

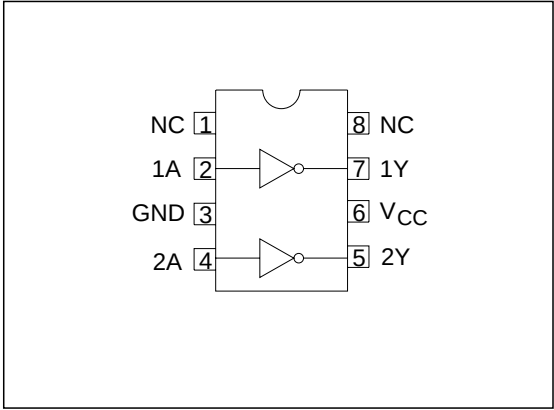
HD29026A/HD29027/HD29028

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

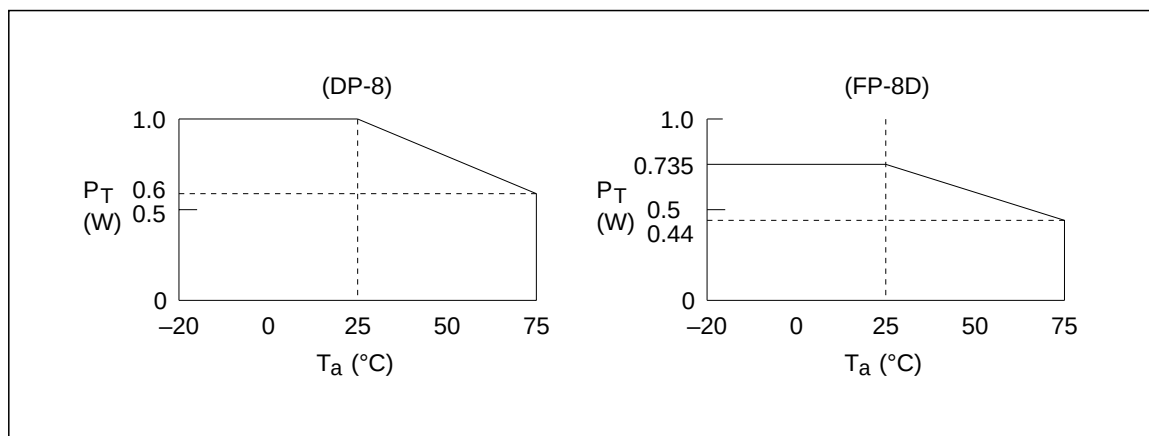
Note: H: High level

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		$I_{b(peak)}$	-1	A
Operating temperature range		T_a	20 to +75	C
Storage temperature range		T_{stg}	65 to +150	C
Junction temperature		T_j	150	C
Total dissipation		P_T^{*2}	1	W
		FP-8D	0.735	

Notes: 1. If no value is specified, the voltage is defined by the GND pin.
2. Value when $T_a = 25$ 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.

