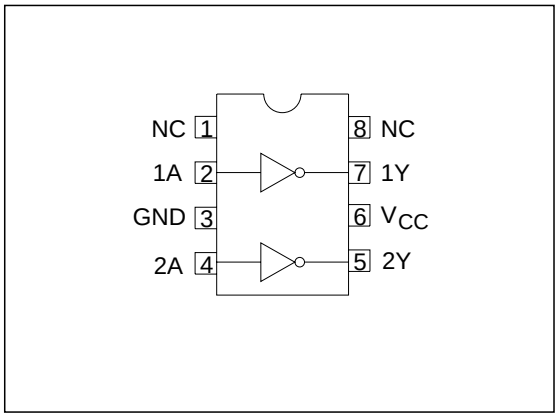
HD29026A/HD29027/HD29028

Dual CCD Drivers

HD29026A, HD29027 and HD29028 include two on-chip drivers on a single chip, making it the optimal choice as a CCD driver. Operation is provided with a TTL level input, and output current of 1 A is available for both sink and source.

Features

- High speed output rise and fall (20 ns typ) at load capacitance (C_L) of 1000 pF
- Direct drive of input block by TTL eliminates the need for external components
- Output swing voltage of 12 V; output current of 1 A available for both sink and source
- Output wave cross point 50% typ



Pin Arrangement

Product name	Supply voltage	Package
HD29026AP	12 V	300 mil 8-pin plastic DIP (DP-8)
HD29026AFP		225 mil 8-pin plastic SOP (FP-8D)
HD29027P	6 V	300 mil 8-pin plastic DIP (DP-8)
HD29027FP		225 mil 8-pin plastic SOP (FP-8D)
HD29028P	12 V	300 mil 8-pin plastic DIP (DP-8)
HD29028FP		225 mil 8-pin plastic SOP (FP-8D)

Ordering Information

Input A	Output Y
H	L
L	H

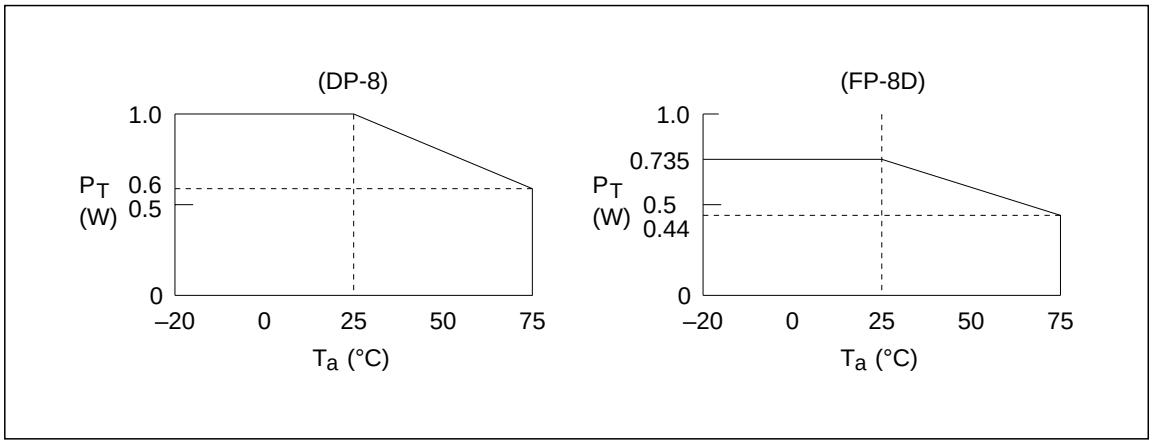
Note: H: High level

Function Table

Absolute Maximum Ratings

Item		Symbol		Rating	Unit
Supply voltage	HD29026A	V_{CC} *1		15	V
	HD29027			10	
	HD29028			15	
Input voltage		V_I		7	V
Output peak current		$I_{O(peak)}$		–1	A
Operating temperature range		Ta		20 to +75	C
Storage temperature range		T_{stg}		65 to +150	C
Junction temperature		T_j		150	C
Total dissipation		P_T *2	DP-8	1	W
			FP-8D	0.735	

Notes: 1. If no value is specified, the voltage is defined by the GND pin.
2. Value when Ta = 25 C. Heat dissipation is required for large-capacitance, high-frequency drivers, so derating of 8 mW/ C (DP-8) and 5.9 mW/ C (FP-8D) are required.

