

COS/MOS INTEGRATED CIRCUIT



HCC/HCF 40257B

41C 09189 D

QUAD 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER

- 3-STATE OUTPUTS
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100 nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD No. 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"

The HCC 40257B (extended temperature range) and HCF 40257B (intermediate temperature range) are monolithic integrated circuits, available in 16-lead dual in-line plastic or ceramic package, ceramic flat package and plastic micropackage.

The HCC/HCF 40257B is a Data Selector/Multiplexer featuring three-state outputs which can interface directly with and drive data lines of bus-oriented systems.

ABSOLUTE MAXIMUM RATINGS

V_{DD}^*	Supply voltage: HCC types HCF types	-0.5 to 20 -0.5 to 18	V V
V_I	Input voltage	-0.5 to $V_{DD} + 0.5$	V
I_I	DC input current (any one input)	± 10	mA
P_{tot}	Total power dissipation (per package)	200	mW
	Dissipation per output transistor for T_{op} = full package-temperature range	100	mW
T_{op}	Operating temperature: HCC types HCF types	-55 to 125 -40 to 85	°C °C
T_{stg}	Storage temperature	-65 to 150	°C

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

* All voltages are with respect to V_{SS} (GND).

ORDERING NUMBERS:

HCC 40257 BD for dual in-line ceramic package.
HCC 40257 BF for dual in-line ceramic package, frit seal
HCC 40257 BK for ceramic flat package
HCF 40257 BE for dual in-line plastic package
HCF 40257 BF for dual in-line ceramic package, frit seal
HCF 40257 BM for plastic micropackage

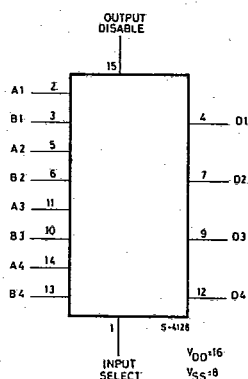
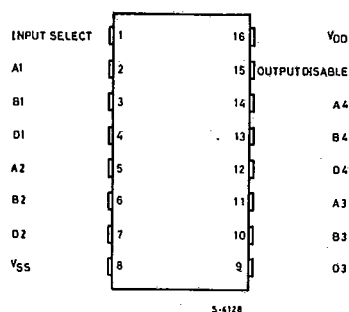
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MECHANICAL DATA (dimensions in mm)

Technical drawing of a 16-pin DIP package. The top view shows a central square body with 8 pins on each side. Dimensions include a total width of 0.995 inches (25.28 mm), a central body width of 0.63 inches (16.01 mm), and pin pitch of 0.063 inches (1.60 mm). The side view shows a package height of 0.159 inches (4.04 mm), a base thickness of 0.038 inches (0.97 mm), and a pin height of 0.127 inches (3.20 mm).

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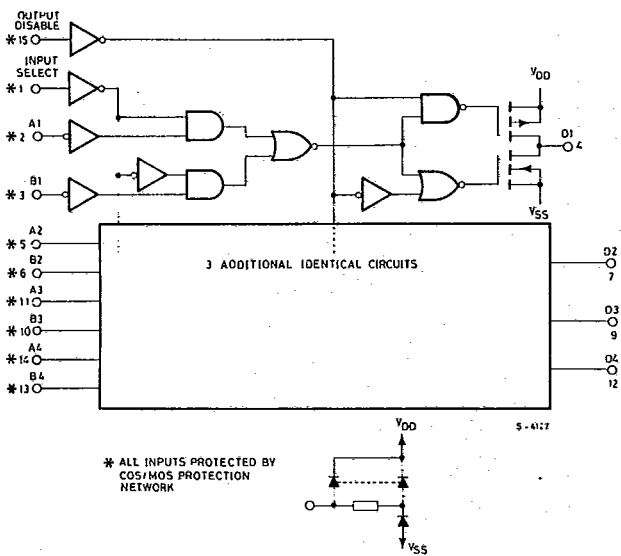
FUNCTIONAL DIAGRAM



V_{DD}	Supply voltage: HCC types HCF types	3 to 18	V
V_I	Input voltage	3 to 15	V
T_{op}	Operating temperature: HCC types HCF types	0 to V_{DD} -55 to 125 -40 to 85	V °C °C

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LOGIC DIAGRAM AND TRUTH TABLE