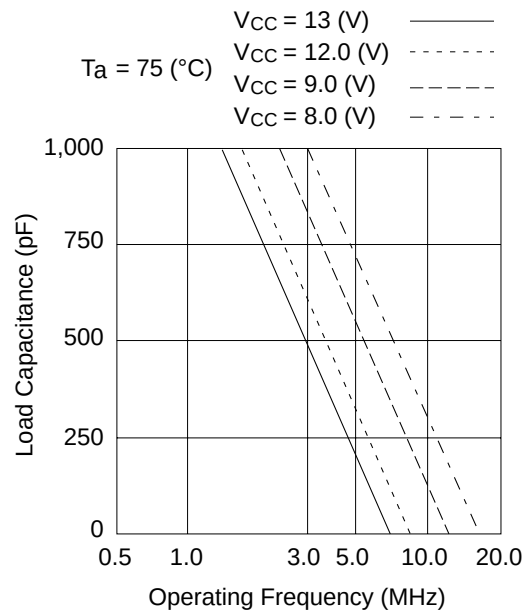


Recommended Operating

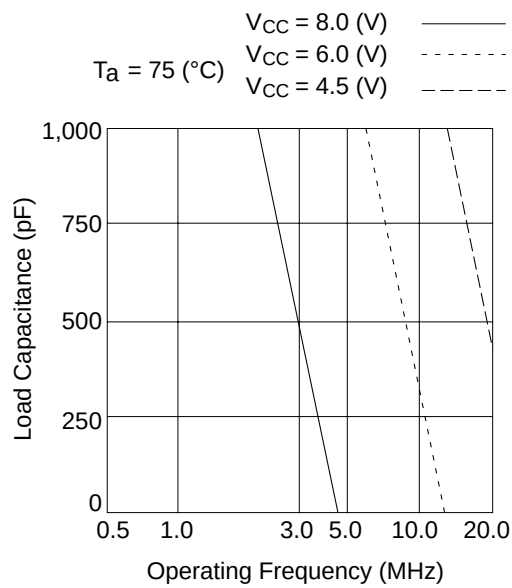
Item		Symbol	Min	Typ	Max	Unit
Supply voltage	HD29026A	V_{CC}	8	12	13	V
	HD29027	V_{CC}	4.5	6	8	
	HD29028	V_{CC}	8	9	13	
Operating temperature		T_a	20	25	75	C

Conditions

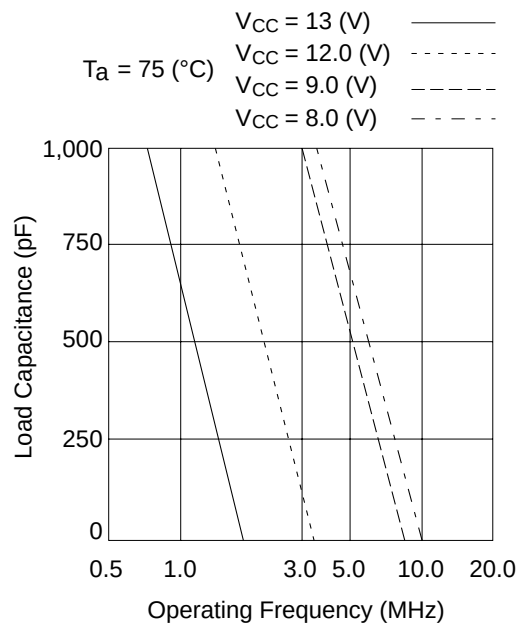
HD29026A



HD29027



HD29028



Electrical Characteristics (Ta = 20 to +75 C)

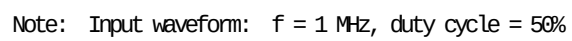
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input voltage	V_{IH}	2.0			V	
	V_{IL}			0.6		
Output voltage	V_{OH}	$V_{CC} - 1$			V	$V_{IL} = 0.6 \text{ V}, I_{OH} = 1 \text{ mA}$
	V_{OL}			0.5		$V_{IH} = 2.0 \text{ V}, I_{OL} = 1 \text{ mA}$
Input current	I_{IH}			20	A	$V_I = 2.7 \text{ V}$
	HD29026A/28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

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

Switching Characteristics (Ta = 25 C)

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

The diagram illustrates a CMOS inverter circuit. A rectangular block labeled "Pulse generator" is connected to the "Input" of the inverter. The inverter is represented by a large rectangle containing two triangles pointing in opposite directions, symbolizing the PMOS and NMOS transistors. The top of the inverter is connected to V_{CC} , and the bottom is connected to ground. The "Output" of the inverter is connected to a load capacitor C_L , which is also connected to ground. The circuit is shown with various connection points and ground symbols.

