

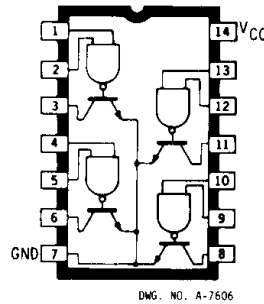
SERIES UHP-400, UHP-400-1, AND UHP-500 POWER AND RELAY DRIVERS

FEATURES

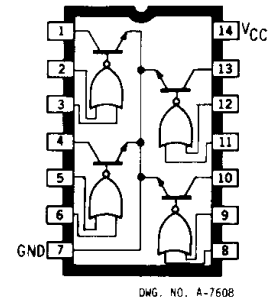
- Inputs Compatible with DTL/TTL
- 500 mA Output Current-Sink Capability
- Pinning Compatible with 54/74 Logic Series
- Transient-Protected Outputs on Relay Drivers
- High-Voltage Output:
 - 100 V Series UHP-500
 - 70 V Series UHP-400-1
 - 40 V Series UHP-400

SERIES UHP-400, UHP-400-1, and UHP-500 power and relay drivers are bipolar integrated circuits with logic and high-current switching transistors on the same chip. Each output transistor is capable of sinking 500 mA in the ON state.

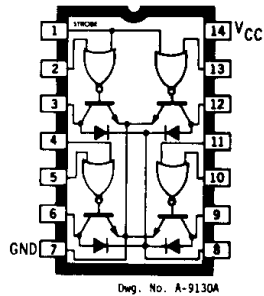
UHP Part Numbers			Function
400	400-1	500	Quad 2-Input AND
402	402-1	502	Quad 2-Input OR
403	403-1	503	Quad OR for Inductive Loads
406	406-1	506	Quad AND for Inductive Loads
407	407-1	507	Quad NAND for Inductive Loads
408	408-1	508	Quad 2-Input NAND
432	432-1	532	Quad 2-Input NOR
433	433-1	533	Quad NOR for Inductive Loads



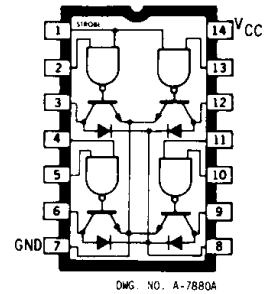
**UHP-400
 UHP-400-1
 UHP-500**



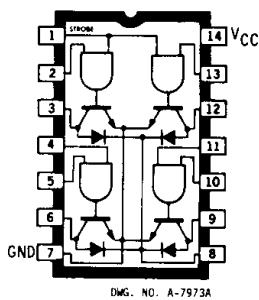
**UHP-402
 UHP-402-1
 UHP-502**



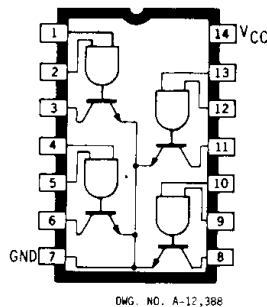
**UHP-403
 UHP-403-1
 UHP-503**



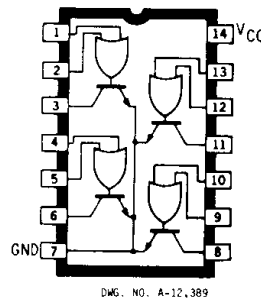
**UHP-406
 UHP-406-1
 UHP-506**



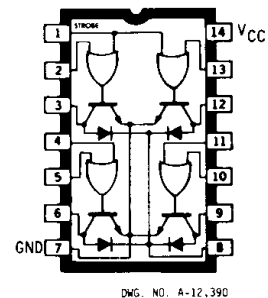
**UHP-407
 UHP-407-1
 UHP-507**



**UHP-408
 UHP-408-1
 UHP-508**



**UHP-432
 UHP-432-1
 UHP-532**



**UHP-433
 UHP-433-1
 UHP-533**

3

**SERIES UHP-400, UHP-400-1, AND UHP-500
QUAD POWER AND RELAY DRIVERS**

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{CC}	7 V
Input Voltage, V_{IN}	5.5 V
Output Off-State Voltage, V_{OFF}	
Series UHP-400	40 V
Series UHP-400-1	70 V
Series UHP-500	100 V
Output On-State Sink Current, I_{ON} (one driver)	500 mA
(total package)	1 A
Suppression Diode Off-State Voltage, V_R	
Series UHP-400	40 V
Series UHP-400-1	70 V
Series UHP-500	100 V
Suppression Diode On-State Current, I_F	500 mA
Operating Free-Air Temperature Range, T_A	-20°C to +85°C
Storage Temperature Range, T_S	-65°C to +150°C

