9005 • 9008
9006

EXTENDABLE AND-OR-INVERT GATES
EXTENDER (9006)

DESCRIPTION: — The 9005 and 9008 are AND-OR-INVERT gates which may be OR extended with the use of the 9006.

ORDERING CODE: See Section 9

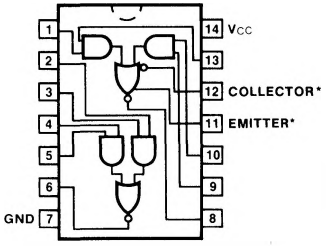
PKGS	PIN OUT	COMMERCIAL GRADE V_{CC} = +5.0 V ±5%, T_A = 0°C to +75°C	MILITARY GRADE V_{CC} = +5.0 V ±10%, T_A = -55°C to +125°C	PKG TYPE
Ceramic DIP (D)	A	9005DC	9005DM	6A
	B	9006DC	9006DM	
	C	9008DC	9008DM	
Flatpak (F)	A	9005FC	9005FM	3I
	B	9006FC	9006FM	
	C	9008FC	9008FM	

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PINS	9005 (U.L.) HIGH/LOW	9006 (U.L.) HIGH/LOW	9008 (U.L.) HIGH/LOW
Non-extendable Gate Inputs	1.5/1.0		
Extendable Gate Inputs	2.25/1.5		
All Inputs		2.25/1.5	2.25/1.5
Outputs	30/8.8 (33)/(8.5)	*	30/8.8 (33)/(8.5)

*Outputs on 9006 have open-emitter and collector

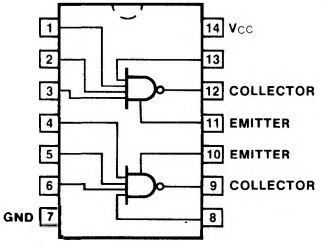
CONNECTION DIAGRAMS
PINOUT A



*Four extenders (9006) may be tied to these terminals

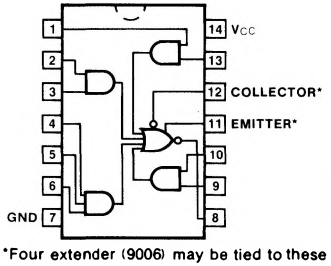
V_{CC} = Pin 14
GND = Pin 7

PINOUT B



V_{CC} = Pin 14
GND = Pin 7

PINOUT C



*Four extender (9006) may be tied to these terminals

V_{CC} = Pin 14
GND = Pin 7

5

DC AND AC CHARACTERISTICS OVER COMMERCIAL TEMPERATURE RANGE: V_{CC} = +5.0 V ±5%

SYMBOL	PARAMETER	0°C Min	0°C Max	25°C Min	25°C Max	75°C Min	75°C Max	UNITS	CONDITIONS
V_{IH}	Input HIGH Voltage	1.9		1.8		1.6		V	Guaranteed Input HIGH Threshold Voltage
V_{IL}	Input LOW Voltage		0.85		0.85		0.85	V	Guaranteed Input LOW Threshold Voltage
V_{OL}	Output LOW Voltage		0.45		0.45		0.45	V	V_{CC} = 5.25 V, I_{OL} = 16 mA,
			0.45		0.45		0.45	V	V_{CC} = 4.75 V, I_{OL} = 14.1 mA
I_{IL}	Input LOW Current 9005 Non-Extendable Gate	-1.6	-1.41	-1.6	-1.41	-1.6	-1.41	mA	V_{CC} = Max / Min; V_{IN} = .45 V 5.25 V on Other Inputs
	Input LOW Current Extendable Gates and Extender	-2.4	-2.12	-2.4	-2.12	-2.4	-2.12	mA	V_{CC} = Max / Min; V_{IN} = .45 V 5.25 V on Other Inputs
I_{CC}	Power Supply Current, ON 9005 Non-Extendable Gate		7.7		7.7		7.7	mA	All Inputs Open
	Power Supply Current, ON 9005 Extendable Gate		13.6		13.6		13.6	mA	All Inputs Open
	Power Supply Current, ON 9008		17.7		17.7		17.7	mA	All Inputs Open
	Power Supply Current, OFF 9005 Non-Extendable Gate		3.4		3.4		3.4	mA	All Inputs Except Extender Inputs Gnd
	Power Supply Current, OFF 9005 Extendable Gate		5.1		5.1		5.1	mA	All Inputs Except Extender Inputs Gnd
	Power Supply Current, OFF 9008		10.2		10.2		10.2	mA	All Inputs Except Extender Inputs Gnd
ΔI_{CC}	Extra Current Drain when one 9006 Extender is attached to a 9005 Gate ON		2.05		2.05		2.05	mA	All Inputs HIGH
	Extra Current Drain when one 9006 Extender is attached to a 9005 gate OFF		2.54		2.54		2.54	mA	All Inputs Gnd