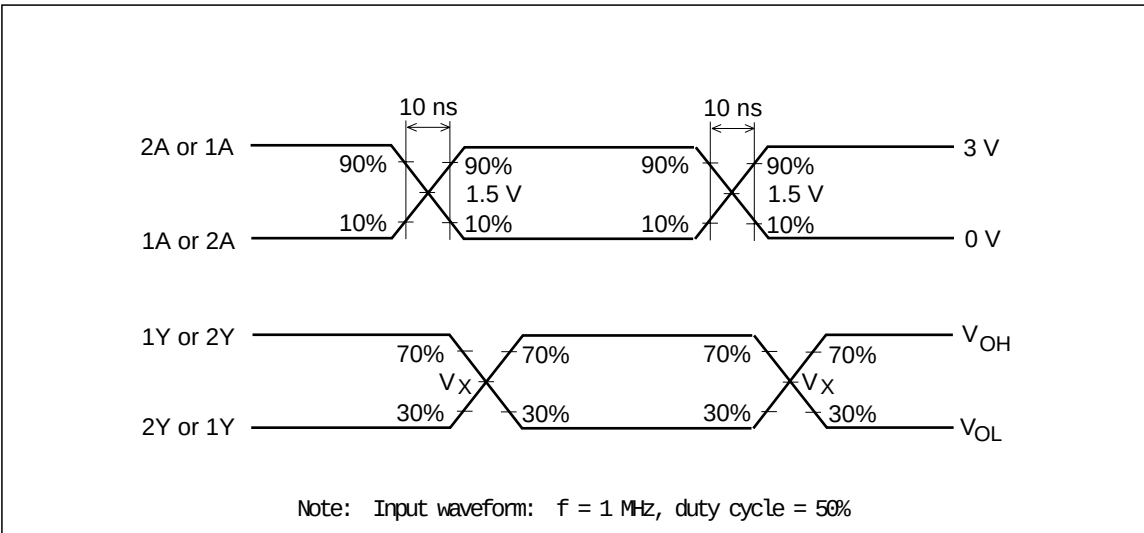
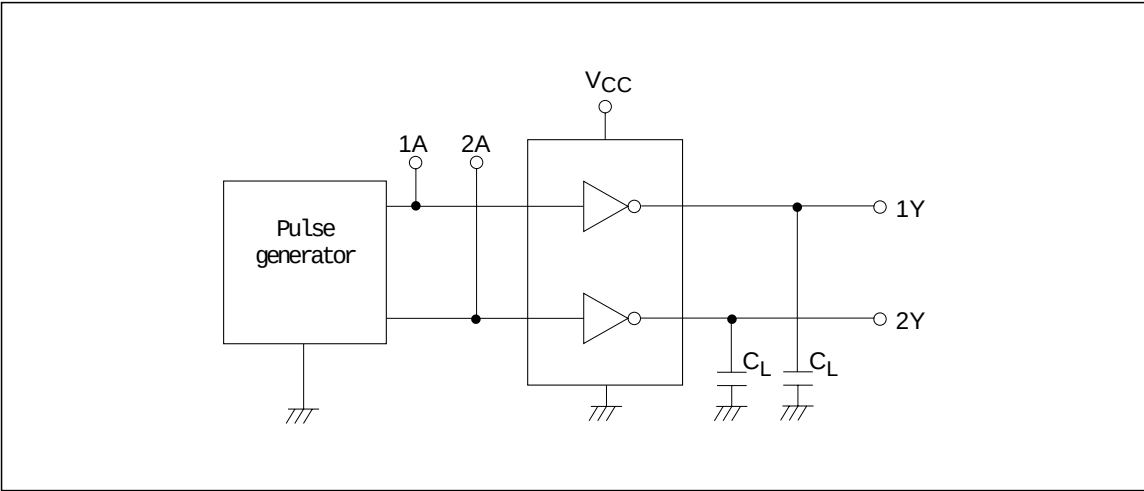


