HD29026A/HD29027/ HD29028

Dual CCD Drivers

Description

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 sync and source.

HD29026AP, HD29027P, HD29028P

(DP-8)

HD29026AFP, HD29027FP, HD29028FP

(FP-8D)

Features

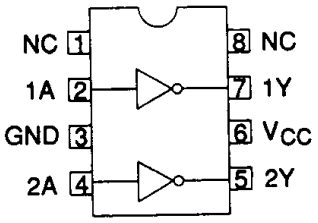
- High speed output rise and fall (20 ns typ) at load capacitance (C_L) of 1000 pF
- Direct drive of input block by TTL eliminates the need for external components
- Output swing voltage of 12 V; output current of 1 A available for both sync and source
- Output wave cross point 50% typ

Function Table

Input A	Output Y
H	L
L	H

Note: H: High level
L: Low level

Pin Arrangement



(Top view)

Ordering Information

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	9 V	300 mil 8-pin plastic DIP (DP-8)
HD29028FP		225 mil 8-pin plastic SOP (FP-8D)

Absolute Maximum Ratings

Item	Symbol		Rating	Unit
Supply Voltage	V_{CC}*1		17	V
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	

The absolute maximum ratings are limiting values, to be applied individually, beyond which the device may be permanently damaged. Functional operation under any of these conditions is not guaranteed. Exposing a circuit to its absolute maximum rating for extended periods of time may affect the device's reliability.

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.

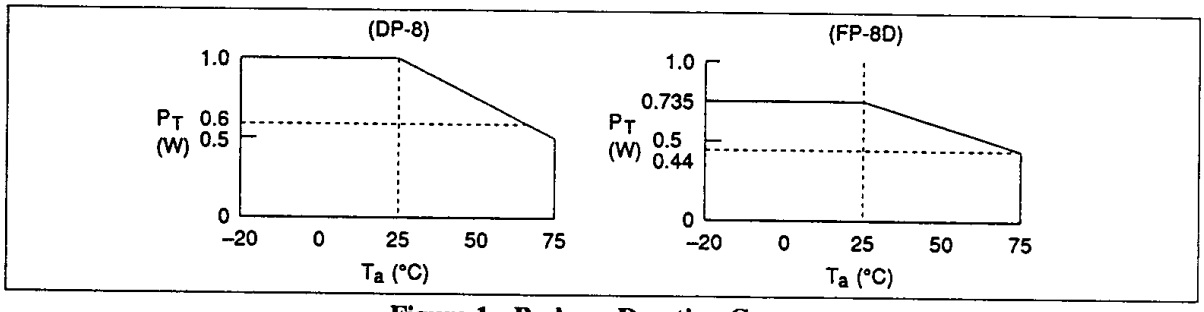


Figure 1 Package Derating Curves

Recommended Operating Conditions

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

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

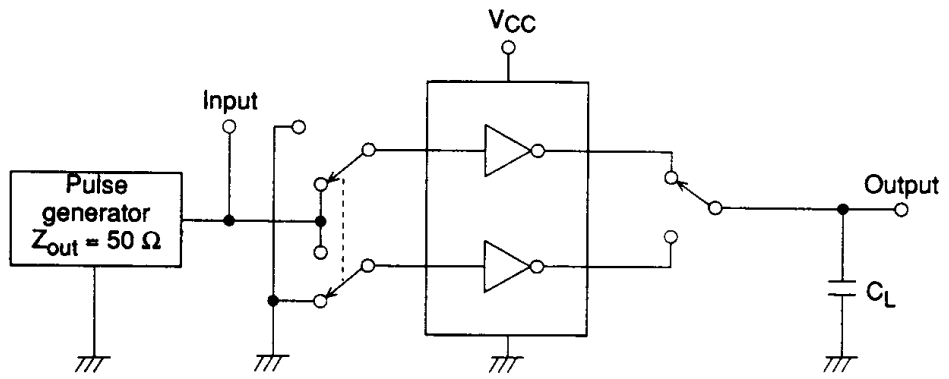
Note: HD29026A: V_{CC} = 8 to 13 V HD29027: V_{CC} = 4.5 to 8 V

Switching Characteristics (Ta = 25°C)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions	
Fall propagation delay time	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 delay time	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) time	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) time	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

