

BRITISH STANDARDS INSTITUTION

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BS CECC 90 104 - 115

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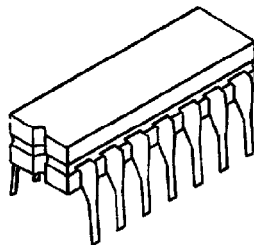
ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH:

BS CECC 90 000 : 1976
 BS CECC 90 100 : 1977

MANUFACTURERS TYPE NUMBER**4016B**

SEE PD 9002 AND CECC 00 200
For ordering information
 see page 12

Outline not to scale: Isometric projection
 Marking information see page 11



4 SINGLE POLE, SINGLE THROW
 SWITCHES

SILICON COMPLEMENTARY MOS.
WITH (B) BUFFERED OUTPUTS AND
CAVITY PACKAGING.

For detail dimensions see IEC 191-2 (A50B)

Assessment levels
R, S, T and V
and optional screening
categories A, B, C and D

CAUTION: THESE ARE STATIC SENSITIVE DEVICES - See clause 1.11

1. Limiting conditions of use (not for inspection purposes)

All voltages referenced to V_{SS}

1.1	Maximum supply voltage, positive	V_{DD}	+18,0V
1.2	Maximum supply voltage, negative	V_{DD}	-0,5V
1.3	Maximum positive input voltage	V_I	V_{DD} +0,5V
1.4	Maximum negative input voltage	V_I	-0,5V

Refer to Qualified Products List PD 9002 and/or CECC 00 200
 for details of manufacturers approved to this specification

1 Limiting conditions of use (contd)

1.5	Maximum power dissipation, per package per output	P_{D1}	200,0mW
		P_{D2}	66,6mW
1.6	Maximum continuous current into any input.	$ I_I $	10,0mA
1.7	Maximum continuous current into any output.	$ I_O $	10,0mA
1.8	Operating temperature range	T_{amb}	
		Full	-55 to +125°C
		Limited	-40 to + 85°C
1.9	Storage temperature range	T_{stg}	-65 to +150°C
1.10	Transient energy rating		400V at 100pF through 1,5kΩ
1.11	<u>Recommended handling precautions</u>		
1.11.1	Store devices in either conductive foam or conductive rails, or connect all leads together using a similar electrical shorting method.		
1.11.2	Use grounded tip soldering irons.		
1.11.3	Ground all test equipment.		
1.11.4	Connect all unused device inputs to V_{DD} or V_{SS} .		
1.11.5	PC boards used to mount MOS devices should have all metal leads grounded during device mounting or flow soldering operations.		
1.11.6	Soldering equipment, solder pots or flow soldering equipment should be grounded whenever in contact with PC boards and/or MOS devices.		
1.11.7	Do not use ungrounded automatic insertion equipment or other handling equipment that precludes the use of suitable device lead grounding techniques during inspection or handling.		
1.11.8	When PC boards containing mounted MOS devices are removed from equipment for test, shipping or storage, 'Dummy connectors' should be used to electrically short all PC board terminals together.		
1.11.9	Switch off power supply before inserting or removing devices from circuits.		
1.11.10	Disconnect all low impedance equipment and input signals from the device before d.c. power supplies are switched off.		

2. Recommended conditions of use and associated characteristics (not for inspection purposes)

These apply over the operating temperature range unless otherwise stated. All voltages referenced to V_{SS} .