RECOMMENDED OPERATING CONDITIONS

	Min.	Nom.	Max.	Units
Supply Voltage (V_{CC})	4.75	5.0	5.25	V
Operating Temperature Range	0	+25	+85	°C
Current into Any Output (ON State)	—	—	250	mA

SWITCHING CHARACTERISTICS at $T_A = +25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$

Characteristic	Series	Test Conditions (Note 3)	Limits			
			Min.	Typ.	Max.	Units
Turn-On Delay Time (t_{pd0})	UHP-400	$V_S = 40\text{ V}$, $R_L = 265\Omega$ (6 W)	—	200	500	ns
	UHP-400-1	$V_S = 70\text{ V}$, $R_L = 465\Omega$ (10 W)	—	200	500	ns
	UHP-500	$V_S = 100\text{ V}$, $R_L = 670\Omega$ (15 W)	—	200	500	ns
Turn-Off Delay Time (t_{pd1})	UHP-400	$V_S = 40\text{ V}$, $R_L = 265\Omega$ (6 W)	—	300	750	ns
	UHP-400-1	$V_S = 70\text{ V}$, $R_L = 465\Omega$ (10 W)	—	300	750	ns
	UHP-500	$V_S = 100\text{ V}$, $R_L = 670\Omega$ (15 W)	—	300	750	ns

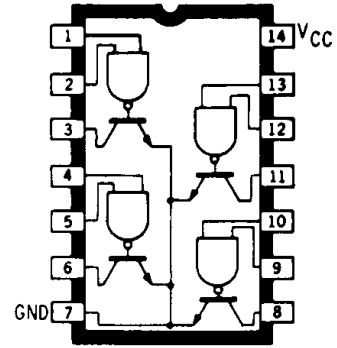
NOTES:

1. Each input tested separately.
2. Voltage values shown in the test-circuit waveforms are with respect to network ground terminal.
3. $C_i = 15\text{ pF}$. Capacitance value specified includes probe and test fixture capacitance.

INPUT PULSE CHARACTERISTICS

$V_{in(0)} = 0\text{ V}$	$t_r = 7.0\text{ ns}$	$t_b = 1.0\text{ }\mu\text{s}$
$V_{in(1)} = 3.5\text{ V}$	$t_f = 14\text{ ns}$	PRR = 500 kHz

