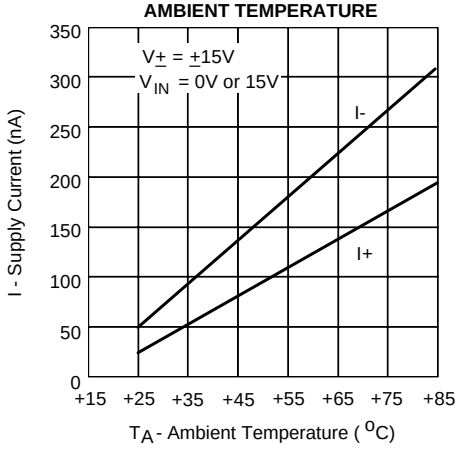
OFF ISOLATION & INSERTION LOSS -VS- FREQUENCY



LOGIC THRESHOLD -VS- SUPPLY VOLTAGES & TEMPERATURE

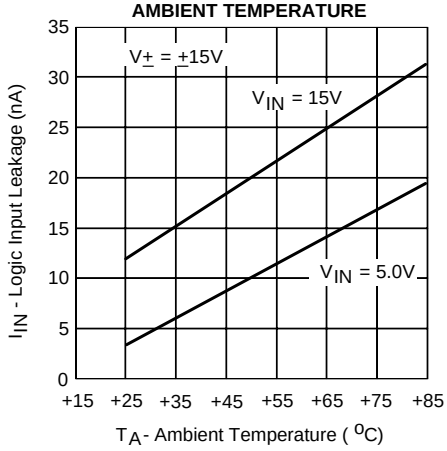


SUPPLY CURRENTS -VS- AMBIENT TEMPERATURE



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

LOGIC INPUT LEAKAGE CURRENT -VS- AMBIENT TEMPERATURE



SWITCH OFF LEAKAGES -VS- AMBIENT TEMPERATURE