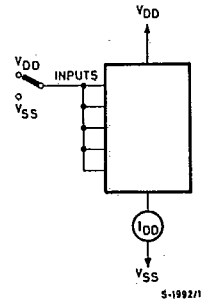


3-STATE OUTPUT DISABLE	INPUTS			OUTPUT
	SELECT	A	B	D
1	X	X	X	Z
0	0	0	X	0
0	0	1	X	1
0	1	X	0	0
0	1	X	1	1

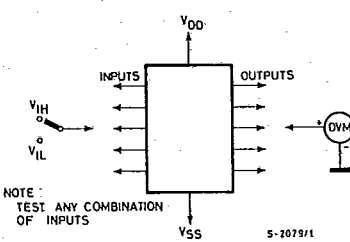
X = DON'T CARE LOGIC 1 = HIGH
LOGIC 0 = LOW Z = HIGH IMPEDANCE

TEST CIRCUITS

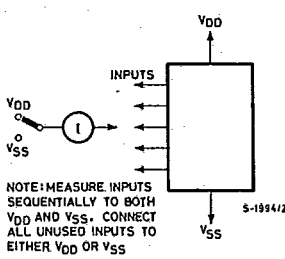
Quiescent device current



Input voltage



Input leakage current



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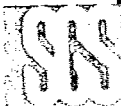
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STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

Parameter			Test conditions				Values							Unit
			V _I (V)	V _O (V)	I _O (μ A)	V _{DD} (V)	T _{Low} *		25°C			T _{High} *		
							Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
I _L	Quiescent current	HCC types	0/ 5			5		1		0.02	1		30	μ A
			0/10			10		2		0.02	2		60	
			0/15			15		4		0.02	4		120	
			0/20			20		20		0.04	20		600	
		HCF types	0/ 5			5		4		0.02	4		30	
			0/10			10		8		0.02	8		60	
			0/15			15		16		0.02	16		120	
V _{OH}	Output high voltage	0/ 5		< 1	5	4.95		4.95			4.95		V	
		0/10		< 1	10	9.95		9.95			9.95			
		0/15		< 1	15	14.95		14.95			14.95			
V _{OL}	Output low voltage	5/0		< 1	5		0.05			0.05		0.05	V	
		10/0		< 1	10		0.05			0.05		0.05		
		15/0		< 1	15		0.05			0.05		0.05		
V _{IH}	Input high voltage		0.5/4.5	< 1	5	3.5		3.5			3.5		V	
			1/9	< 1	10	7		7			7			
			1.5/13.5	< 1	15	11		11			11			
V _{IL}	Input low voltage		4.5/0.5	< 1	5		1.5			1.5		1.5	V	
			9/1	< 1	10		3			3		3		
			13.5/1.5	< 1	15		4			4		4		
I _{OH}	Output drive current	HCC types	0/ 5	2.5		5	-2		-1.6	-3.2		-1.15		mA
			0/ 5	4.6		5	-0.64		-0.51	-1		-0.36		
			0/10	9.5		10	-1.6		-1.3	-2.6		-0.9		
			0/15	13.5		15	-4.2		-3.4	-6.8		-2.4		
		HCF types	0/ 5	2.5		5	-1.53		-1.36	-3.2		-1.1		
			0/ 5	4.6		5	-0.52		-0.44	-1		-0.36		
			0/10	9.5		10	-1.3		-1.1	-2.6		-0.9		
			0/15	13.5		15	-3.6		-3.0	-6.8		-2.4		
I _{OL}	Output sink current	HCC types	0/ 5	0.4		5	0.64		0.51	1		0.36		mA
			0/10	0.5		10	1.6		1.3	2.6		0.9		
			0/15	1.5		15	4.2		3.4	6.8		2.4		
		HCF types	0/ 5	0.4		5	0.52		0.44	1		0.36		
			0/10	0.5		10	1.3		1.1	2.6		0.9		
			0/15	1.5		15	3.6		3.0	6.8		2.4		
I _{IH} , I _{IL}	Input leakage current	HCC types	0/18	Any input		18		± 0.1		$\pm 10^{-5}$	± 0.1		± 1	μ A
		HCF types	0/15			15		± 0.3		$\pm 10^{-5}$	± 0.3		± 1	
I _{OH} , I _{OL} **	3-state output leakage current	HCC types	0/18	0/18		18		± 0.4		$\pm 10^{-4}$	± 0.4		± 12	μ A
		HCF types	0/15	0/15		15		± 1.0		$\pm 10^{-4}$	± 1.0		± 7.5	
C _I	Input capacitance			Any input						5	7.5			pF

* T_{Low} = - 55°C for HCC device; -40°C for HCF device.* T_{High} = +125°C for HCC device; +85°C for HCF device.The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD} = 5V2V min. with V_{DD} = 10V** Forced output disable. 2.5V min. with V_{DD} = 15V



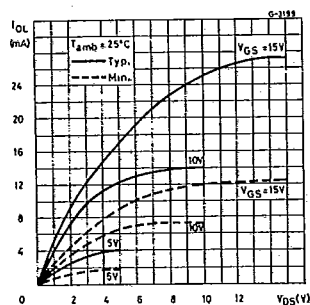
HCC/HCF 40257B

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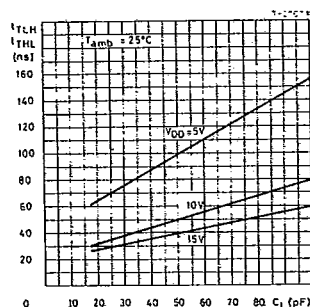
DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^\circ\text{C}$, $C_L = 50\text{ pF}$, $R_L = 200\text{ k}\Omega$, typical temperature coefficient for all V_{DD} values is $0.3\%/^\circ\text{C}$, all input rise and fall time = 20 ns)