UHP-400, UHP-400-1, and UHP-500
Quad 2-Input AND Power Drivers

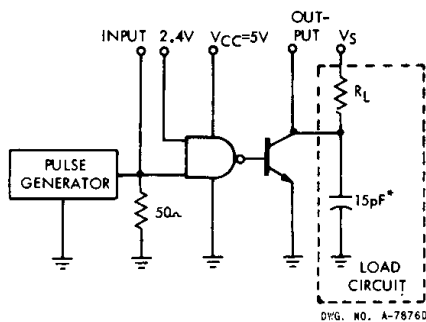


DWG. NO. A-7606

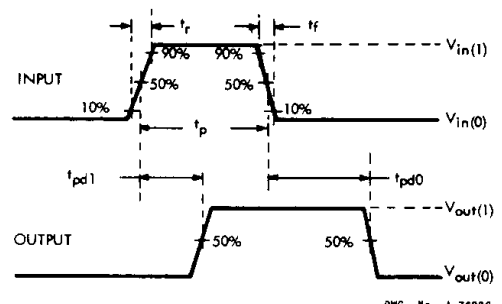
ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-400	Min.	2.0 V	2.0 V	40 V	—	—	50	μA
		UHP-400-1	Min.	2.0 V	2.0 V	70 V	—	—	50	μA
		UHP-500	Min.	2.0 V	2.0 V	100 V	—	—	50	μA
Output Voltage	V _{CE(SAT)}	All	Min.	0.8 V	4.75 V	150 mA	—	—	0.5	V
			Min.	0.8 V	4.75 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	5.0 V	5.0 V	—	—	4.0	6.0	mA
	I _{CC(0)}	All	Max.	0 V	0 V	—	—	17.5	24.5	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
			Max.	2.4 V	0 V	—	—	—	40	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.
4. T_a = +25°C.



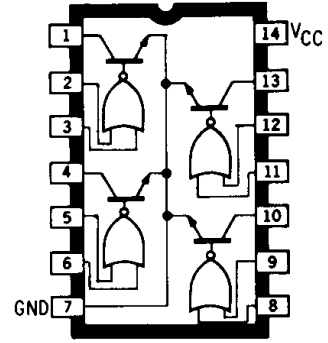
DWG. NO. A-7876D



DWG. No. A-7828C

*Includes probe and test fixture capacitance.

UHP-402, UHP-402-1, and UHP-502
Quad 2-Input OR Power Drivers

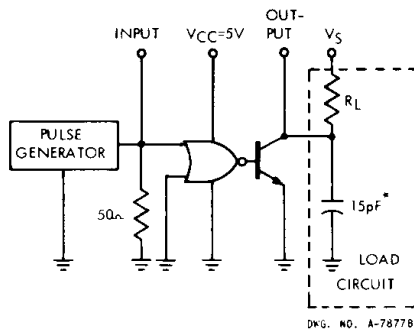


DMG. NO. A-7608

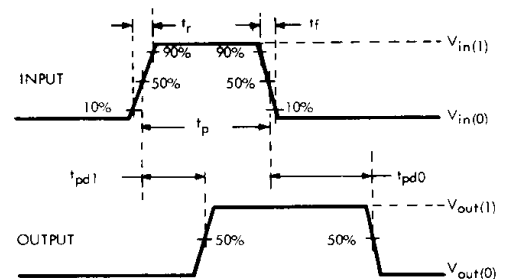
ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-402	Min.	2.0 V	0 V	40 V	—	—	50	μA
		UHP-402-1	Min.	2.0 V	0 V	70 V	—	—	50	μA
		UHP-502	Min.	2.0 V	0 V	100 V	—	—	50	μA
Output Voltage	V _{CE(SAT)}	All	Min.	0.8 V	0.8 V	150 mA	—	—	0.5	V
			Min.	0.8 V	0.8 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	5.0 V	5.0 V	—	—	4.1	6.3	mA
	I _{CC(0)}	All	Max.	0 V	0 V	—	—	18	25	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
		All	Max.	2.4 V	0 V	—	—	—	40	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.
4. T_A = +25°C.



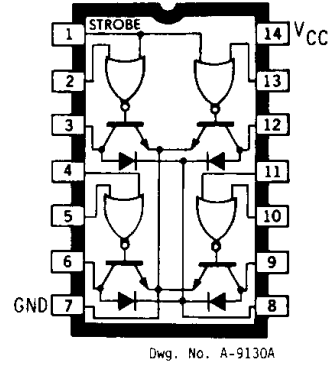
DMG. NO. A-7877B



DMG. No. A-7628C

*Includes probe and test fixture capacitance.