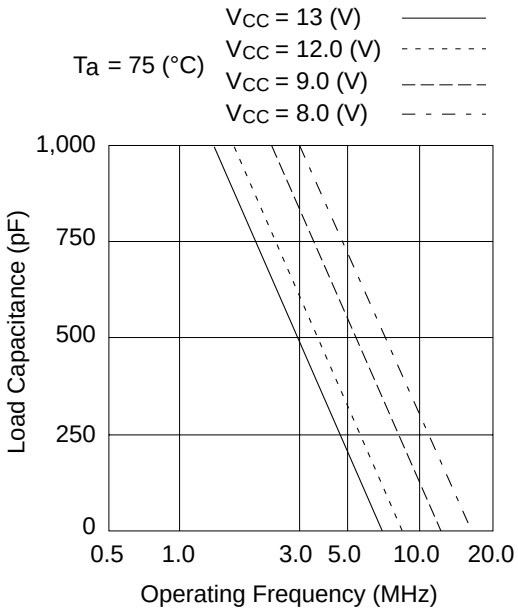


Recommended Operating

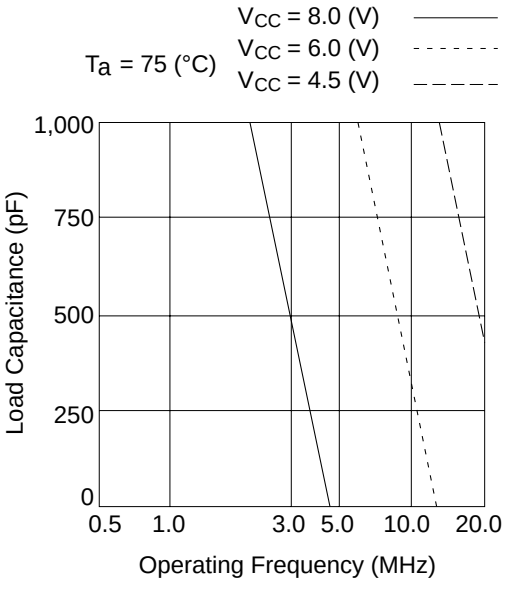
Item		Symbol	Min	Typ	Max	Unit
Supply voltage	HD29026A	V_{CC}	8	12	13	V
	HD29027	V_{CC}	4.5	6	8	
	HD29028	V_{CC}	8	9	13	
Operating temperature		Ta	20	25	75	C

Conditions

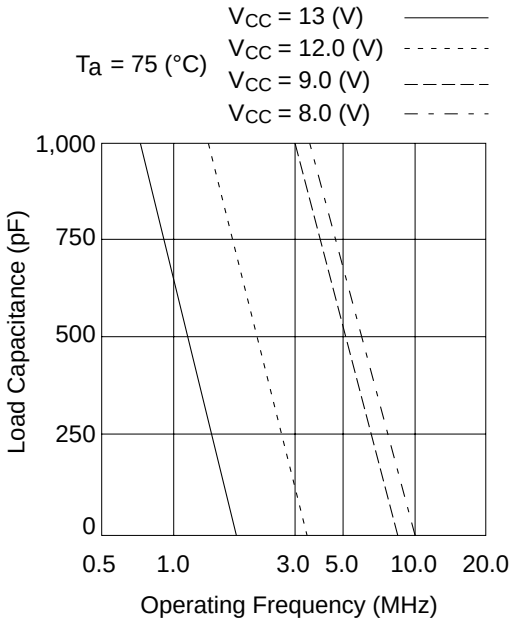
HD29026A



HD29027



HD29028



Electrical Characteristics (Ta = −20 to +75°C)

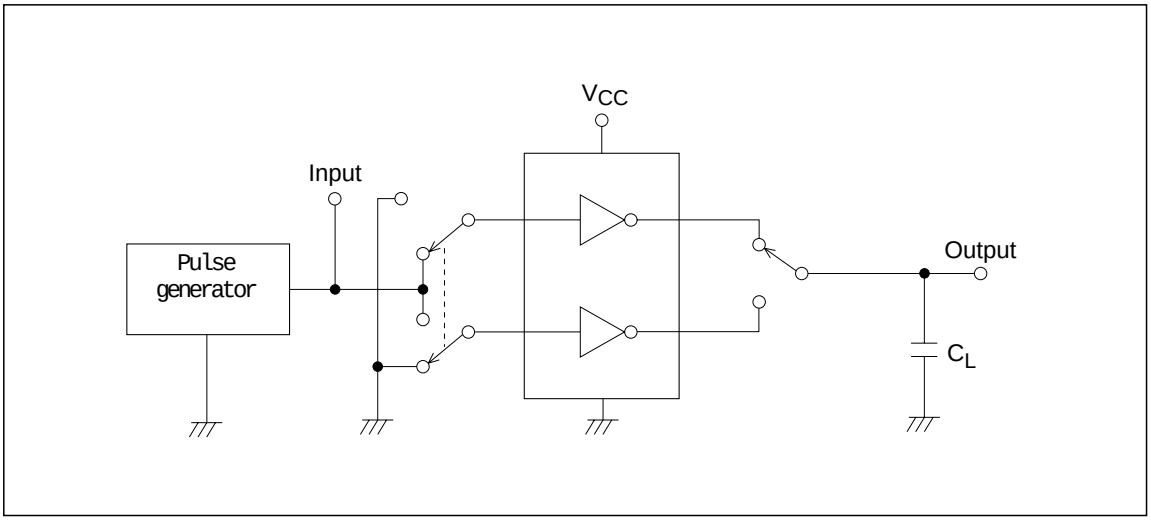
Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Input voltage		V_{IH}	2.0			V	
		V_{IL}			0.6		
Output voltage		V_{OH}	V_{CC} −1			V	V_{IL} = 0.6 V, I_{OH} = −1 mA
		V_{OL}			0.5		V_{IH} = 2.0 V, I_{OL} = 1 mA
Input current		I_{IH}			20	µA	V_I = 2.7 V
	HD29026A/28	I_{IL}			−100		V_I = 0.4 V
	HD29027				−200		
Supply current	HD29026A	I_{CCH}			12	mA	
	HD29027				20		
	HD29028				15		
	HD29026A	I_{CCL}			20		
	HD29027				30		
	HD29028				25		
Input current		I_I			100	µA	V_I = 7 V
Input clamp voltage		V_{IK}			−1.5	V	I_{IN} = −18 mA

