



# HD29026A/HD29027

## Dual CCD Drivers

REJ03D0302-0200Z  
 (Previous ADE-205-001 (Z))  
 Rev.2.00  
 Jul.16.2004

### Description

HD29026A and HD29027 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
- Ordering Information

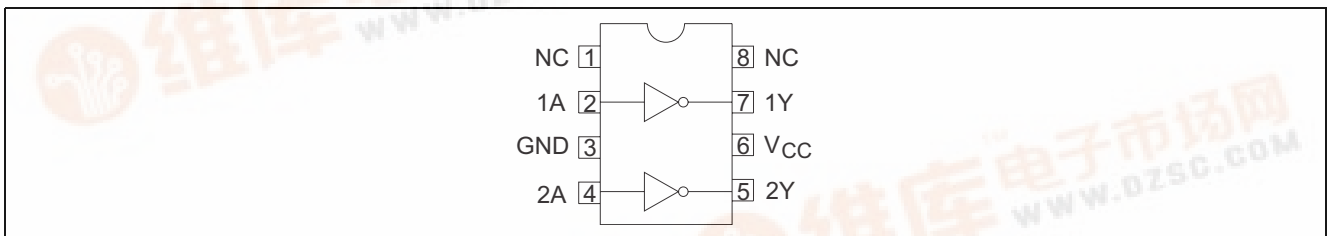
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD29026AFPEL	SOP-8 pin (JEITA)	FP-8DGV	FP	EL (2,500 pcs/reel)
HD29027FPEL	SOP-8 pin (JEITA)	FP-8DGV	FP	EL (2,500 pcs/reel)

### Function Table

Input A	Output Y
H	L
L	H

Note: H: High level  
 L: Low level

### Pin Arrangement



**Absolute Maximum Ratings**

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

- Notes: 1. If no value is specified, the voltage is defined by the GND pin.  
 2. Value when  $T_a = 25^{\circ}C$ . Heat dissipation is required for large-capacitance, high-frequency drivers, so derating of 5.9 mW/ $^{\circ}C$  are required.