UHP-403, UHP-403-1, and UHP-503
Quad OR Relay Drivers

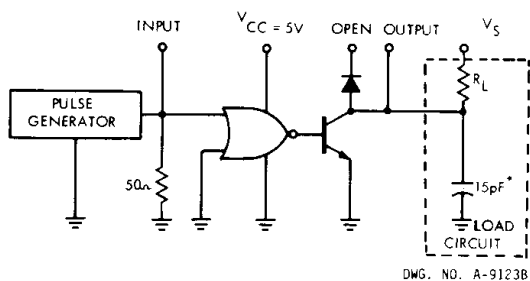


Dwg. No. A-9130A

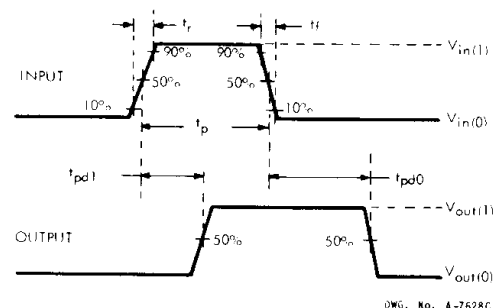
ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-403	Min.	2.0 V	0 V	40 V	—	—	100	μA
		UHP-403-1	Min.	2.0 V	0 V	70 V	—	—	100	μA
		UHP-503	Min.	2.0 V	0 V	100 V	—	—	100	μA
Diode Leakage Current (Note 5)	I _R	All	Nom.	0 V	0 V	Open	—	—	200	μA
Diode Forward Voltage Drop (Note 6)	V _F	All	Nom.	5.0 V	5.0 V	—	—	1.5	1.75	V
Output Voltage	V _{CE(SAT)}	All	Min.	0.8 V	0.8 V	150 mA	—	—	0.5	V
			Min.	0.8 V	0.8 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	5.0 V	5.0 V	—	—	4.1	6.3	mA
	I _{CC(0)}	All	Max.	0 V	0 V	—	—	18	25	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Max.	—	—	—	—	—	0.8	V
Input Current at All Inputs Except Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
	I _{IN(1)}	All	Max.	2.4 V	0 V	—	—	—	40	μA
			Max.	5.5 V	0 V	—	—	—	1.0	mA
Input Current at Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-1.1	-1.6	mA
	I _{IN(1)}	All	Max.	2.4 V	0 V	—	—	—	100	μA
			Max.	5.5 V	0 V	—	—	—	1.0	mA

- Typical values at V_{CC} = 5.0 V.
- Each gate.
- Each input tested separately.
- T_a = +25°C.
- Diode leakage current measured at V_R = V_{OFF(MIN)}.
- Diode forward voltage drop measured at I_F = 200 mA.



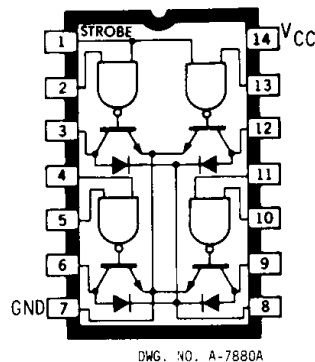
DWG. NO. A-9123B



DWG. No. A-7628C

*Includes probe and test fixture capacitance.

UHP-406, UHP-406-1, and UHP-506 Quad AND Relay Drivers



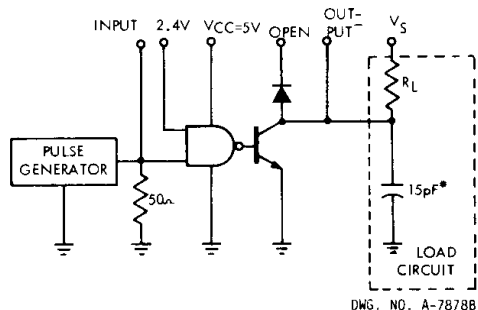
DWG. NO. A-7880A

ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

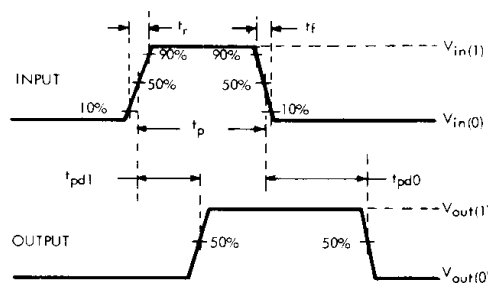
Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-406	Min.	2.0 V	2.0 V	40 V	—	—	100	μA
		UHP-406-1	Min.	2.0 V	2.0 V	70 V	—	—	100	μA
		UHP-506	Min.	2.0 V	2.0 V	100 V	—	—	100	μA
Diode Leakage Current (Note 5)	I _R	All	Nom.	0 V	0 V	Open	—	—	200	μA
Diode Forward Voltage Drop (Note 6)	V _F	All	Nom.	5.0 V	5.0 V	—	—	1.5	1.75	V
Output Voltage	V _{CE(SAT)}	All	Min.	0.8 V	4.75 V	150 mA	—	—	0.5	V
			Min.	0.8 V	4.75 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	5.0 V	5.0 V	—	—	4.0	6.0	mA
	I _{CC(0)}	All	Max.	0 V	0 V	—	—	17.5	24.5	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current at All Inputs Except Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
		All	Max.	2.4 V	0 V	—	—	—	40	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA
Input Current at Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-1.1	-1.6	mA
		All	Max.	2.4 V	0 V	—	—	—	100	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.