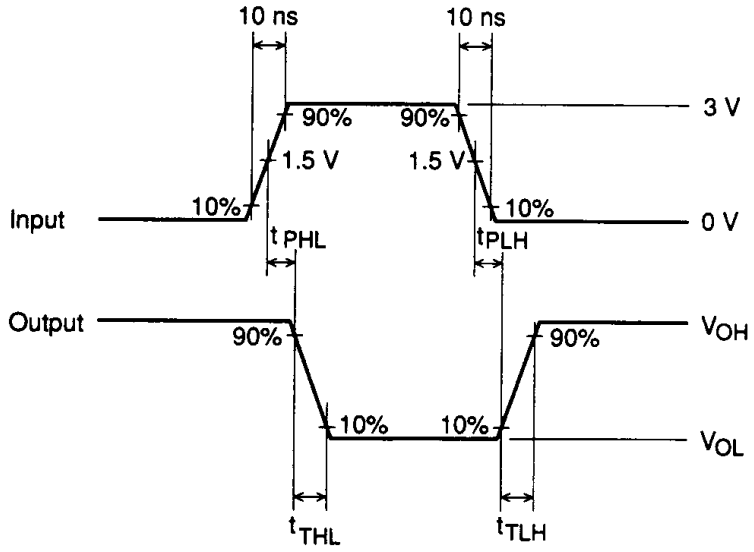
Switching Time Test Method

• Test circuit



Note: C_L includes stray capacitance of probe and other tools

• Waveforms



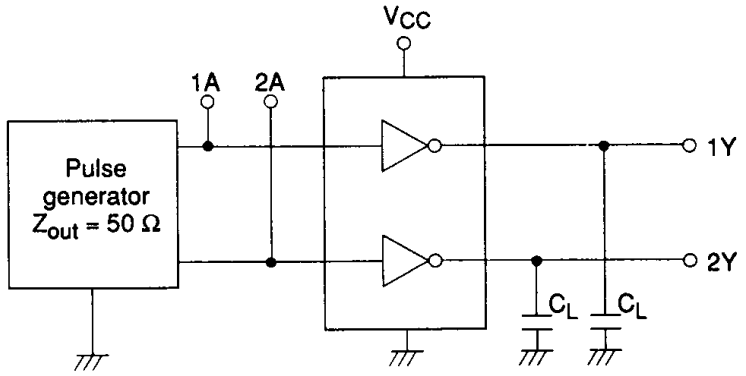
Note: Input waveform: f = 1 MHz, duty cycle = 50%

Output Timing Characteristics (Ta = 25°C, V_{CC} = 6 V) (HD29027/28)

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

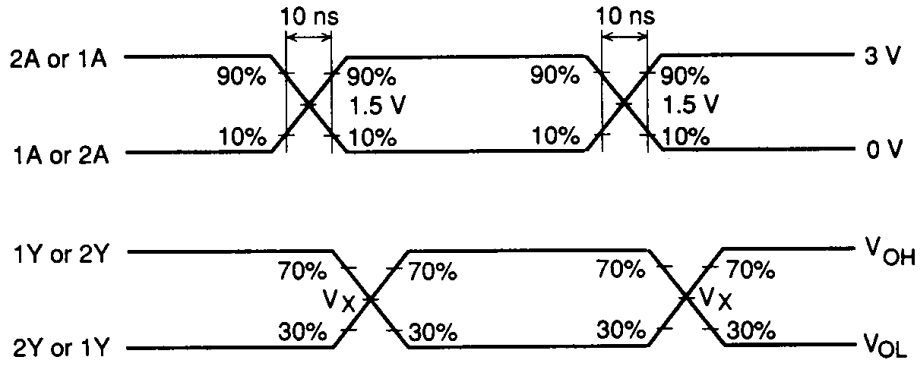
Output Timing Characteristics Test Method (HD29027/28)