Parameter		Test conditions		Values			Unit
			V _{DD} (V)	Min.	Typ.	Max.	
t _{PLH} , t _{PHL}	Propagation Delay Time Data Input to Output		5		150	300	ns
			10		70	140	
			15		50	100	
Select to output			5		190	380	ns
			10		85	170	
			15		65	130	
Output Disable to Output			5		95	190	ns
			10		50	100	
			15		40	80	
t _{THL} , t _{TLH}	Transition time		5		100	200	ns
			10		50	100	
			15		40	80	

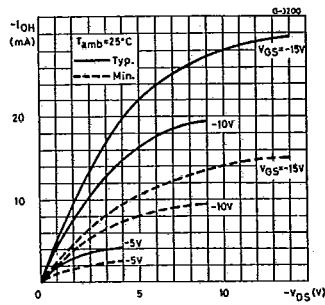
Output low (sink) current characteristics



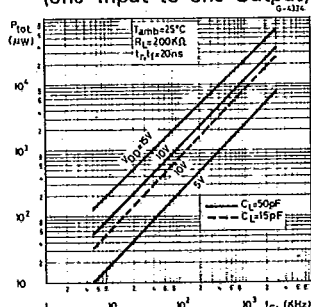
Typical transition time vs. load capacitance



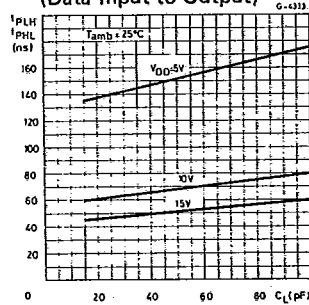
Output high (source) current characteristics

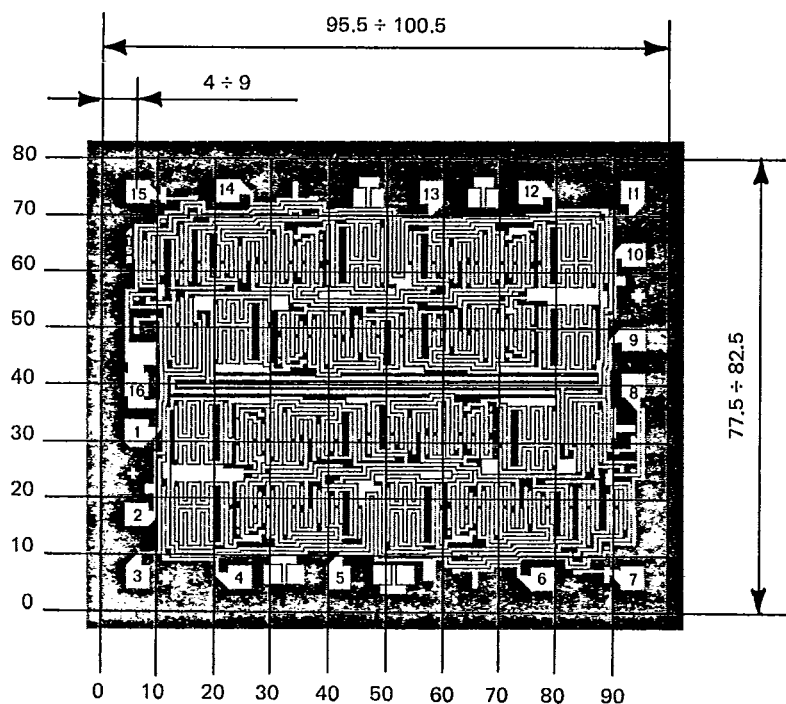


Typical dynamic power dissipation vs. input frequency (one Input to one Output)

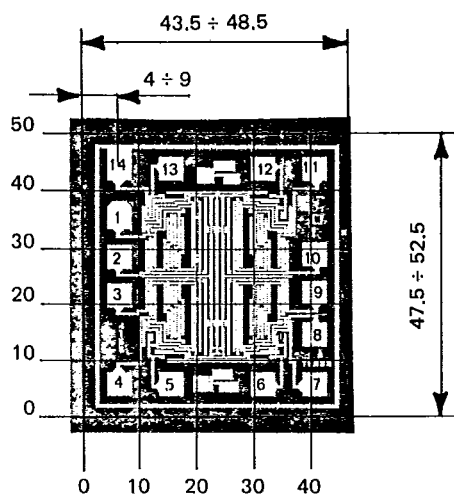


Typical propagation delay time vs. load capacitance (Data Input to Output)





4015B



4016B