4. T_A = +25°C.
5. Diode leakage current measured at V_R = V_{OFF(MIN)}.
6. Diode forward voltage drop measured at I_F = 200 mA.



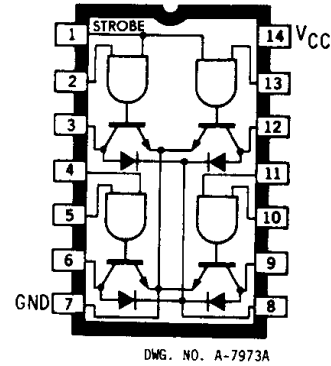
DWG. NO. A-7878B



DWG. No. A-7628C

*Includes probe and test fixture capacitance.

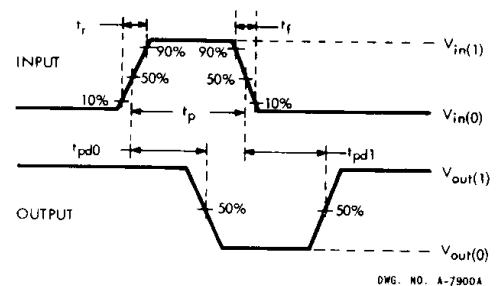
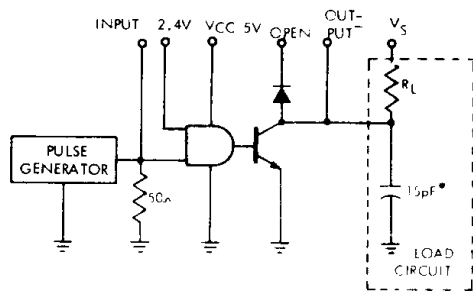
UHP-407, UHP-407-1, and UHP-507
Quad NAND Relay Drivers



ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

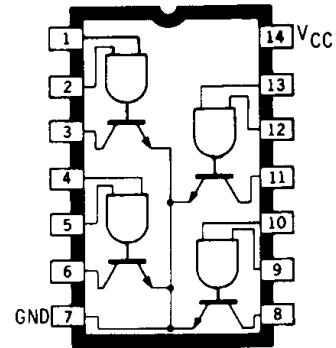
Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-407	Min.	0.8 V	4.75 V	40 V	—	—	100	μA
		UHP-407-1	Min.	0.8 V	4.75 V	70 V	—	—	100	μA
		UHP-507	Min.	0.8 V	4.75 V	100 V	—	—	100	μA
Diode Leakage Current (Note 5)	I _r	All	Nom.	5.0 V	5.0 V	Open	—	—	200	μA
Diode Forward Voltage Drop (Note 6)	V _f	All	Nom.	0 V	0 V	—	—	1.5	1.75	V
Output Voltage	V _{CE(SAT)}	All	Min.	2.0 V	2.0 V	150 mA	—	—	0.5	V
			Min.	2.0 V	2.0 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	0 V	0 V	—	—	6.0	7.5	mA
	I _{CC(0)}	All	Max.	5.0 V	5.0 V	—	—	20	26.5	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current at All Inputs Except Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
			Max.	2.4 V	0 V	—	—	—	40	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA
Input Current at Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-1.1	-1.6	mA
			Max.	2.4 V	0 V	—	—	—	100	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.
4. T_A = +25°C.
5. Diode leakage current measured at V_r = V_{OFF(MIN)}.
6. Diode forward voltage drop measured at I_f = 200 mA.



