

Buffers/drivers

FAST 74F655A, 74F656A

74F655A Octal buffer/driver with parity, inverting (3-State); 74F656A Octal buffer/driver with parity, non-inverting (3-State)

FEATURES

- Significantly improved AC performance over 'F655 and 'F656
- High impedance NPN base inputs for reduced loading (I_{IL} is $40\mu A$ in High and Low states)
- Ideal in applications where high output drive and light bus loading are required (I_{IL} is $40\mu A$ vs FAST std of $600\mu A$)
- 'F655A combines 'F240 and 'F280A functions in one package
- 'F656A combines 'F244 and 'F280A functions in one package
- 'F655A Inverting
- 'F656A Non-Inverting
- 3-state outputs sink 64mA and source 15mA
- 24-pin plastic Slim DIP (300mil) package
- Inputs on one side and outputs on the other side simplifies PC board layout
- Combined functions reduce part count and enhance system performance
- Industrial temperature range available ($-40^{\circ}C$ to $+85^{\circ}C$)

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F655A	6.5ns	64mA
74F656A	6.5ns	64mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$ $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$	INDUSTRIAL RANGE $V_{CC} = 5V \pm 10\%$ $T_{amb} = -40^{\circ}C$ to $+85^{\circ}C$
24-Pin Plastic Slim DIP (300mil)	N74F655AN, N74F656AN	I74F655AN, I74F656AN
24-Pin Plastic SOL	N74F655AD, N74F656AD	I74F655AD, I74F656AD

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D0- D7	Data inputs	2.0/0.066	$40\mu A/40\mu A$
PI	Parity input	1.0/0.033	$20\mu A/20\mu A$
OE0, OE1, OE2	Output Enable inputs (active Low)	1.0/0.033	$20\mu A/20\mu A$
ΣE , ΣO	Parity outputs	750/106.7	15mA/64mA
Q0- Q7	Data outputs ('F655A)	750/106.7	15mA/64mA
Q0- Q7	Data outputs ('F656A)	750/106.7	15mA/64mA

NOTE:

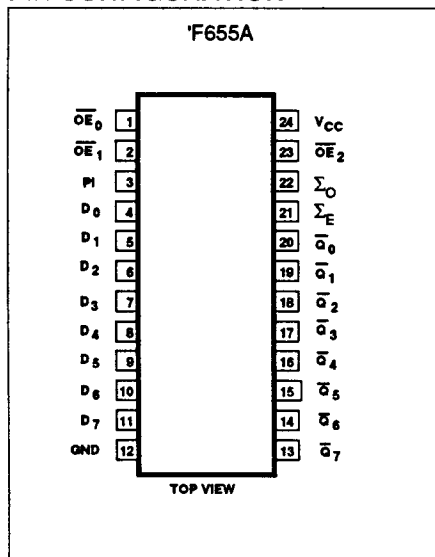
One (1.0) FAST Unit Load is defined as: $20\mu A$ in the High state and $0.6mA$ in the Low state.

DESCRIPTION

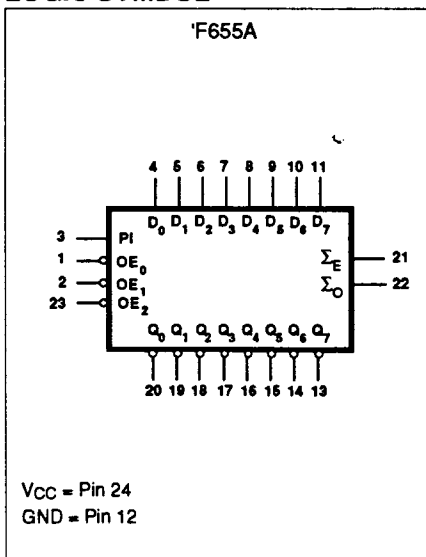
The 74F655A and 74F656A are octal buffers and line drivers with parity generation/checking designed to be employed as memory address drivers,

clock drivers, and bus-oriented transmitters/receivers. These parts include parity generator/checker to improve PC board density.