Note: Input waveform: $f = 1 \text{ MHz}$, duty cycle = 50%

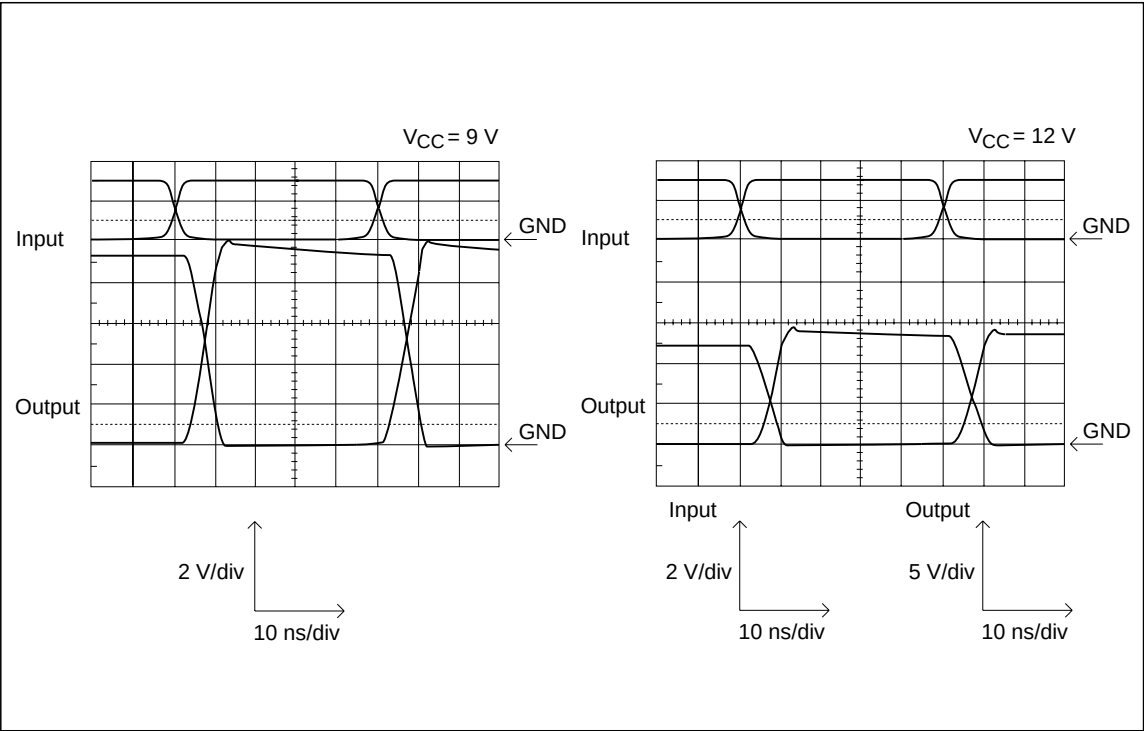
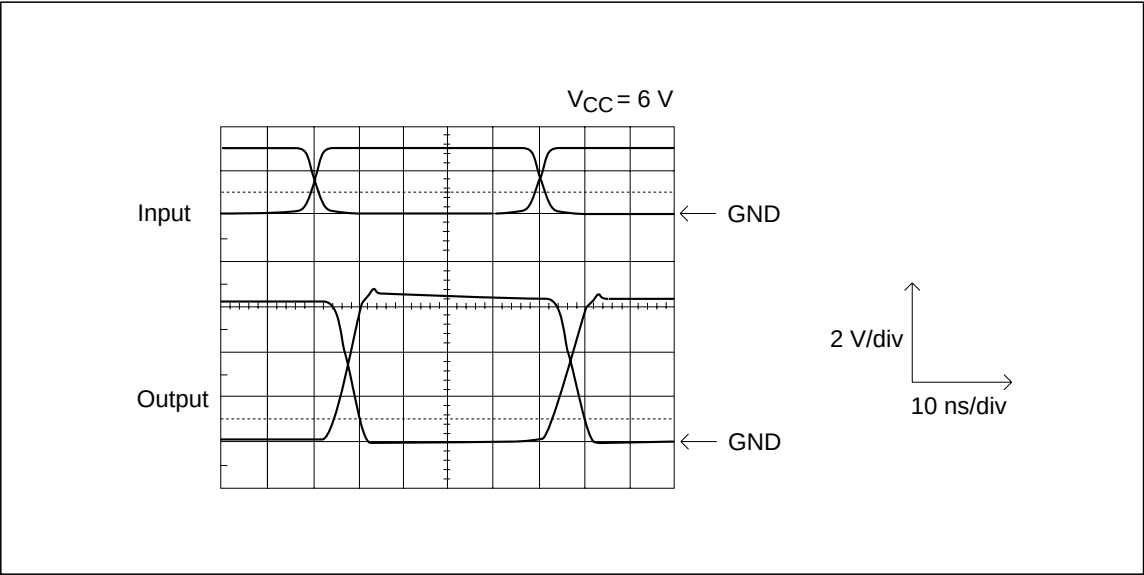
Output Timing Characteristics (Ta = 25 C)