DC AND AC CHARACTERISTICS OVER MILITARY TEMPERATURE RANGE: V_{CC} = +5.0 V ±10%

SYMBOL	PARAMETER	-55°C Min	-55°C Max	25°C Min	25°C Max	125°C Min	125°C Max	UNITS	CONDITIONS
V_{IH}	Input HIGH Voltage	2.0		1.7		1.4		V	Guaranteed Input HIGH Threshold Voltage
V_{IL}	Input LOW Voltage		0.8		0.9		0.8	V	Guaranteed Input LOW Threshold Voltage
V_{OL}	Output LOW Voltage		0.4		0.4		0.4	V	V_{CC} = 5.5 V, I_{OL} = 17.6 mA
			0.4		0.4		0.4	V	V_{CC} = 4.5 V, I_{OL} = 13.6 mA
I_{IL}	Input LOW Current 9005 Non-extendable Gate	-1.6	-1.24	-1.6	-1.24	-1.6	-1.24	mA	V_{CC} = Max / Min; V_{IN} = .4 V 5.5 V on Other Inputs
	Input LOW Current Extendable Gate and Extender	-2.4	-1.86	-2.4	-1.86	-2.4	-1.86	mA	V_{CC} = Max / Min; V_{IN} = .4 V 5.5 V on Other Inputs

NOTE:
Output characteristics above apply to a 9005 (both gates) or a 9008.
Input characteristics above apply to a 9005 (both gates) or a 9008 using either the internal gates or an external 9006 extender.

DC AND AC CHARACTERISTICS OVER MILITARY TEMPERATURE RANGE: V_{CC} = +5.0 V ±10% (Cont'd)

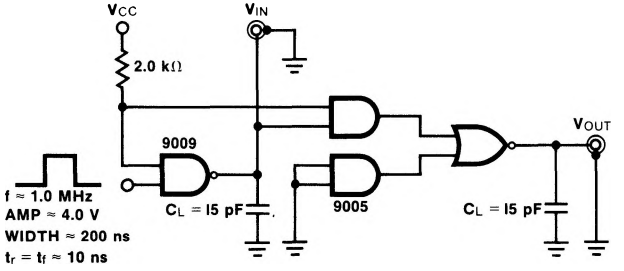
SYMBOL	PARAMETER	-55°C		25°C		125°C		UNITS	CONDITIONS
		Min	Max	Min	Max	Min	Max		
I_{CC}	Power Supply Current, ON								
	9005 Non-extendable Gate		6.5		6.5		6.5		
	9005 Extendable Gate		11.3		11.3		11.3	mA	All Inputs Open
	9008		12.5		12.5		12.5		
	Power Supply Current, OFF								
	9005 Non-extendable Gate		3.1		3.1		3.1		
	9005 Extendable Gate		4.7		4.7		4.7	mA	All Inputs Except Extender Inputs Gnd
	9008		9.4		9.4		9.4		
ΔI_{CC}	Extra Current Drain from one 9006 Extender Gate ON		1.61		1.61		1.61	mA	All Inputs HIGH
	Extra Current Drain from one 9006 Extender Gate OFF		2.35		2.35		2.35	mA	All Inputs Gnd 9006 Attached to a 9005

NOTE:
Output characteristics apply to a 9005 (both gates) or a 9008.
Input characteristics apply to a 9005 (both gates) or a 9008 using either the internal gates or an external 9006 extender.