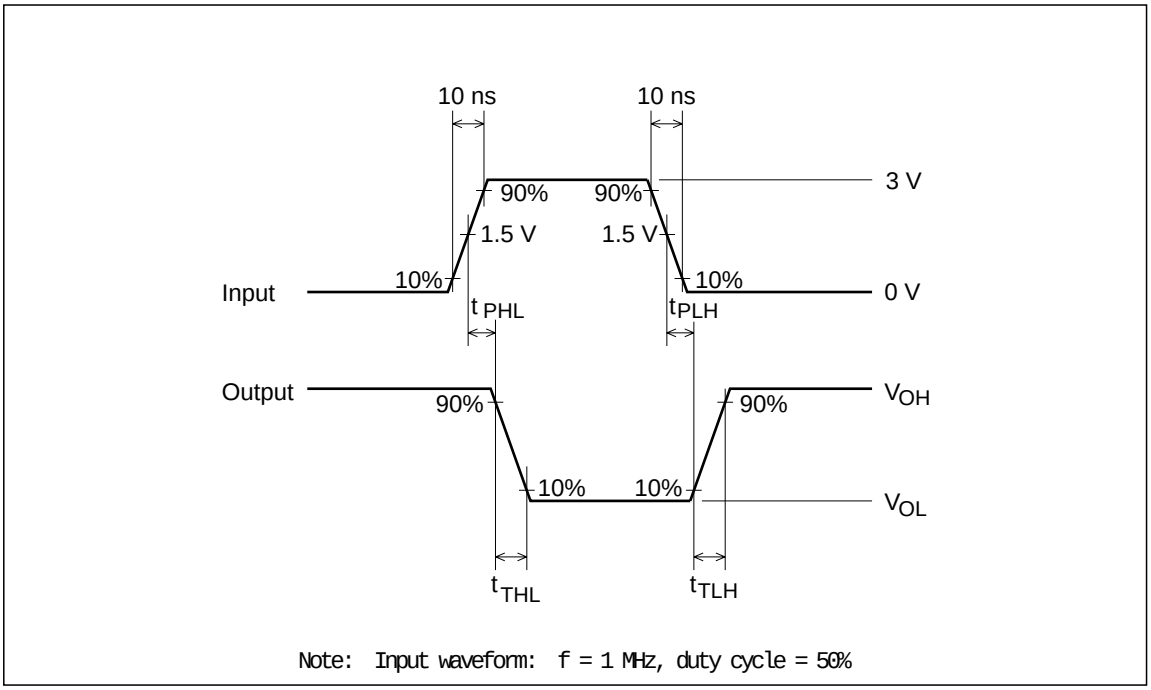
Note: HD29026A/28: V_{CC} = 8 to 13 V
HD29027: V_{CC} = 4.5 to 8 V

Switching Characteristics (Ta = 25 C)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions	
Fall propagation	HD29026A	t_{PHL}		16	20	ns	C_L = 1000 pF	V_{CC} = 8 V
				11	15			V_{CC} = 12 V
	HD29027			10	15			V_{CC} = 6 V
	HD29028			10	15			V_{CC} = 9 V
				8	13			V_{CC} = 12 V
Rise propagation	HD29026A	t_{PLH}		18	25	ns	C_L = 1000 pF	V_{CC} = 8 V
				13	20			V_{CC} = 12 V
	HD29027			10	15			V_{CC} = 6 V
	HD29028			10	15			V_{CC} = 9 V
				8	13			V_{CC} = 12 V
Fall (transition)	HD29026A	t_{THL}		17	21	ns	C_L = 250 pF	V_{CC} = 8 V
				12	16			V_{CC} = 12 V
	HD29027			9	14			V_{CC} = 6 V
	HD29028			9	13			V_{CC} = 9 V
				7	14			V_{CC} = 12 V
	HD29026A			20	23		C_L = 500 pF	V_{CC} = 8 V
				15	18			V_{CC} = 12 V
	HD29027			12	17			V_{CC} = 6 V
	HD29028			12	17			V_{CC} = 9 V
				10	15			V_{CC} = 12 V
	HD29026A			25	40		C_L = 1000 pF	V_{CC} = 8 V
				20	35			V_{CC} = 12 V
	HD29027			20	25			V_{CC} = 6 V
	HD29028			20	25			V_{CC} = 9 V
				18	23			V_{CC} = 12 V
Rise (transition)	HD29026A	t_{TLH}		15	20	ns	C_L = 250 pF	V_{CC} = 8 V
				10	15			V_{CC} = 12 V
	HD29027			9	14			V_{CC} = 6 V
	HD29028			9	14			V_{CC} = 9 V
				7	12			V_{CC} = 12 V
	HD29026A			21	25		C_L = 500 pF	V_{CC} = 8 V
				16	20			V_{CC} = 12 V
	HD29027			12	17			V_{CC} = 6 V
	HD29028			12	17			V_{CC} = 9 V
				10	15			V_{CC} = 12 V
	HD29026A			22	30		C_L = 1000 pF	V_{CC} = 8 V
				17	25			V_{CC} = 12 V
	HD29027			20	25			V_{CC} = 6 V
	HD29028			20	25			V_{CC} = 9 V
				18	23			V_{CC} = 12 V