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

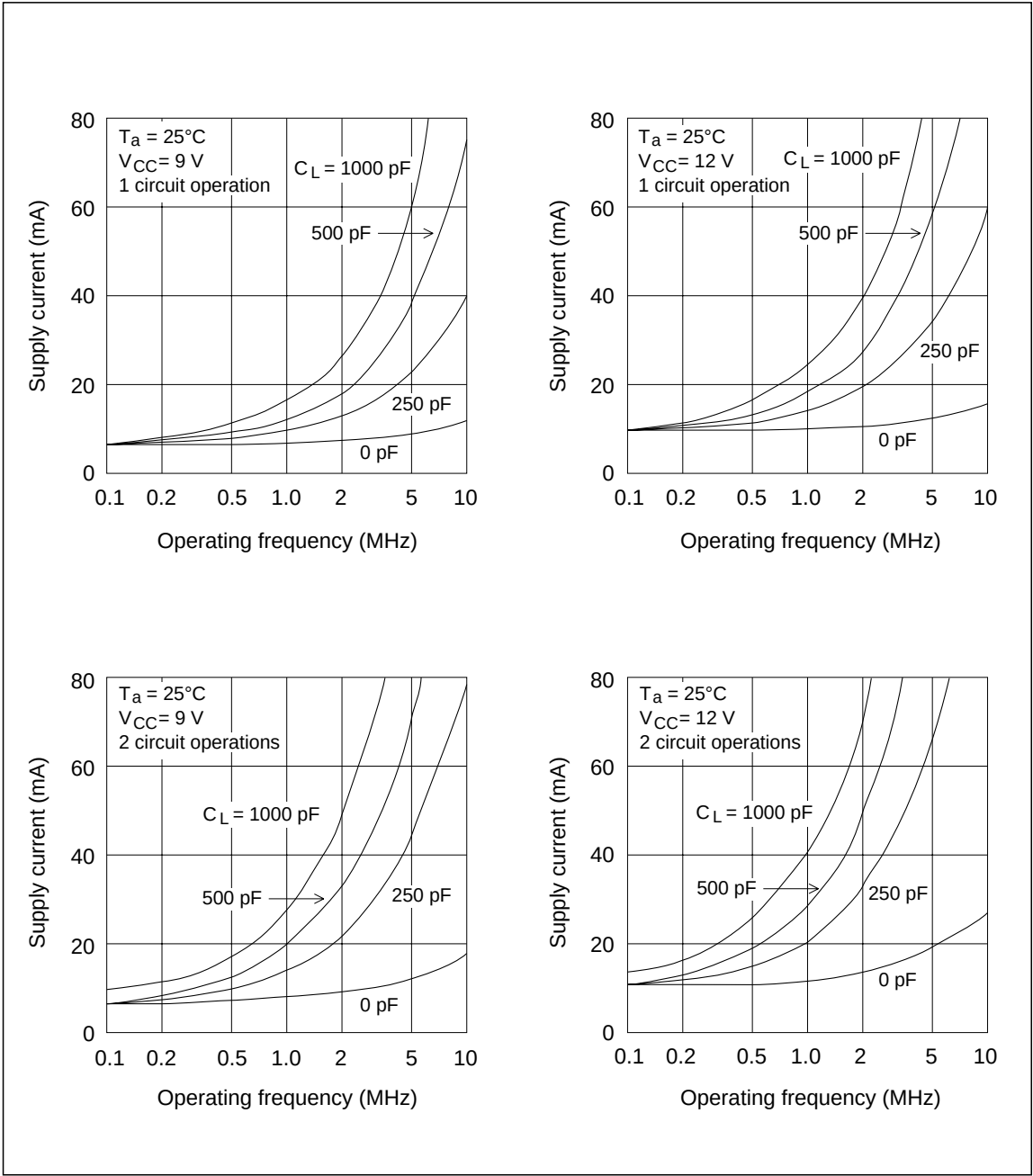
Output Timing Characteristics Test Method (HD29027/28)