• Test circuit



Note: C_L includes stray capacitance of probe and other tools

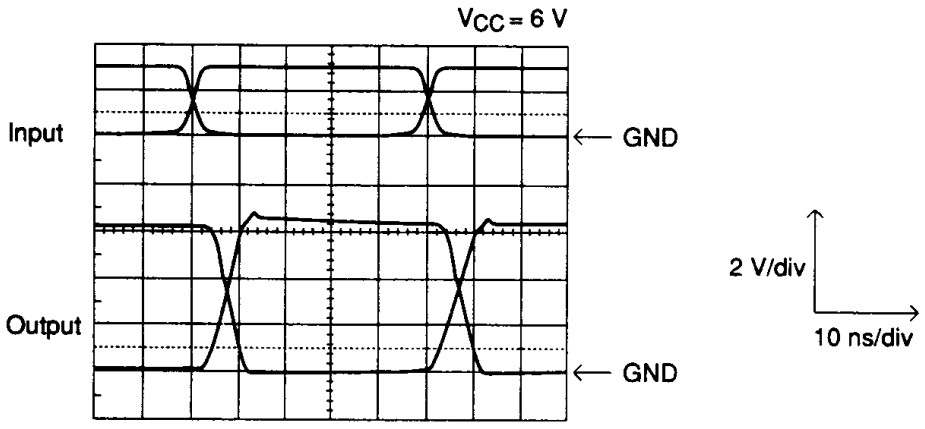
• Waveform



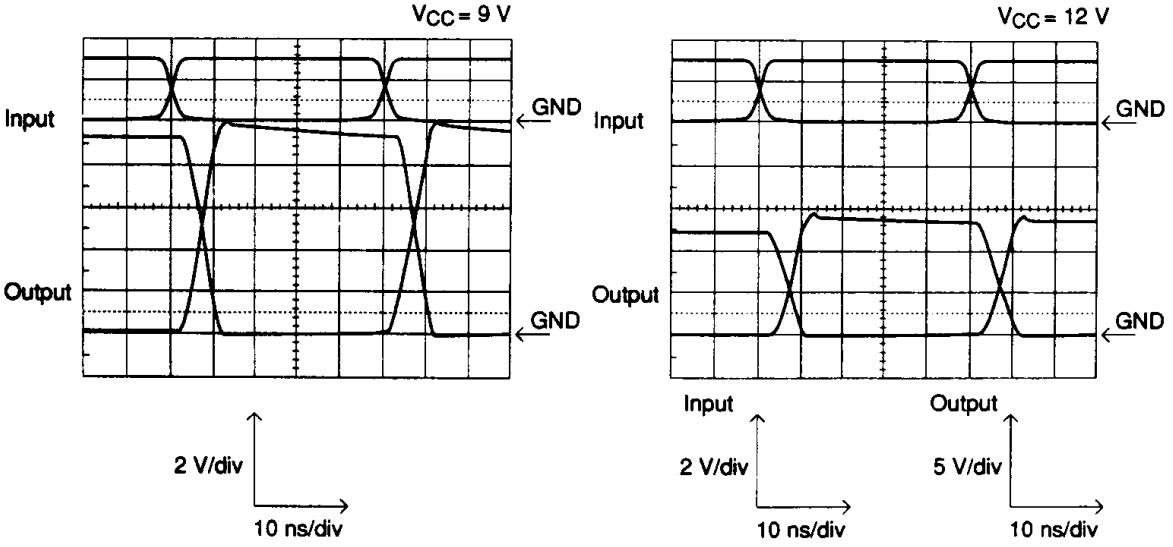
Note: Input waveform: f = 1 MHz, duty cycle = 50%