Characteristics	Conditions	Symbol	$V_{DD}(V)$	T_{amb} LOW	T_{amb} = 25°C	T_{amb} HIGH	Unit
Quiescent device current	$V_{IL} = 0V$ $V_{IH} = V_{DD}$						
Full temperature range	Outputs open circuit	I_{DDA}	5,0	0,25	0,25	7,5	μA
		I_{DDA}	10,0	0,50	0,50	15,0	μA
		I_{DDA}	15,0	1,00	1,00	30,0	μA
Limited temperature range		I_{DDA}	5,0	1,0	1,0	7,5	μA
		I_{DDA}	10,0	2,0	2,0	15,0	μA
		I_{DDA}	15,0	4,0	4,0	30,0	μA
Input leakage current	$V_{IL} = 0V$ $V_{IH} = V_{DD}$						
Full temperature range		$ I_{IA} $	15,0	0,10	0,10	1,00	μA
Limited temperature range		$ I_{IA} $	15,0	0,30	0,30	1,00	μA
Switch 'ON' level resistance	$R_L = 10k\Omega$	$r_{DS(ON)A}$					
Full temperature range	$V_C = V_{DD}$ $V_{SS} = -5,0V$ $V_{IN} = +0,25V$	$r_{DS(ON)A}$	5,0	600,0	660,0	960,0	Ω
	$V_C = V_{DD}$ $V_{SS} = -5,0V$ $V_{IN} = \pm 5,00V$	$r_{DS(ON)A}$	5,0	600,0	660,0	960,0	Ω
	$V_C = V_{DD}$ $V_{SS} = -7,5V$ $V_{IN} = \pm 0,25V$	$r_{DS(ON)A}$	7,5	360,0	400,0	600,0	Ω
	$V_C = V_{DD}$ $V_{SS} = -7,5V$ $V_{IN} = \pm 7,50V$	$r_{DS(ON)A}$	7,5	360,0	400,0	600,0	Ω
	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 0,25V/10,0V$	$r_{DS(ON)A}$	10,0	600,0	660,0	960,0	Ω

Characteristics	Conditions	Symbol	$V_{DD}(V)$	T_{amb} LOW	T_{amb} = 25°C	T_{amb} HIGH	Unit
Switch 'ON' level resistance (contd)							
Full temperature range (contd)	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 5,60V$	$r_{DS(ON)A}$	10,0	600,0	660,0	960,0	Ω
	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 0,25V/15,0V$	$r_{DS(ON)A}$	15,0	360,0	400,0	520,0	Ω
	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 9,30V$	$r_{DS(ON)A}$	15,0	360,0	400,0	600,0	Ω
Limited temperature range	$V_C = V_{DD}$ $V_{SS} = -5,0V$ $V_{IN} = \pm 0,25V$	$r_{DS(ON)A}$	5,0	610,0	660,0	840,0	Ω
	$V_C = V_{DD}$ $V_{SS} = -7,5V$ $V_{IN} = \pm 5,00V$	$r_{DS(ON)A}$	5,0	610,0	660,0	840,0	Ω
	$V_C = V_{DD}$ $V_{SS} = -5,0V$ $V_{IN} = \pm 0,25V$	$r_{DS(ON)A}$	7,5	370,0	400,0	520,0	Ω
	$V_C = V_{DD}$ $V_{SS} = -7,5V$ $V_{IN} = \pm 7,50V$	$r_{DS(ON)A}$	7,5	370,0	400,0	520,0	Ω
	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 0,25V/10,0V$	$r_{DS(ON)A}$	10,0	610,0	660,0	840,0	Ω
	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 5,60V$	$r_{DS(ON)A}$	10,0	610,0	660,0	840,0	Ω
	$V_C = V_{DD}$ $V_{SS} = 0V$ $V_{IN} = 0,25V/15,0V$						

Characteristics	Conditions	Symbol	V _{DD} (V)	T _{amb} LOW	T _{amb} = 25°C	T _{amb} HIGH	Unit
Switch 'ON' resistance (contd)							
Limited temperature range (contd)	V _C = V _{DD} V _{SS} = 0V V _{IN} = 9,30V	r _{DS(ON)} A	15,0	370,0	400,0	520,0	Ω
Variation of switch 'ON' level resistance	V _C = V _{DD} V _{IN} = ±5,0V V _{SS} = -0,5V	Δr _{DS(ON)} A	5,0	50,0	50,0	125,0	Ω
	V _{IN} = 17,5V V _{SS} = -7,5V	Δr _{DS(ON)} A	7,5	50,0	50,0	125,0	Ω
Switch 'OFF' level leakage currents							
Full temperature range	V _C = V _{SS} = 0V V _{IN} , V _{OUT} = V _{DD}	I _{S(OFF)} A I _{D(OFF)} A	15,0	1,0	1,0	30,0	μA
Limited temperature range	V _C = V _{SS} = 0V V _{IN} , V _{OUT} = V _{DD}	I _{S(OFF)} A	15,0	4,0	4,0	30,0	μA
Switch terminal 'ON' level leakage current into control circuit	V _{CC} = V _{OUT} = V _{DD}						
Full temperature range		I _{D(ON)} A	15,0	1,0	1,0	30,0	μA
Limited temperature range		I _{D(ON)} A	15,0	4,0	4,0	30,0	μA
Input Voltage* Control Input		V _{ILA} V _{ILA} V _{ILA}	5,0 10,0 15,0	- - -	0,9 0,9 0,9	- - -	Vdc Vdc Vdc
Input Voltags* Control Input		V _{IHA} V _{IHA} V _{IHA}	5,0 10,0 15,0	- - -	3,0 8,0 13,0	- - -	Vdc Vdc Vdc
Propagation and Transition Times	C _L = 50pF (Test conditions as in Sub-group A5)						