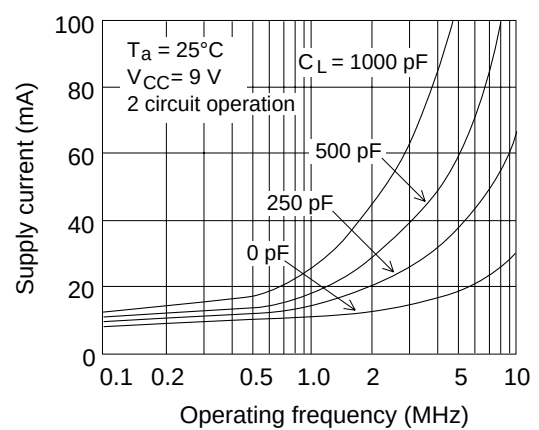
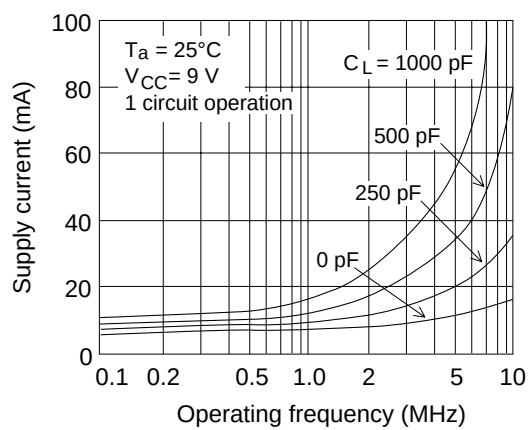
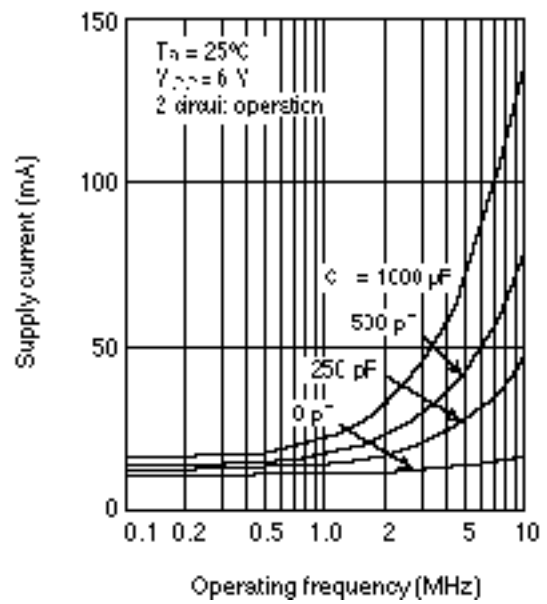
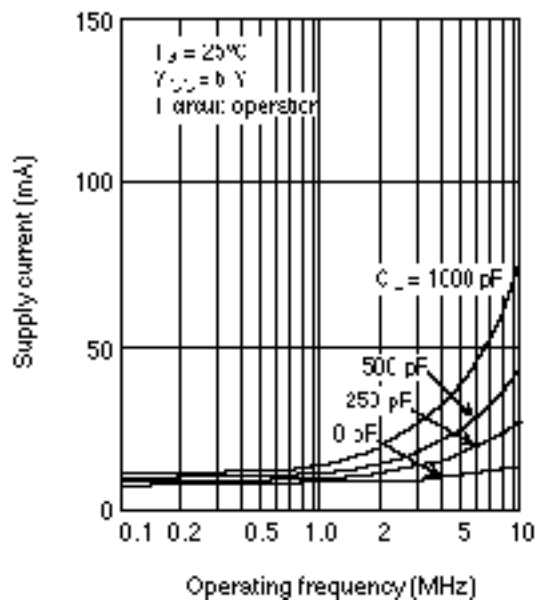