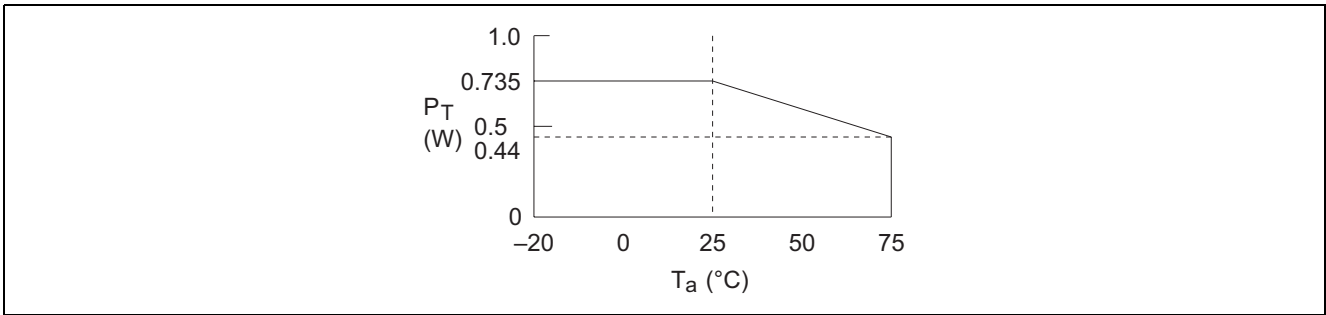


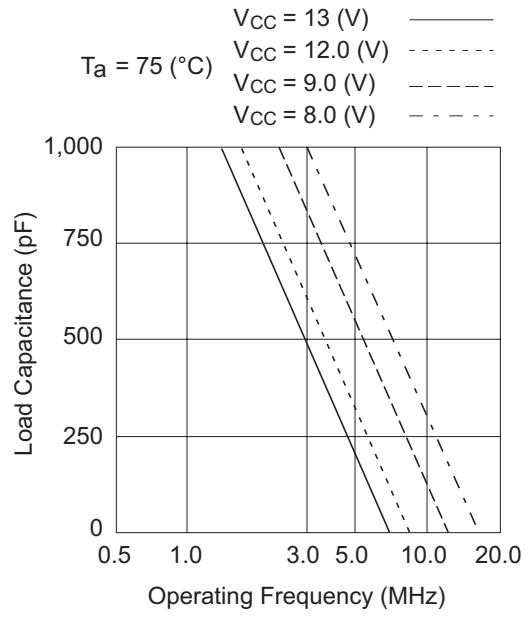
Figure 1 Package Derating Curves

**Recommended Operating Conditions**

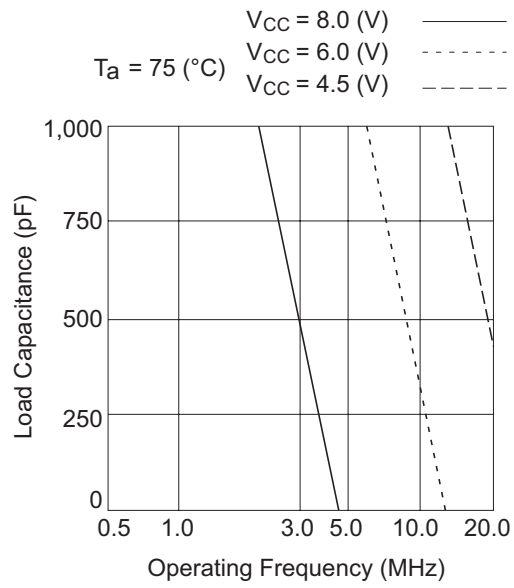
Item	Symbol	Min	Typ	Max	Unit	
Supply voltage	HD29026A	$V_{CC}$	8	12	13	V
	HD29027	$V_{CC}$	4.5	6	8	
Operating temperature	$T_a$	-20	25	75	$^{\circ}C$	

### Recommended Operating Frequency Area

#### HD29026A



#### HD29027



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

Item	Symbol	Min	Typ	Max	Unit	Test Conditions	
Input voltage	V <sub>IH</sub>	2.0	—	—	V		
	V <sub>IL</sub>	—	—	0.6			
Output voltage	V <sub>OH</sub>	V <sub>CC</sub> -1	—	—	V	V <sub>IL</sub> = 0.6 V, I <sub>OH</sub> = -1 mA	
	V <sub>OL</sub>	—	—	0.5		V <sub>IH</sub> = 2.0 V, I <sub>OL</sub> = 1 mA	
Input current	I <sub>IH</sub>	—	—	20	μA	V <sub>I</sub> = 2.7 V	
	I <sub>IL</sub>	—	—	-100		V <sub>I</sub> = 0.4 V	
Supply current	HD29026A	I <sub>CCH</sub>	—	—	12	mA	
	HD29027		—	—	20		
	HD29026A	I <sub>CCL</sub>	—	—	20		
	HD29027		—	—	30		
Input current	I <sub>I</sub>	—	—	100	μA	V <sub>I</sub> = 7 V	
Input clamp voltage	V <sub>IK</sub>	—	—	-1.5	V	I <sub>IN</sub> = -18 mA	

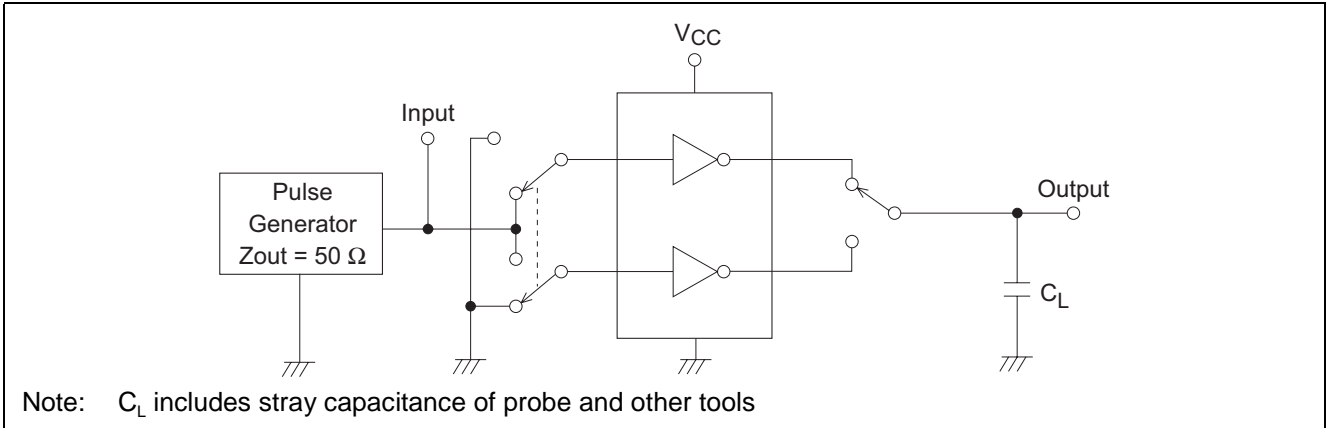
Note: HD29026A: V<sub>CC</sub> = 8 to 13 V  
 HD29027: V<sub>CC</sub> = 4.5 to 8 V