Switching Time Test Method



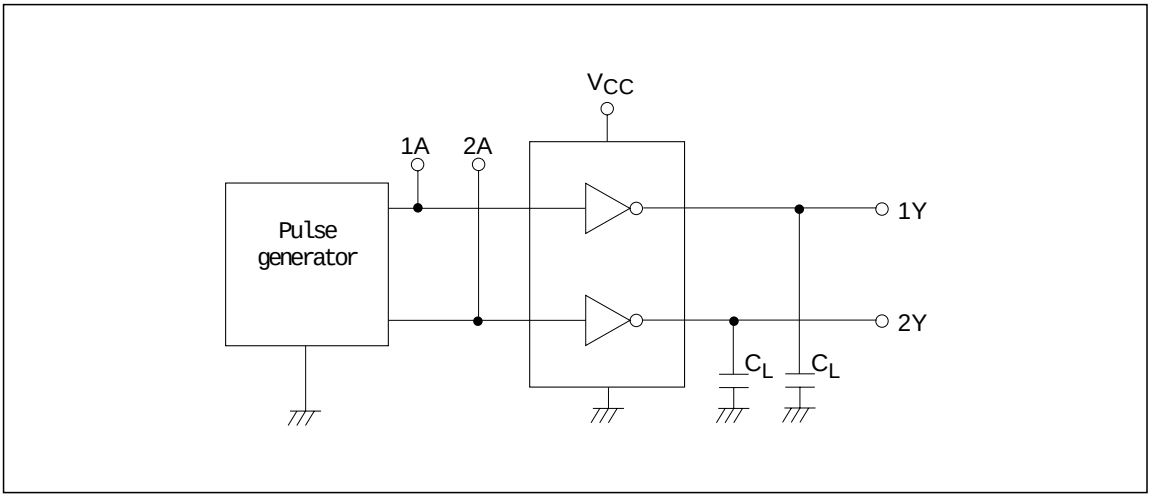


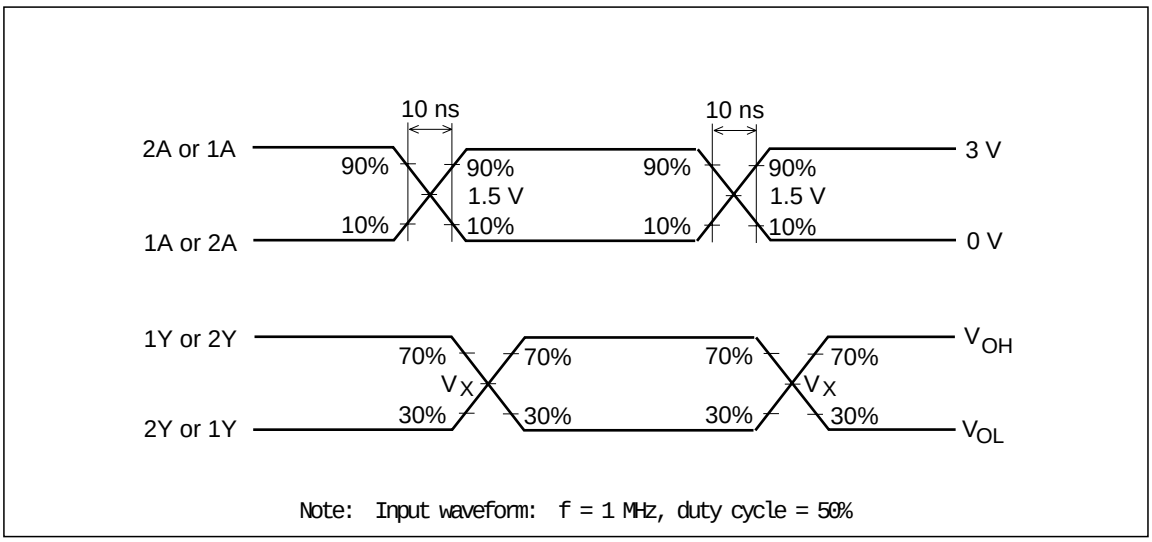
Note: Input waveform: f = 1 MHz, duty cycle = 50%

Output Timing Characteristics (Ta = 25 C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output wave cross point	V_X	30	50	70	%	C_L = 250 pF
		30	50	70		C_L = 500 pF
		30	50	70		C_L = 1000 pF

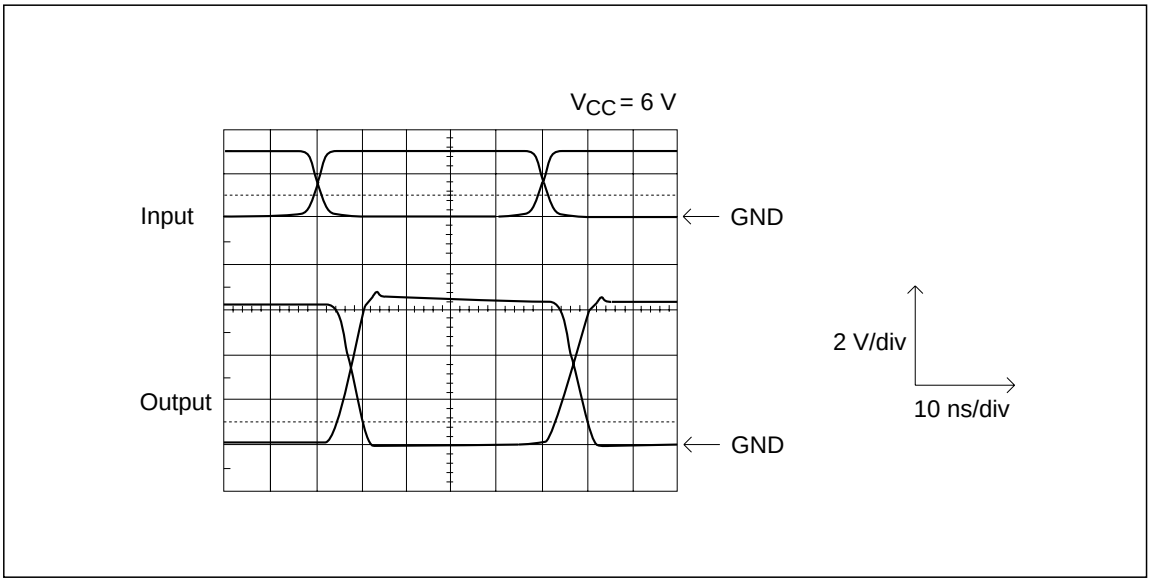
Output Timing Characteristics Test Method (HD29027/28)