*Includes probe and test fixture capacitance.

UHP-408, UHP-408-1, and UHP-508
Quad 2-Input NAND Power Drivers

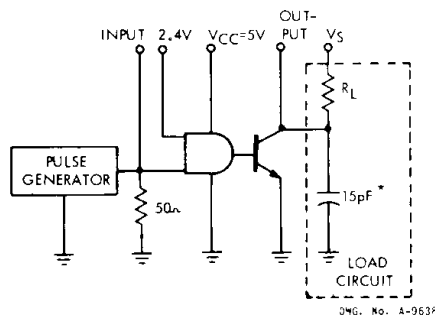


DWG. NO. A-12,388

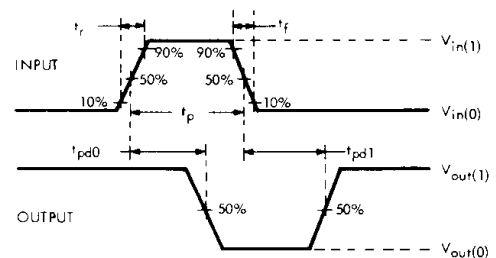
ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-408	Min.	0.8 V	4.75 V	40 V	—	—	50	μA
		UHP-408-1	Min.	0.8 V	4.75 V	70 V	—	—	50	μA
		UHP-508	Min.	0.8 V	4.75 V	100 V	—	—	50	μA
Output Voltage	V _{CE(SAT)}	All	Min.	2.0 V	2.0 V	150 mA	—	—	0.5	V
			Min.	2.0 V	2.0 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	0 V	0 V	—	—	6.0	7.5	mA
	I _{CC(0)}	All	Max.	5.0 V	5.0 V	—	—	20	26.5	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
		All	Max.	2.4 V	0 V	—	—	—	40	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.
4. T_A = +25°C.



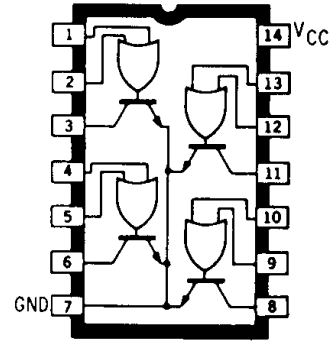
DWG. NO. A-963A



DWG. NO. A-7900A

*Includes probe and test fixture capacitance.

UHP-432, UHP-432-1, and UHP-532
Quad 2-Input NOR Power Drivers

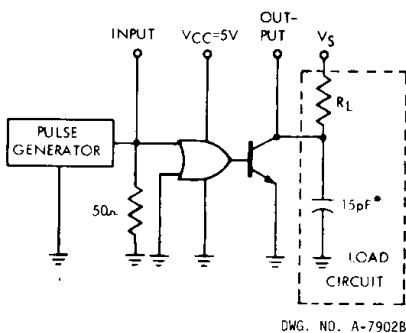


DWG. NO. A-12,389

ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

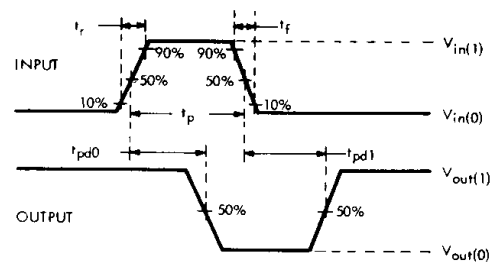
Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-432	Min.	0.8 V	0.8 V	40 V	—	—	50	μA
		UHP-432-1	Min.	0.8 V	0.8 V	70 V	—	—	50	μA
		UHP-532	Min.	0.8 V	0.8 V	100 V	—	—	50	μA
Output Voltage	V _{CE(SAT)}	All	Min.	2.0 V	0 V	150 mA	—	—	0.5	V
			Min.	2.0 V	0 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	0 V	0 V	—	—	6.0	7.5	mA
	I _{CC(0)}	All	Max.	5.0 V	5.0 V	—	—	20	25	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
		All	Max.	2.4 V	0 V	—	—	—	40	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.
4. T_A = +25°C.