Output Timing Characteristics

• HD29027

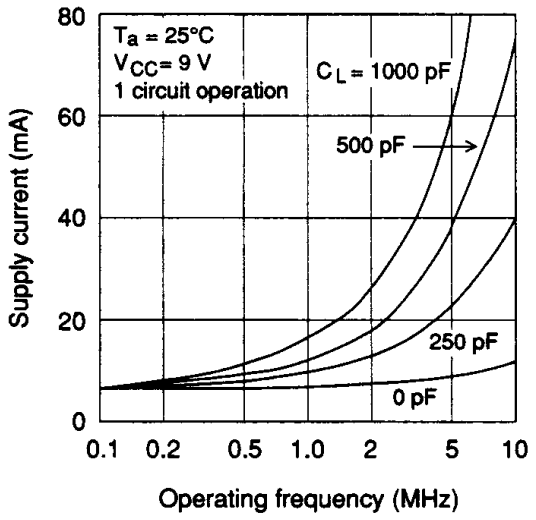


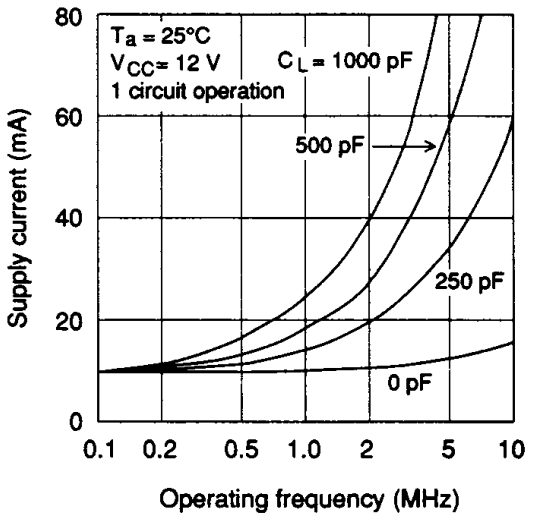
• HD29028

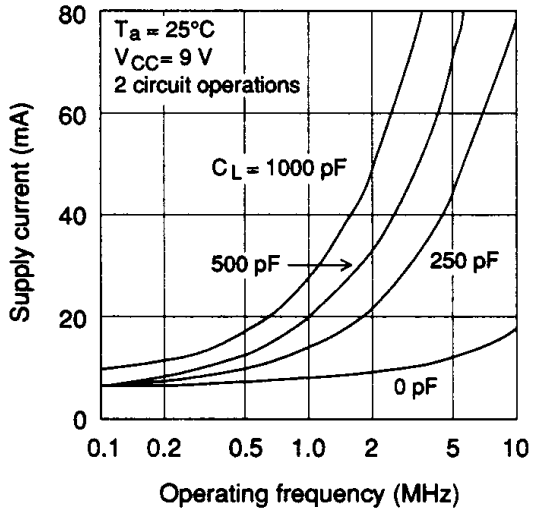


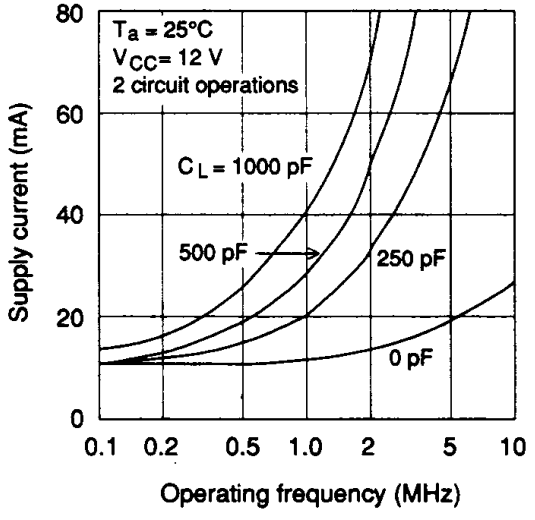
Typical Characteristic Curves

• Supply current vs. operating frequency (HD29026A)