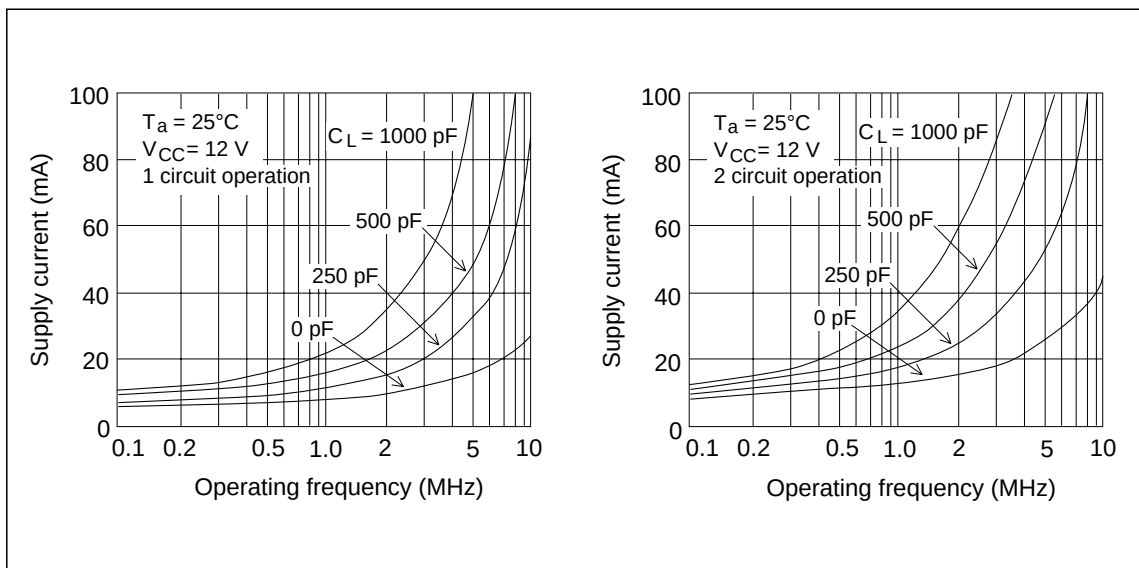
Output Timing Characteristics



Typical Characteristic Curves







Cautions (HD29026A only)