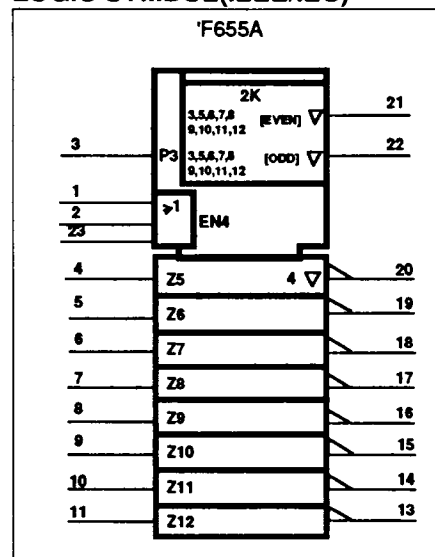
PIN CONFIGURATION



LOGIC SYMBOL



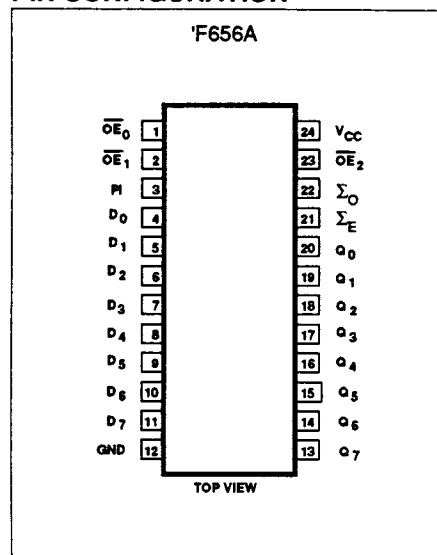
LOGIC SYMBOL (IEEE/IEC)



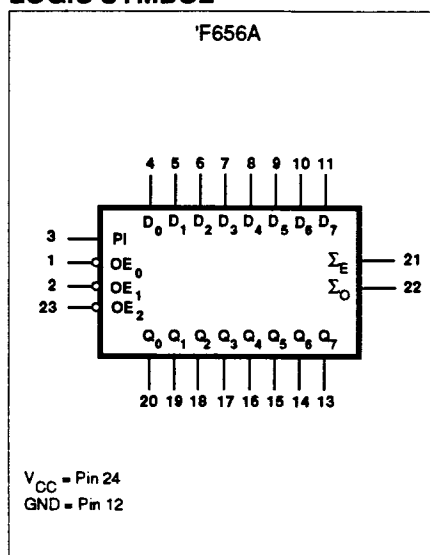
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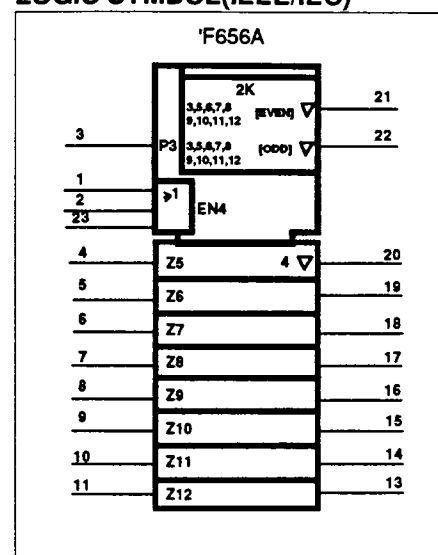
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



FUNCTION TABLE

INPUTS				OUTPUTS	
				'F655A	'F656A
$\overline{OE0}$	$\overline{OE1}$	$\overline{OE2}$	D_n	$\overline{Q_n}$	Q_n
L	L	L	L	H	L
L	L	L	H	L	H
H	X	X	X	Z	Z
X	H	X	X	Z	Z
X	X	H	X	Z	Z

H = High voltage level

L = Low voltage level

X = Don't care

Z = High impedance "off" state

FUNCTION TABLE for PARITY OUTPUTS

INPUTS	OUTPUTS	
Number of inputs High (PI, D0-D7)	ΣE	ΣO
Even ----- 0, 2, 4, 6, 8	H	L
Odd ----- 1, 3, 5, 7, 9	L	H
Any $\overline{OE_n}$ =High	Z	Z