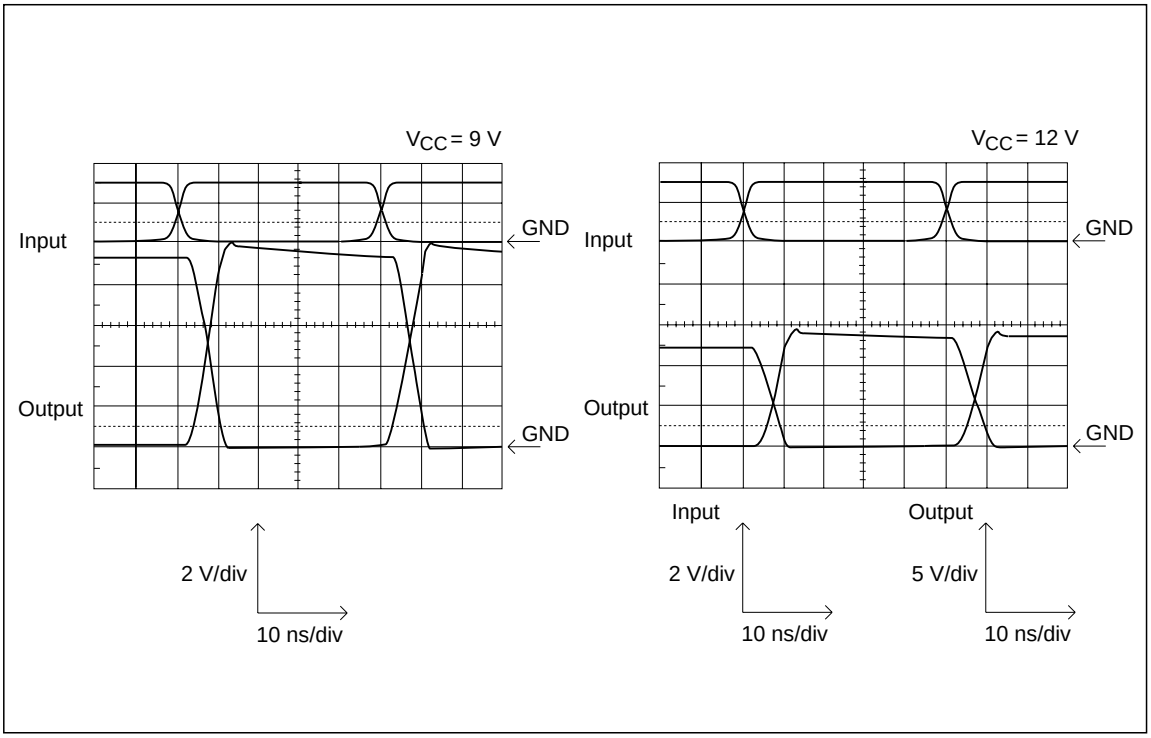




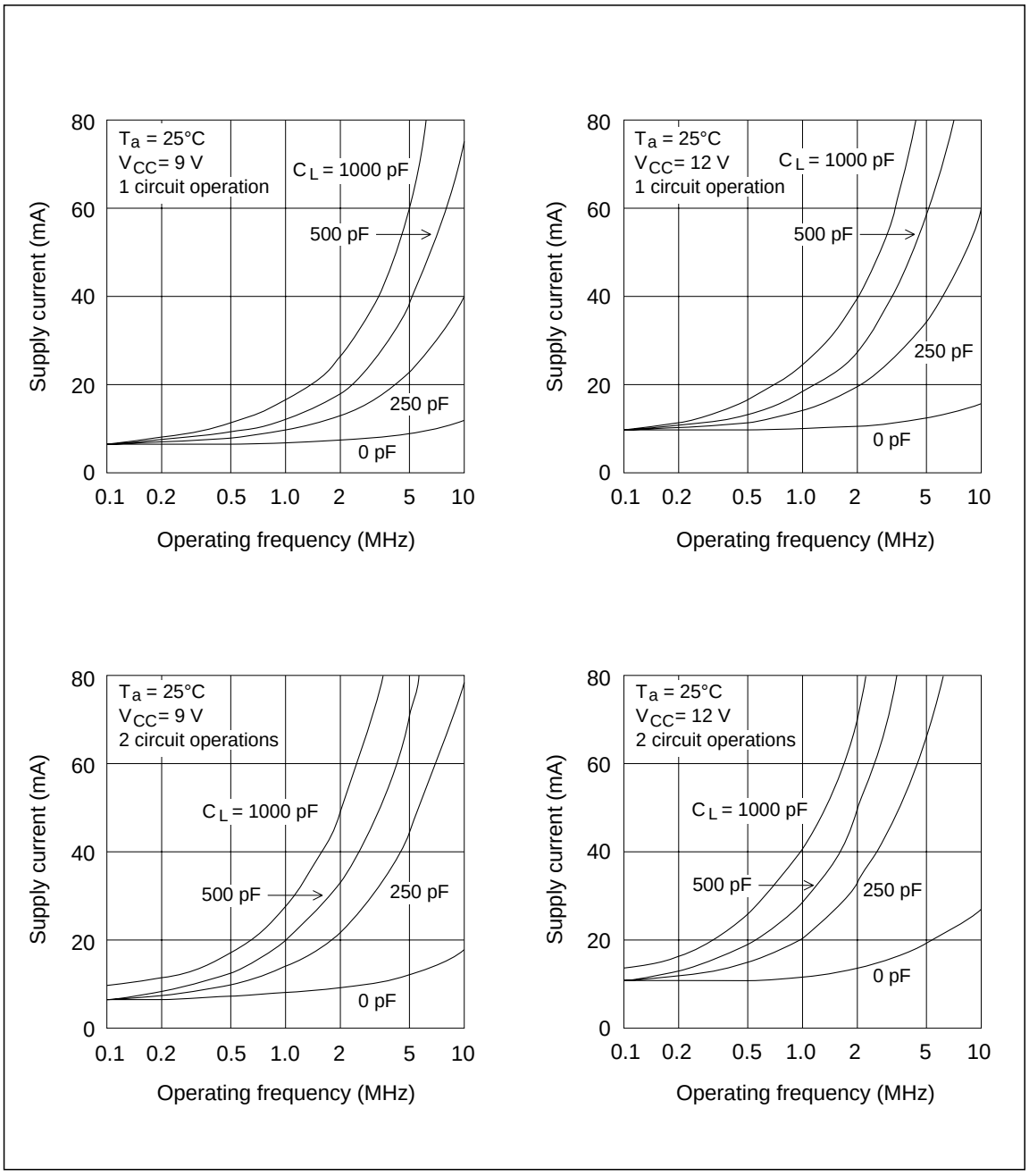
Note: Input waveform: f = 1 MHz, duty cycle = 50%