SWITCHING CHARACTERISTICS (T_A = 25°C)

SYMBOL	LIMITS		UNITS	TEST CONDITIONS
	Min	Max		
t_{PLH}	3.0	12	ns	V_{CC} = 5.0 V, C_L = 15 pF
t_{PHL}	3.0	14		9005 Non-extendable Gate Only, See Figure a
t_{PLH}	3.0	15	ns	V_{CC} = 5.0 V, C_L = 15 pF, C_N = 5.0 pF
t_{PHL}	3.0	12		9005 Extendable Gate and 9008, See Figure b
Δt_{PLH}	-2.0	4.0	ns	9006 Only
Δt_{PHL}	-2.0	4.0		The 9006 is tested by measuring its propagation time through the 9005. The delay readings shall not exceed the 9005 readings by the specified amount. See Figure c

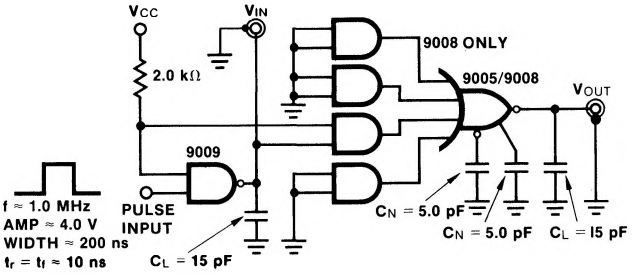
SWITCHING CHARACTERISTICS TEST CIRCUITS



Note: Capacitance includes probe and jig capacitance

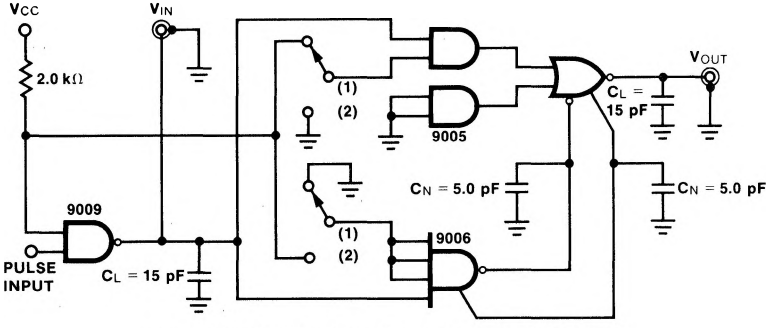
Fig. a 9005 Non-Extendable Gate

SWITCHING CHARACTERISTICS (Cont'd)
TEST CIRCUITS



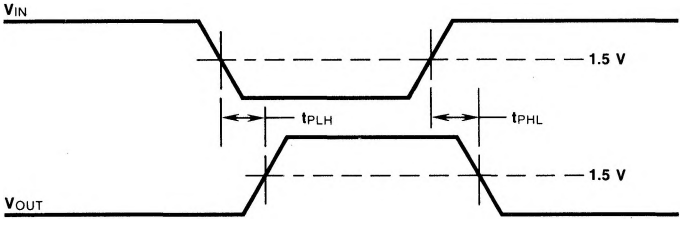
Note: Capacitance includes probe and jig capacitance

Fig. b 9005 or 9008 Extendable Gate



Note: Capacitance includes probe and jig capacitance

Fig. c 9006 Extender



NOTES:
With switch in postion (1) measure delay of 9005. With switch in position (2) measure delay (9005) + Δdelay (9006). Capacitances include probe and jig capacitances.

Fig. d Switching Waveform