H = High voltage level

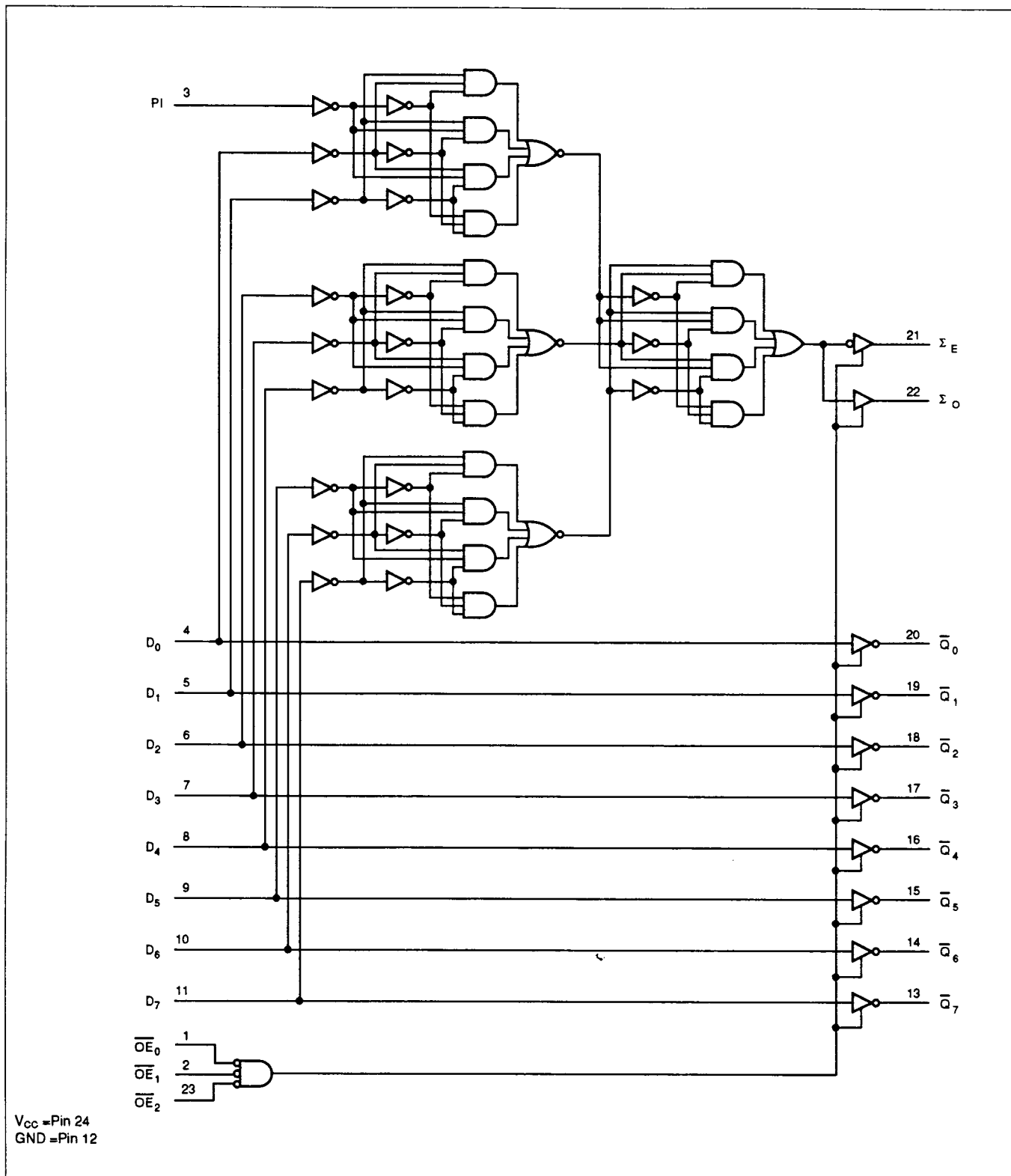
L = Low voltage level

Z = High impedance "off" state

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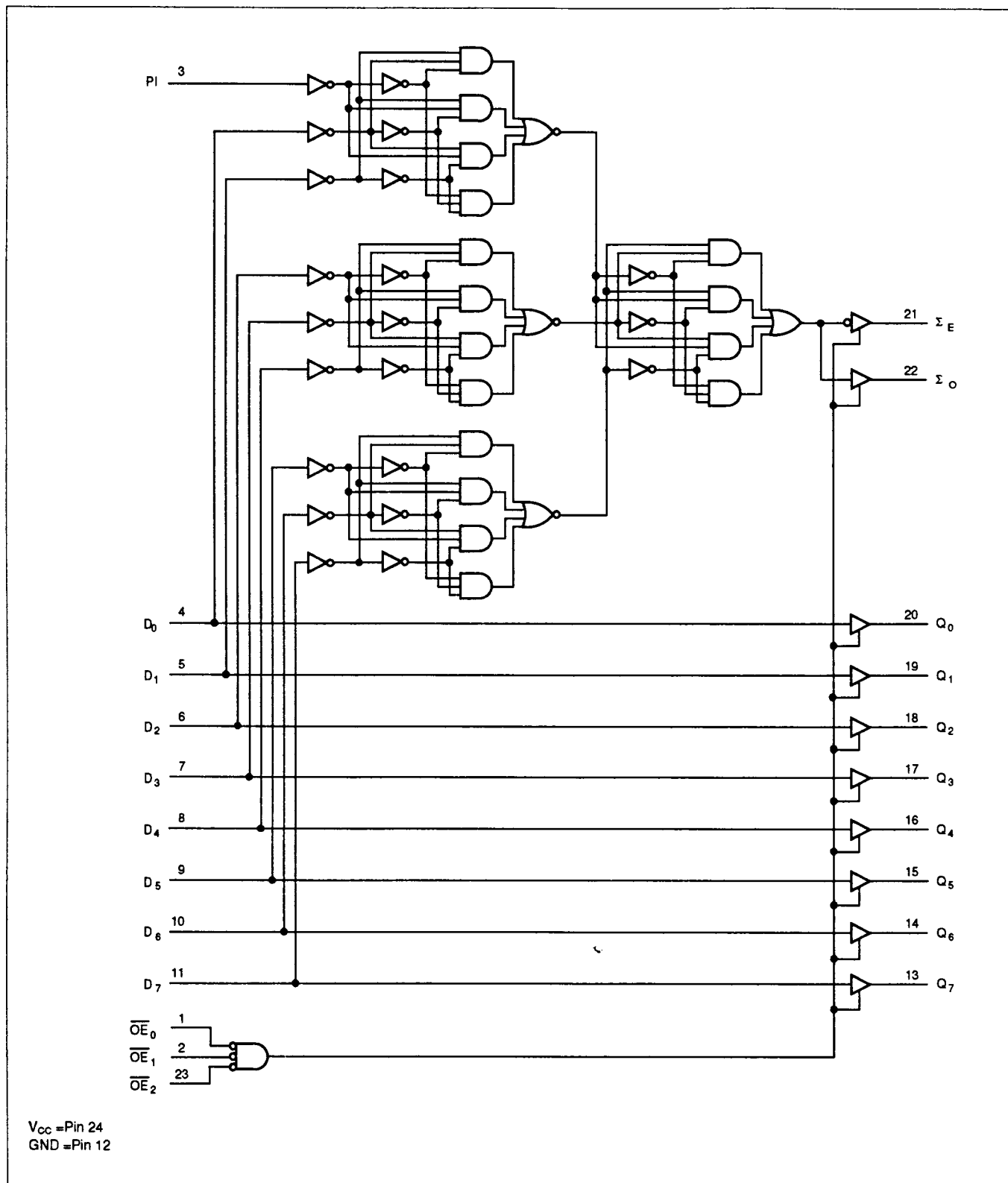
LOGIC DIAGRAM for 'F655A



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LOGIC DIAGRAM for 'F656A



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ABSOLUTE MAXIMUM RATINGS (Operation beyond the limits set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER		RATING	UNIT
V_{CC}	Supply voltage		-0.5 to +7.0	V
V_{IN}	Input voltage		-0.5 to +7.0	V
I_{IN}	Input current		-30 to +5	mA
V_{OUT}	Voltage applied to output in High output state		-0.5 to V_{CC}	V
I_{OUT}	Current applied to output in Low output state		128	mA
T_{amb}	Operating free-air temperature range	Commercial range	0 to +70	°C
		Industrial range	-40 to +85	°C
T_{STG}	Storage temperature		-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER		LIMITS			UNIT
			Min	Nom	Max	
V_{CC}	Supply voltage		4.5	5.0	5.5	V
V_{IH}	High-level input voltage		2.0			V
V_{IL}	Low-level input voltage				0.8	V
I_{IK}	Input clamp current				-18	mA
I_{OH}	High-level output current				-15	mA
I_{OL}	Low-level output current				64	mA
T_{amb}	Operating free-air temperature range	Commercial range	0		70	°C
		Industrial range	-40		85	°C