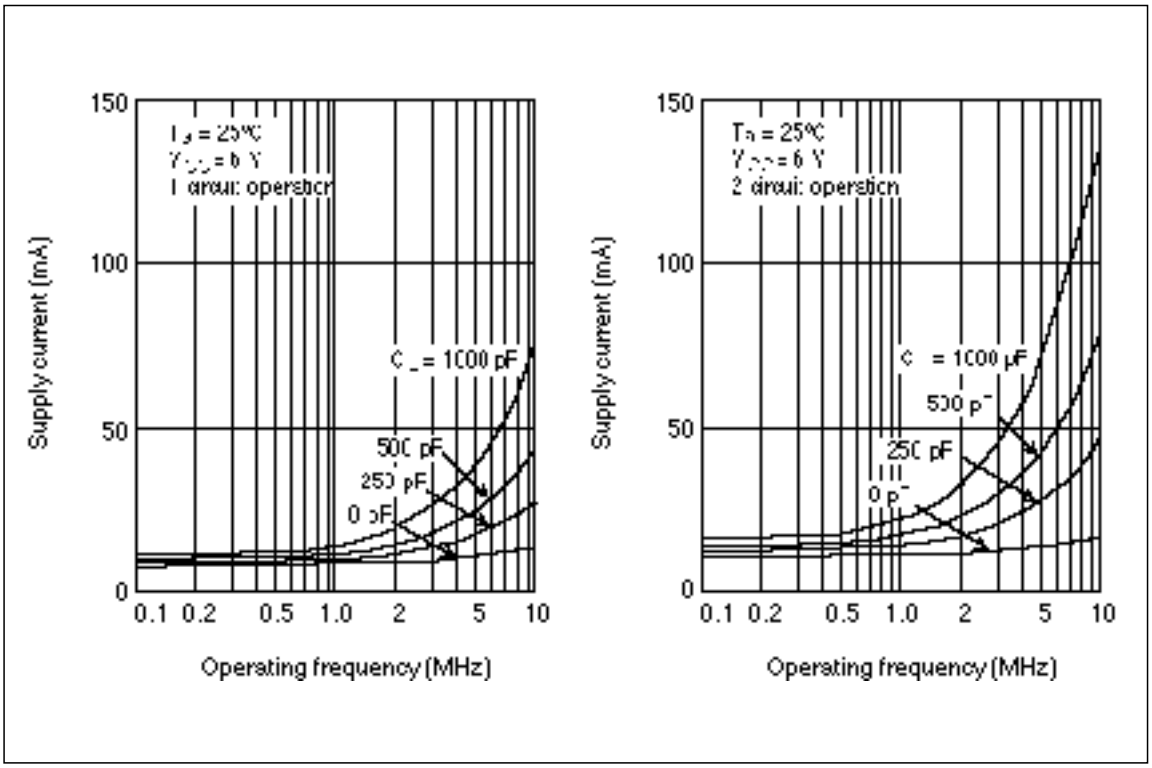
Output Timing Characteristics

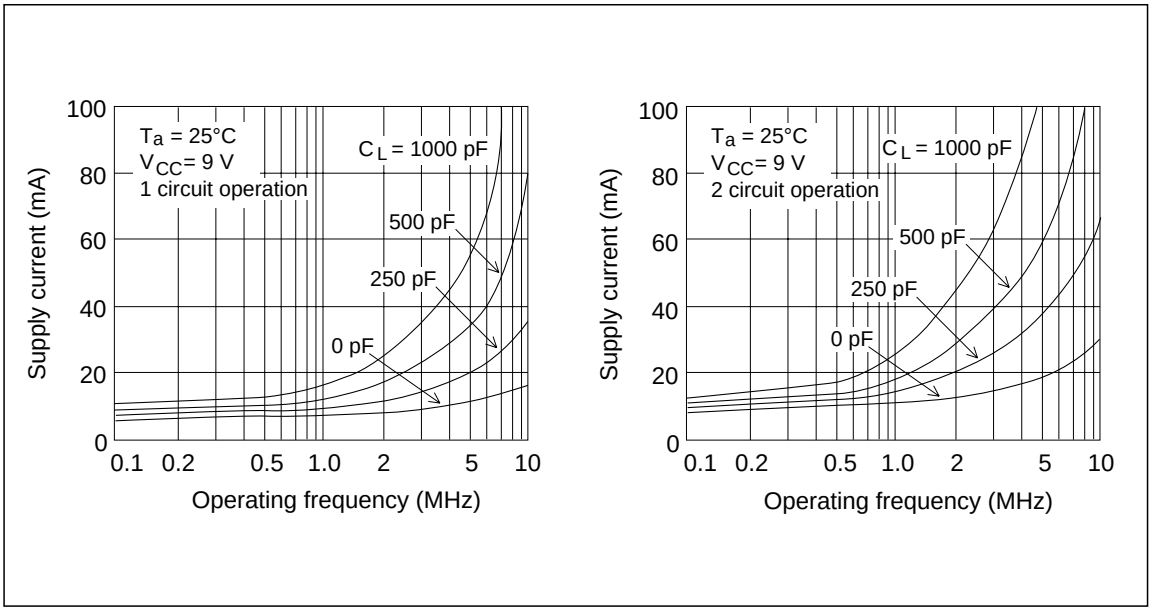


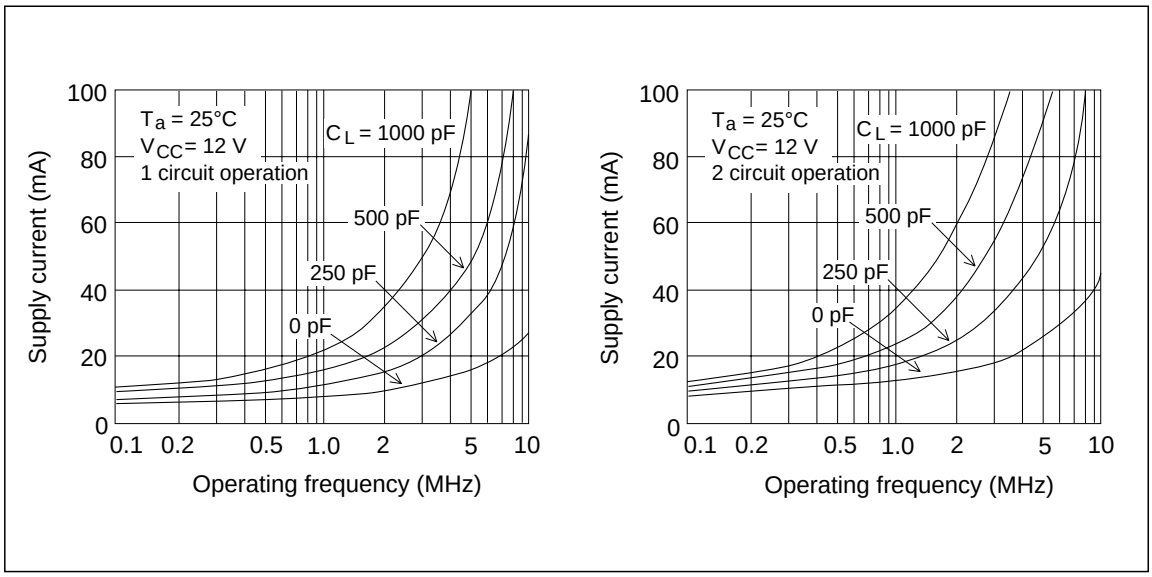


Typical Characteristic Curves




150
100
50
0
Supply current (mA)
0.1 0.2 0.5 1.0 2 5 10
Operating frequency (MHz)
500 pF
250 pF
0 pF
Ta = 25°C
2 circuit operation


100
80
60
40
20
0
Supply current (mA)
0.1 0.2 0.5 1.0 2 5 10
Operating frequency (MHz)
Ta = 25°C
VCC= 9 V
1 circuit operation
CL = 1000 pF
500 pF
250 pF
0 pF
Ta = 25°C
VCC= 9 V
2 circuit operation
CL = 1000 pF
500 pF
250 pF
0 pF



Cautions (HD29026A only)

The short output rise and fall time, as well as the large output amplitude of this product tends to generate overshooting and undershooting. The connection of 5 to 15 damping resistance (R_D) to the output as illustrated in figure 2 serves to