*Input voltage specified as the voltage required at the Control Input for 10,0μA current through the transmission gate with an input-to-output stress of
V_{DD} = V_{SS} for V_{IL} and V_{IH}

Characteristics	Conditions	Symbol	$V_{DD}(V)$	T_{amb} LOW	T_{amb} = 25°C	T_{amb} HIGH	Unit
<u>Control</u> 'OFF' level to 'ON' level Propagation Delay Time ** $V_C = V_{SS}$ to V_{DD} $R_L = 1,0k\Omega$, $V_{IN} = V_{DD}$		t_{ONA} t_{ONA} t_{ONA}	5,0 10,0 15,0	- - -	90,0 45,0 35,0	- - -	ns ns ns
<u>Control</u> 'ON' level to 'OFF' level Propagation Delay Time ** $V_{SS} = V_{DD}$ to V_{SS} $R_L = 1,0k\Omega$, $V_{IN} = V_{DD}$		t_{OFFA} t_{OFFA} t_{OFFA}	5,0 10,0 15,0	- - -	90,0 45,0 35,0	- - -	ns ns ns
Propagation Delay Time Input to Signal Output ** $V_C = V_{DD}$, $V_{IN} = V_{SS}$ or V_{DD} $R_L = 10,0k\Omega$		$t_{PHLA}/$ t_{PLHA}	5,0 10,0 15,0	- - -	45,0 15,0 12,0	- - -	ns ns ns
Bandwidth at 3dB (Channel in 'ON' level) ($R_L = 1,0k\Omega$), $V_{IN} = 5,0V_{p-p}$		f_{1B}	10,0	-	44,0	-	MHz
Input Capacitance (Any Input)		C_{inA}	-	-	7,5	-	pF

** V_C = Control Voltage

Terminal identification

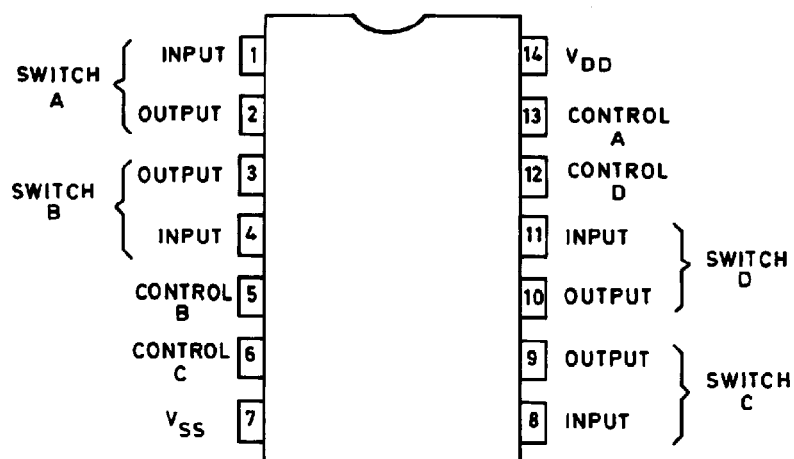


Figure 1

Function table
(each switch)