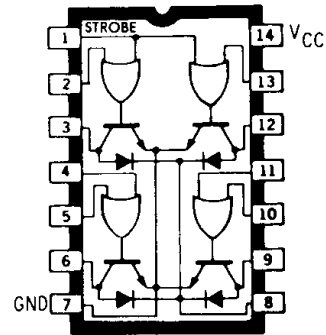
DWG. NO. A-7902B

*Includes probe and test fixture capacitance.



DWG. NO. A-7900A

UHP-433, UHP-433-1, and UHP-533
Quad NOR Relay Drivers

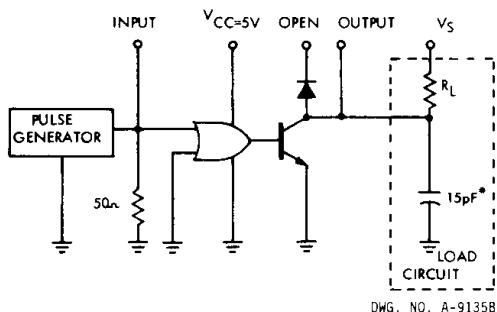


DWG. NO. A-12,390

ELECTRICAL CHARACTERISTICS over operating temperature range (unless otherwise noted)

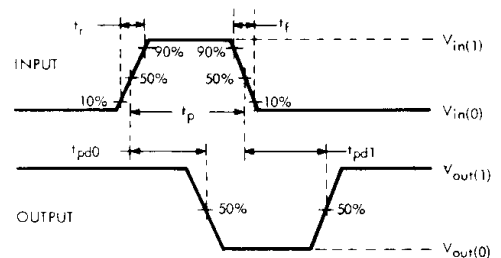
Characteristic	Symbol	Applicable Devices	Test Conditions				Limits			
			V _{CC}	Driven Input	Other Input	Output	Min.	Typ.	Max.	Units
Output Reverse Current	I _{CEX}	UHP-433	Min.	0.8 V	0.8 V	40 V	—	—	100	μA
		UHP-433-1	Min.	0.8 V	0.8 V	70 V	—	—	100	μA
		UHP-533	Min.	0.8 V	0.8 V	100 V	—	—	100	μA
Diode Leakage Current (Note 5)	I _R	All	Nom.	5.0 V	5.0 V	Open	—	—	200	μA
Diode Forward Voltage Drop (Note 6)	V _F	All	Nom.	0 V	0 V	—	—	1.5	1.75	V
Output Voltage	V _{CE(SAT)}	All	Min.	2.0 V	0 V	150 mA	—	—	0.5	V
			Min.	2.0 V	0 V	250 mA	—	—	0.7	V
Supply Current (Notes 1, 2 and 4)	I _{CC(1)}	All	Max.	0 V	0 V	—	—	6.0	7.5	mA
	I _{CC(0)}	All	Max.	5.0 V	5.0 V	—	—	20	25	mA
Input Voltage	V _{IN(1)}	All	Min.	—	—	—	2.0	—	—	V
	V _{IN(0)}	All	Min.	—	—	—	—	—	0.8	V
Input Current at All Inputs Except Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-0.55	-0.8	mA
	I _{IN(1)}	All	Max.	2.4 V	0 V	—	—	—	40	μA
			Max.	5.5 V	0 V	—	—	—	1.0	mA
Input Current at Strobe (Note 3)	I _{IN(0)}	All	Max.	0.4 V	4.5 V	—	—	-1.1	-1.6	mA
			Max.	2.4 V	0 V	—	—	—	100	μA
	I _{IN(1)}	All	Max.	5.5 V	0 V	—	—	—	1.0	mA

1. Typical values at V_{CC} = 5.0 V.
2. Each gate.
3. Each input tested separately.
4. T_A = +25°C.
5. Diode leakage current measured at V_R = V_{OFF(MIN)}.
6. Diode forward voltage drop measured at I_F = 200 mA.



DWG. NO. A-9135B

*Includes probe and test fixture capacitance.



DWG. NO. A-7900A