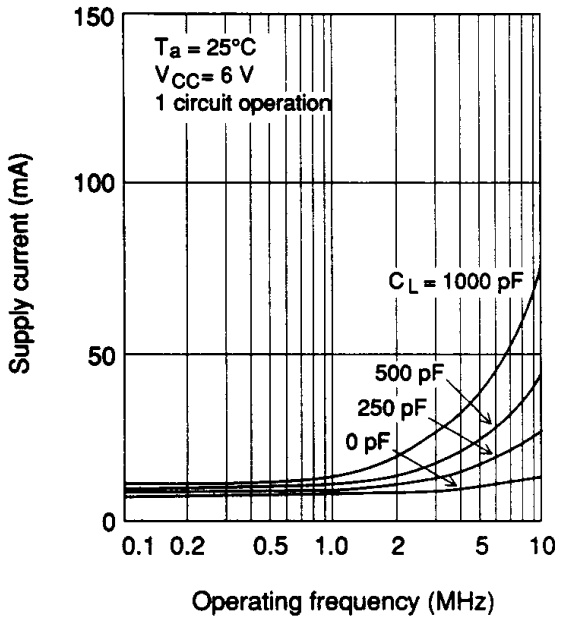


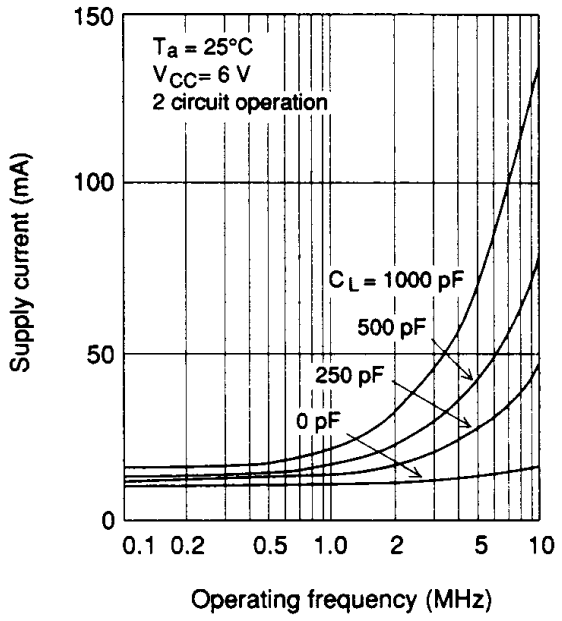




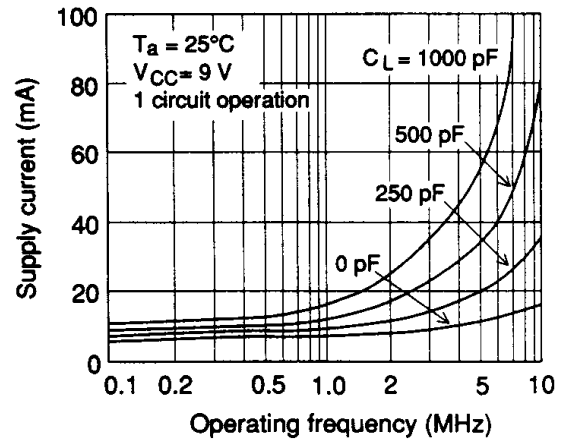


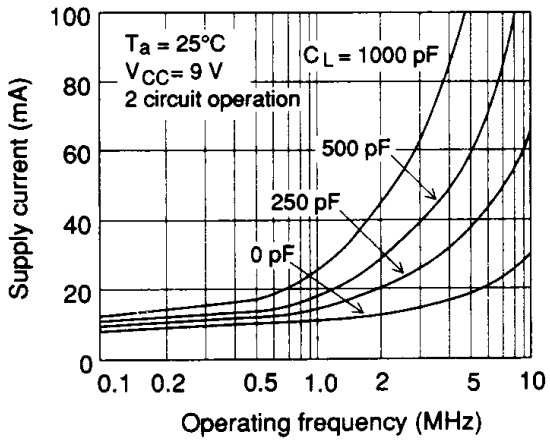
• Supply current vs. operating frequency (HD29027)