Table 1

CONTROL INPUT	OUTPUT
L	Switch open
H	Switch closed

H = HIGH level
L = LOW level

Function block diagram

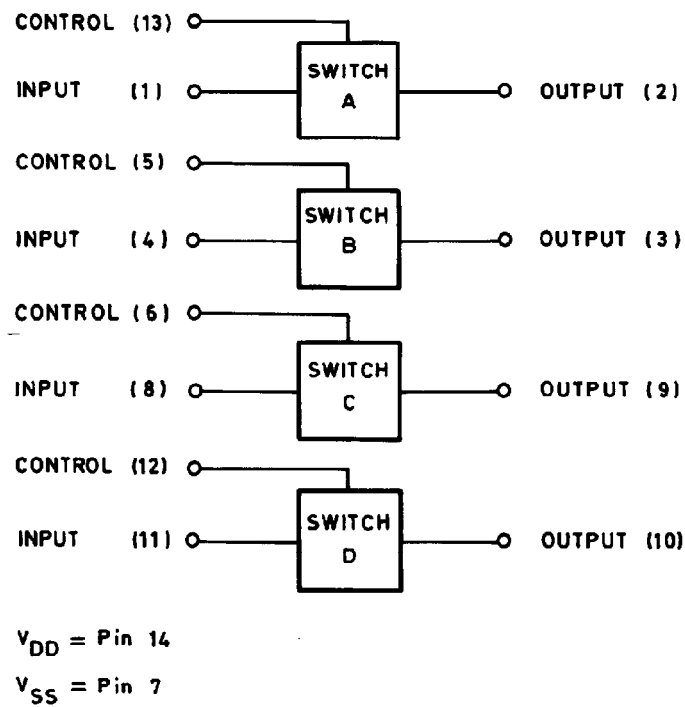
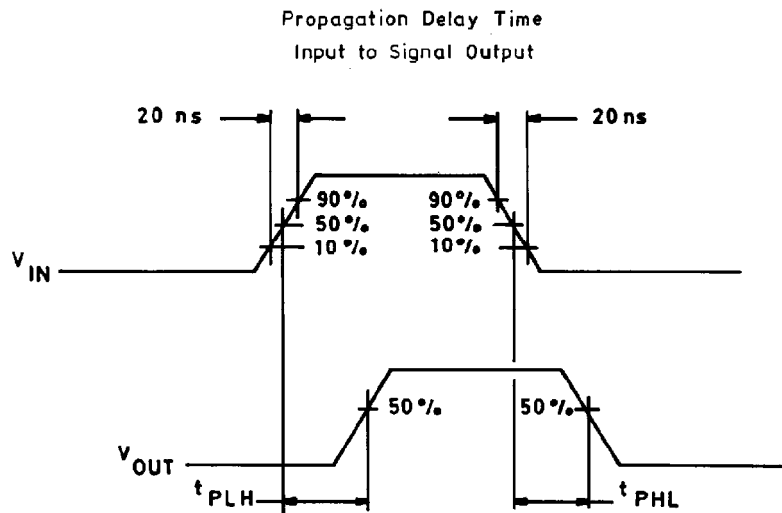


Figure 2

Switching time waveforms



Control, OFF to ON level and ON to OFF level

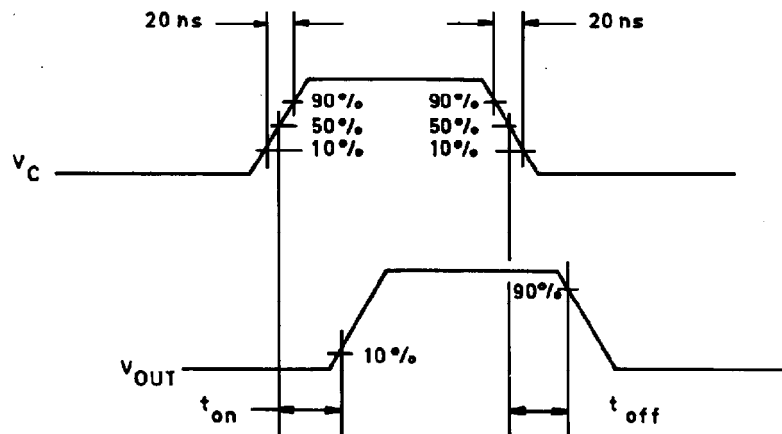


Figure 3