illustrated in figure 2 serves to

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

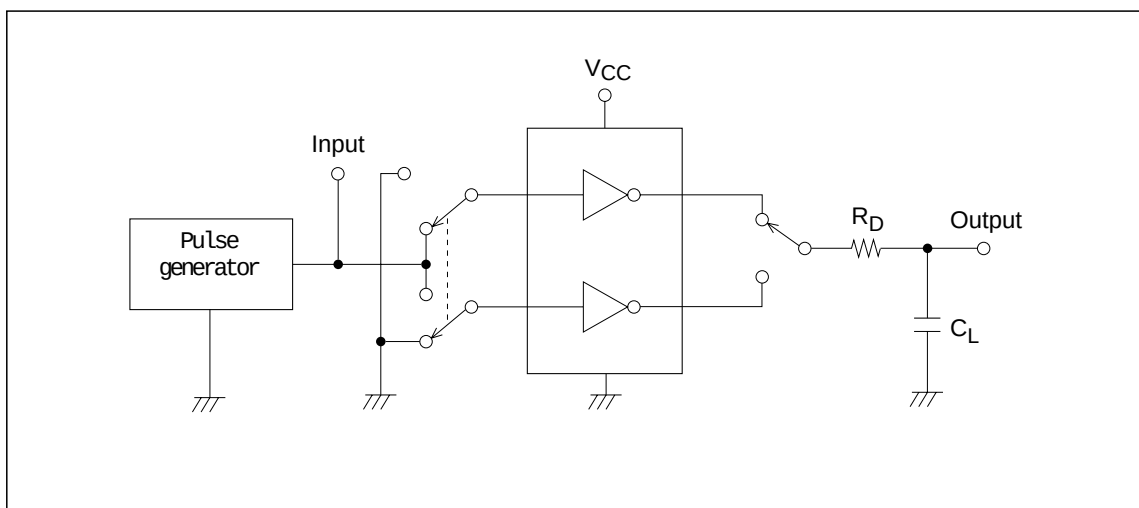


Figure 2

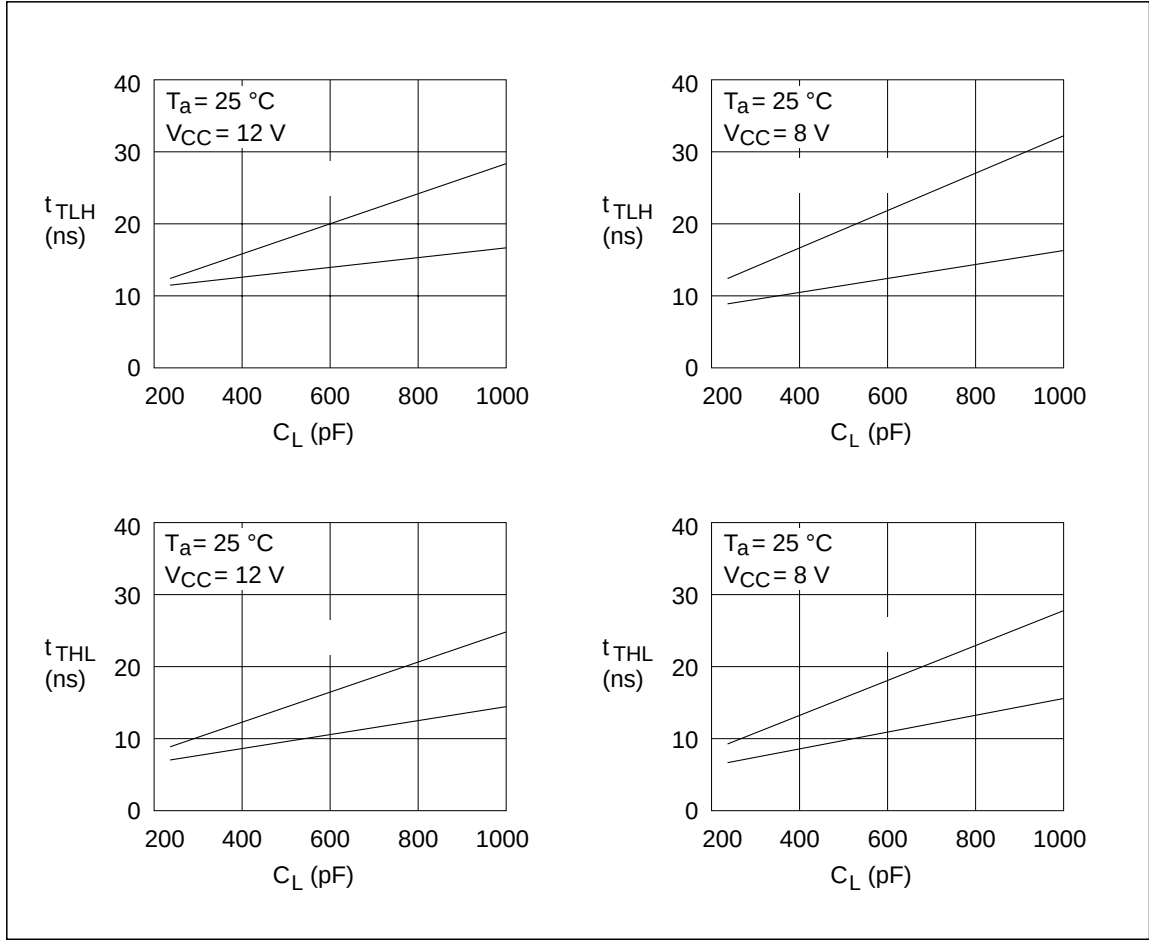


Figure 3