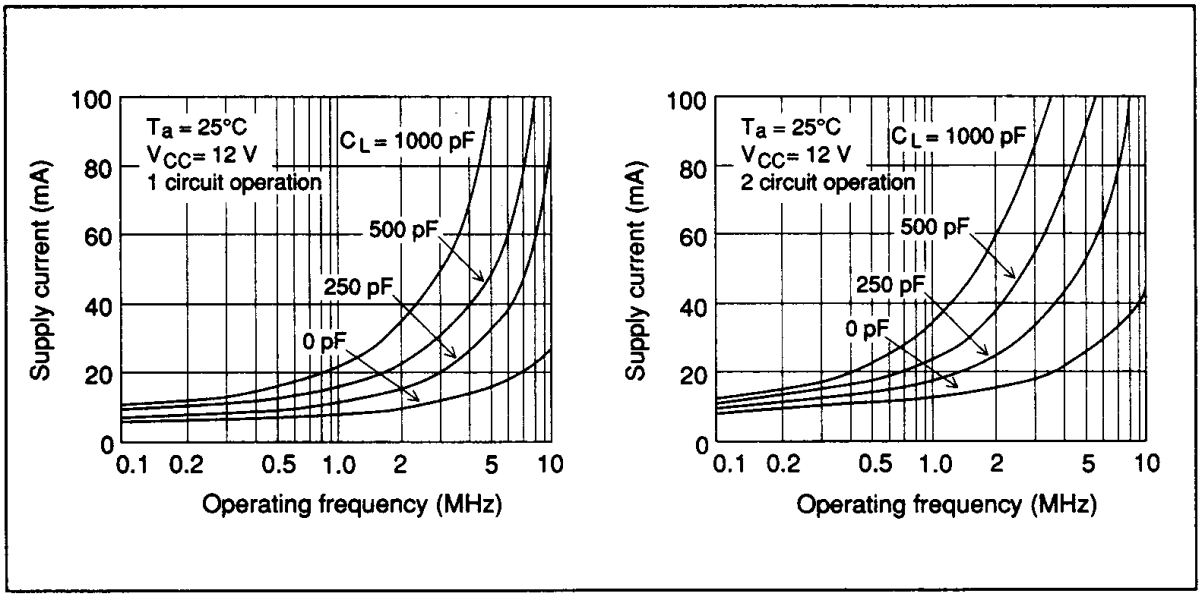




• Supply current vs. operating frequency (HD29028)







Cautions

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 Ω damping resistance (R_D) to the output as illustrated in figure 2 serves to increase the output rise and fall time, making it possible to reduce the chance of overshooting and undershooting. Figure 3 shows the characteristics that result for a damping resistance (R_D) of 10 Ω.