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DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER			TEST CONDITIONS ¹			LIMITS			UNIT
							Min	Typ ²	Max	
V _{OH}	High-level output voltage			V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OH} =-3mA	±10%V _{CC}	2.4			V
						±5%V _{CC}	2.7	3.3		V
					I _{OH} =-15mA	±10%V _{CC}	2.0			V
V _{OL}	Low-level output voltage			V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OL} =64mA	±10%V _{CC}			0.55	V
						±5%V _{CC}		0.42	0.55	V
V _{IK}	Input clamp voltage			V _{CC} = MIN, I _I = I _{IK}				-0.73	-1.2	V
I _I	Input current at maximum input voltage			V _{CC} = 0.0V, V _I = 7.0V					100	μA
I _{IH}	High-level Input current	Commercial range	Dn	V _{CC} = MAX, V _I = 2.7V					40	μA
			PI, <u>Q</u> En						20	μA
		Industrial range	Dn						80	μA
			PI, <u>Q</u> En						40	μA
I _{IL}	Low-level input current		Dn	V _{CC} = MAX, V _I = 0.5V					-40	μA
			PI, <u>Q</u> En						-20	μA
I _{OZH}	Off-state output current High-level voltage applied			V _{CC} = MAX, V _O = 2.7V					50	μA
I _{OZL}	Off-state output current Low-level voltage applied			V _{CC} = MAX, V _O = 0.5V					-50	μA
I _{OS}	Short-circuit output current ³			V _{CC} = MAX			-100		-225	mA
I _{CC}	Supply current (total)		I _{CCH}	V _{CC} = MAX				50	80	mA
			I _{CCL}					78	110	mA
			I _{CCZ}					83	90	mA

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}$, $T_{\text{amb}} = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time. For testing I_{OS} , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

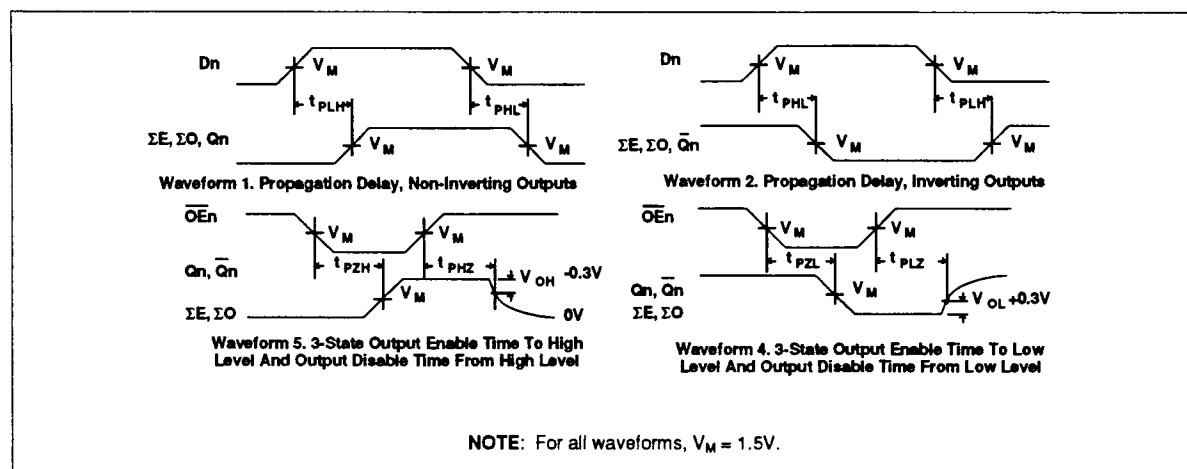
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AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER		TEST CONDITION	LIMITS								UNIT
				$T_{amb} = +25^{\circ}\text{C}$			$T_{amb} = 0^{\circ}\text{C to } +70^{\circ}\text{C}$		$T_{amb} = -40^{\circ}\text{C to } +85^{\circ}\text{C}$			
				$V_{CC} = 5\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$V_{CC} = 5\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		$V_{CC} = 5\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			
				Min	Typ	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation delay Dn to Qn	'F655A	Waveform 2	2.0 1.0	4.5 2.5	6.5 4.0	2.0 1.0	7.5 4.5	2.0 1.0	8.5 5.5	ns	
t_{PLH} t_{PHL}	Propagation delay Dn to Qn	'F656A	Waveform 1	2.0 2.5	4.0 5.5	6.5 7.0	2.0 2.5	7.0 7.5	2.0 2.5	8.0 9.0	ns	
t_{PLH} t_{PHL}	Propagation delay Dn to ΣE , ΣO		Waveform 1, 2	5.5 5.5	10.0 11.0	13.0 14.5	5.5 5.5	14.0 16.5	4.5 5.5	16.5 18.0	ns	
t_{PZH} t_{PZL}	Output Enable time to High or Low level		Waveform 3 Waveform 4	3.5 4.0	7.0 8.0	10.5 11.0	3.5 4.0	11.5 12.0	3.0 4.0	13.0 13.5	ns	
t_{PHZ} t_{PLZ}	Output Disable time from High or Low level		Waveform 3 Waveform 4	1.5 2.0	4.5 5.0	8.0 8.0	1.5 2.0	9.0 9.0	1.5 1.5	10.0 10.0	ns	

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS