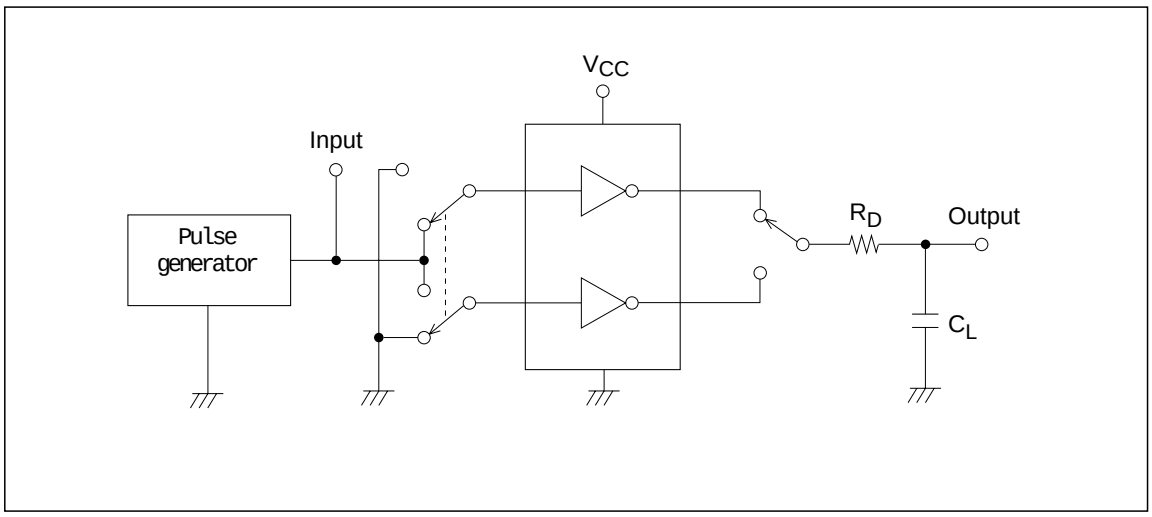


Figure 2

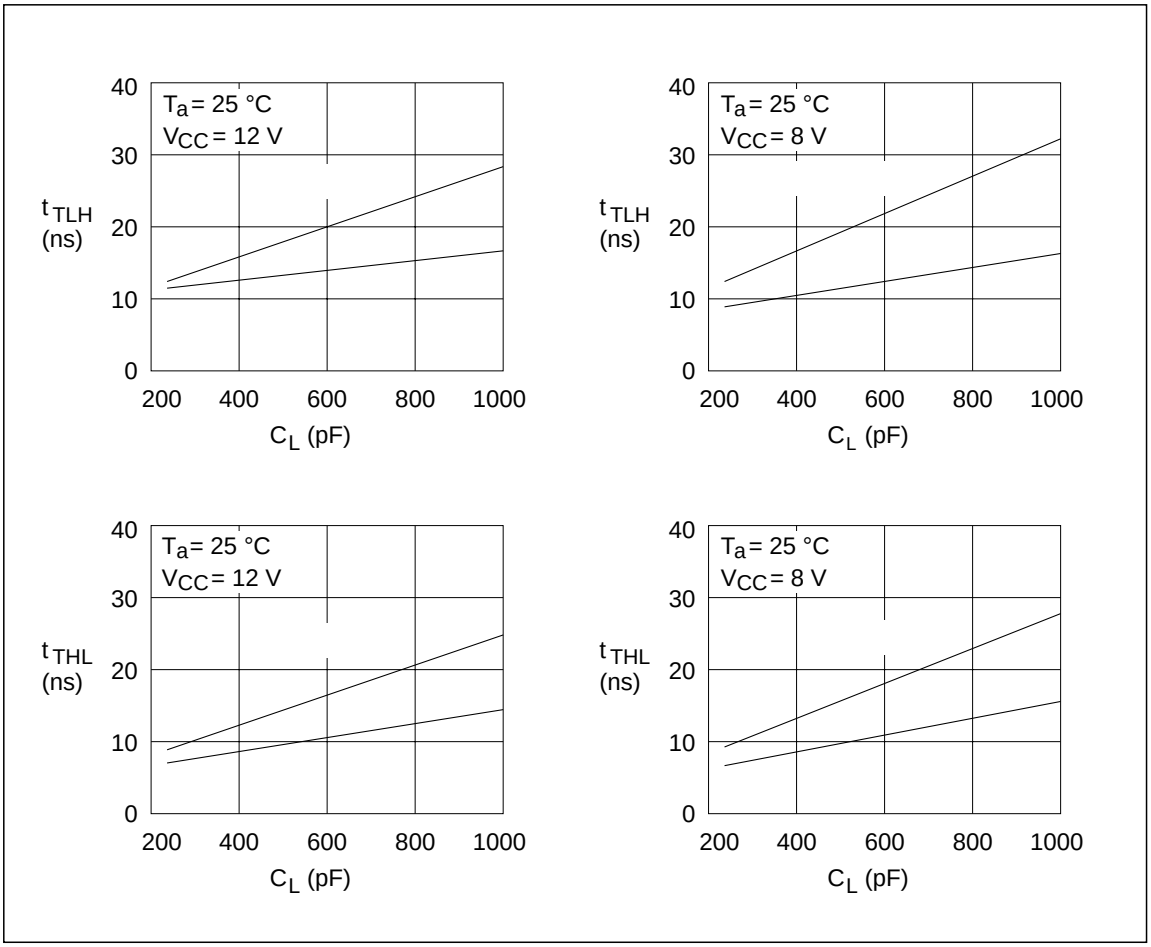

T_a = 25 °C
V_{CC} = 12 V
t_{TLH} (ns)
C_L (pF)
T_a = 25 °C
V_{CC} = 8 V
t_{TLH} (ns)
C_L (pF)
T_a = 25 °C
V_{CC} = 12 V
t_{THL} (ns)
C_L (pF)
T_a = 25 °C
V_{CC} = 8 V
t_{THL} (ns)
C_L (pF)
0
10
20
30
40
200
400
600
800
1000

Figure 3