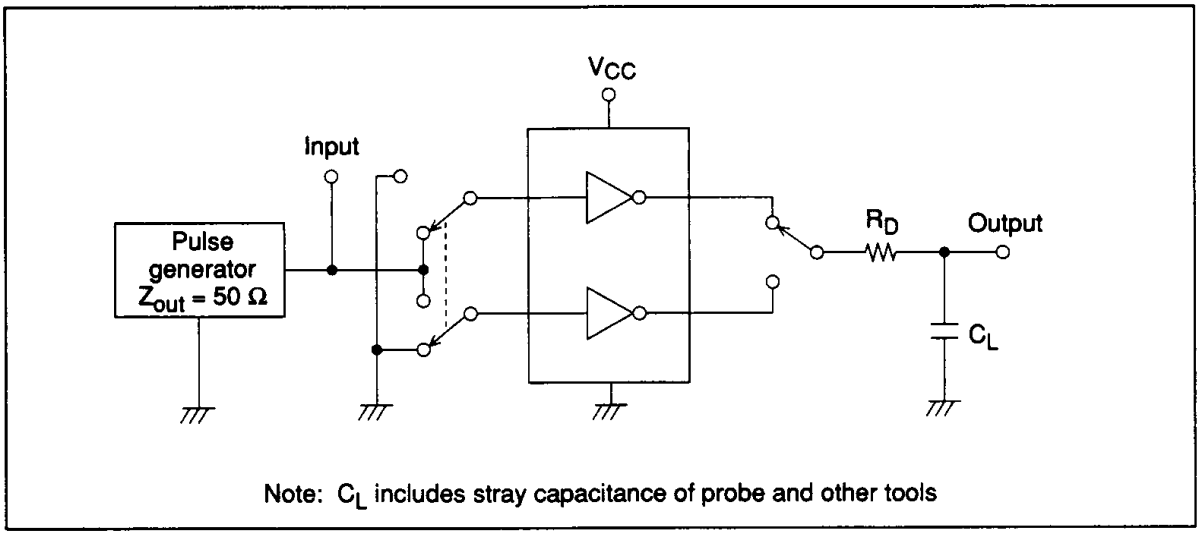


Figure 2

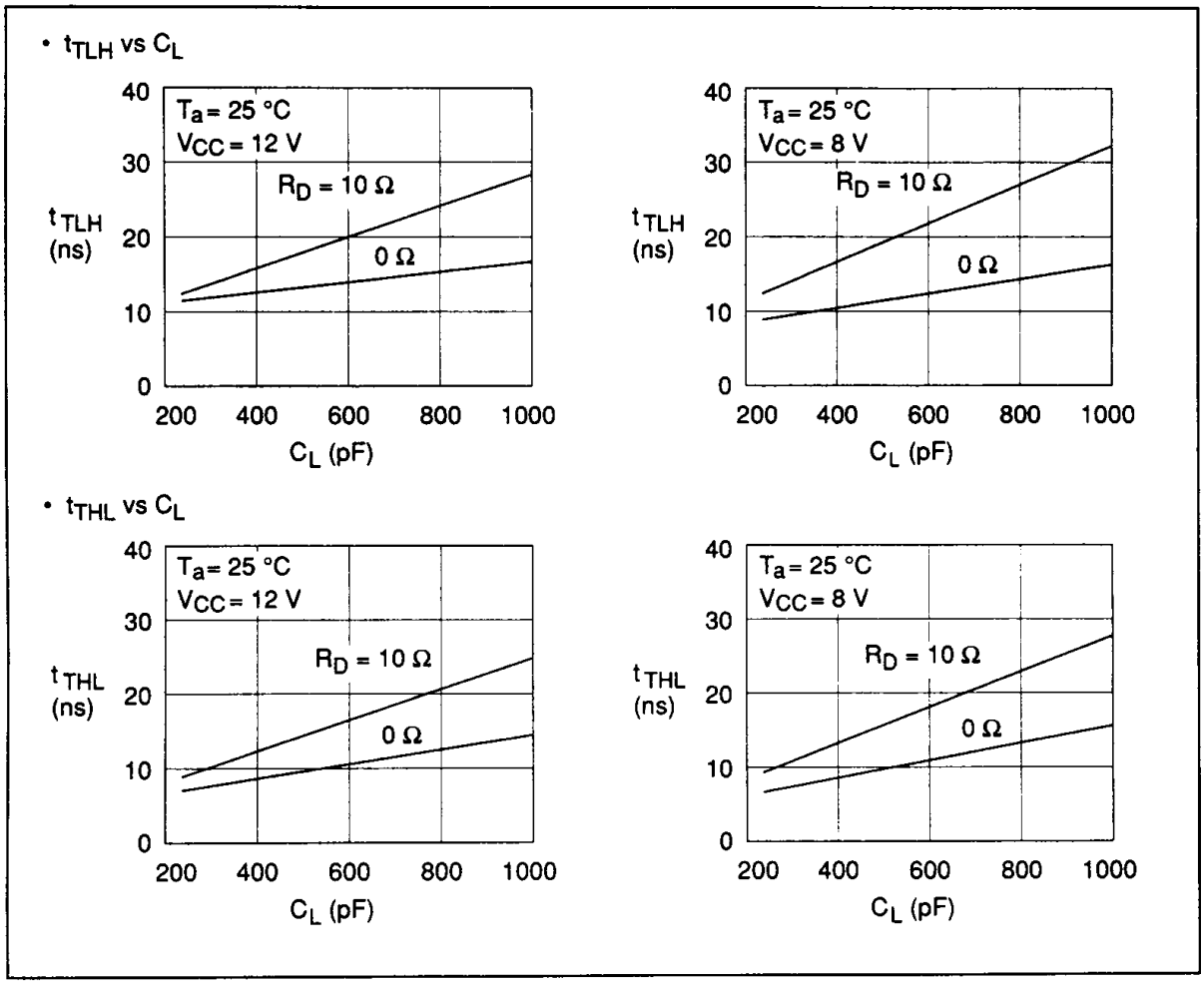

• t_{TLH} vs C_L
T_a = 25 °C
V_{CC} = 12 V
R_D = 10 Ω
0 Ω
t_{TLH} (ns)
C_L (pF)
T_a = 25 °C
V_{CC} = 8 V
R_D = 10 Ω
0 Ω
t_{TLH} (ns)
C_L (pF)
• t_{THL} vs C_L
T_a = 25 °C
V_{CC} = 12 V
R_D = 10 Ω
0 Ω
t_{THL} (ns)
C_L (pF)
T_a = 25 °C
V_{CC} = 8 V
R_D = 10 Ω
0 Ω
t_{THL} (ns)
C_L (pF)

Figure 3