**Switching Characteristics (Ta = 25°C)**

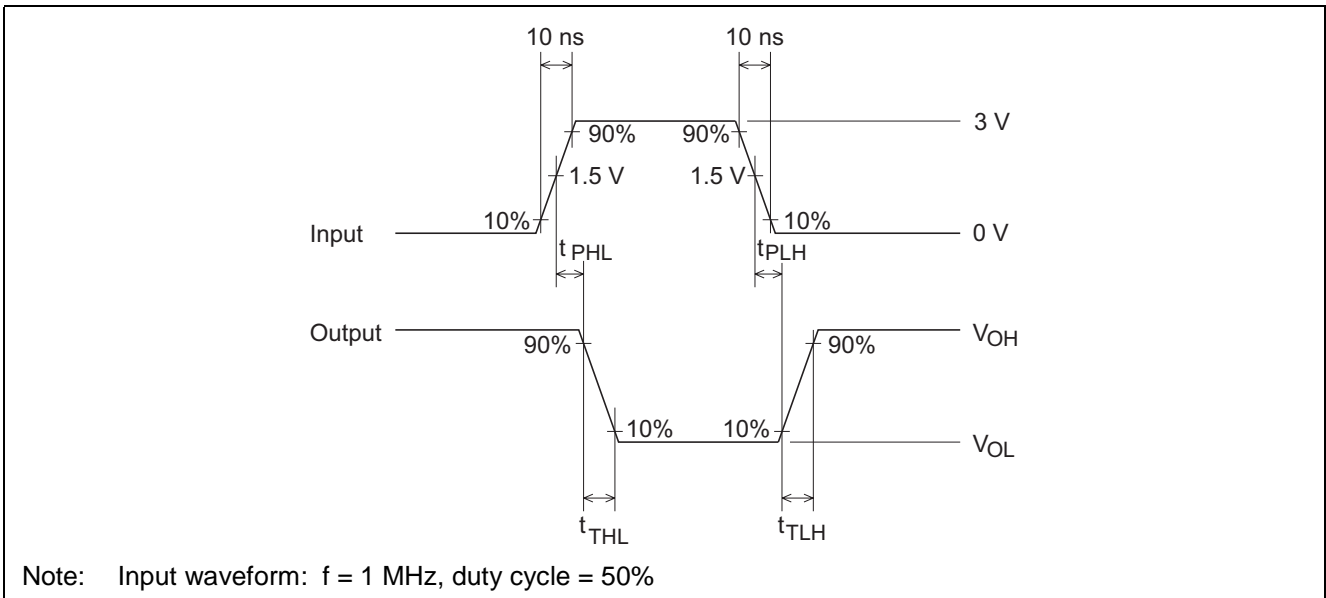
Item	Symbol	Min	Typ	Max	Unit	Test Conditions	
Fall propagation delay time	HD29026A	t <sub>PHL</sub>	—	16	20	ns	C <sub>L</sub> = 1000 pF, V <sub>CC</sub> = 8 V
			—	11	15		V <sub>CC</sub> = 12 V
	HD29027	—	10	15	V <sub>CC</sub> = 6 V		
Rise propagation delay time	HD29026A	t <sub>PLH</sub>	—	18	25	ns	C <sub>L</sub> = 1000 pF, V <sub>CC</sub> = 8 V
			—	13	20		V <sub>CC</sub> = 12 V
	HD29027	—	10	15	V <sub>CC</sub> = 6 V		
Fall (transition) time	HD29026A	t <sub>THL</sub>	—	17	21	ns	C <sub>L</sub> = 250 pF, V <sub>CC</sub> = 8 V
			—	12	16		V <sub>CC</sub> = 12 V
			—	9	14		V <sub>CC</sub> = 6 V
	HD29027	t <sub>THL</sub>	—	9	14	ns	C <sub>L</sub> = 250 pF, V <sub>CC</sub> = 6 V
			—	20	23		V <sub>CC</sub> = 8 V
			—	15	18		V <sub>CC</sub> = 12 V
	HD29026A	t <sub>THL</sub>	—	12	17	ns	C <sub>L</sub> = 500 pF, V <sub>CC</sub> = 6 V
			—	25	40		V <sub>CC</sub> = 8 V
			—	20	35		V <sub>CC</sub> = 12 V
HD29027	t <sub>THL</sub>	—	20	25	ns	C <sub>L</sub> = 1000 pF, V <sub>CC</sub> = 6 V	
		—	20	35		V <sub>CC</sub> = 12 V	
		—	20	25		V <sub>CC</sub> = 6 V	
Rise (transition) time	HD29026A	t <sub>TLH</sub>	—	15	20	ns	C <sub>L</sub> = 250 pF, V <sub>CC</sub> = 8 V
			—	10	15		V <sub>CC</sub> = 12 V
			—	9	14		V <sub>CC</sub> = 6 V
	HD29027	t <sub>TLH</sub>	—	9	14	ns	C <sub>L</sub> = 250 pF, V <sub>CC</sub> = 6 V
			—	21	25		V <sub>CC</sub> = 8 V
			—	16	20		V <sub>CC</sub> = 12 V
	HD29026A	t <sub>TLH</sub>	—	12	17	ns	C <sub>L</sub> = 500 pF, V <sub>CC</sub> = 6 V
			—	22	30		V <sub>CC</sub> = 8 V
			—	17	25		V <sub>CC</sub> = 12 V
HD29027	t <sub>TLH</sub>	—	20	25	ns	C <sub>L</sub> = 1000 pF, V <sub>CC</sub> = 6 V	
		—	20	25		V <sub>CC</sub> = 12 V	
		—	20	25		V <sub>CC</sub> = 6 V	

## Switching Time Test Method

### Test circuit



### Waveforms



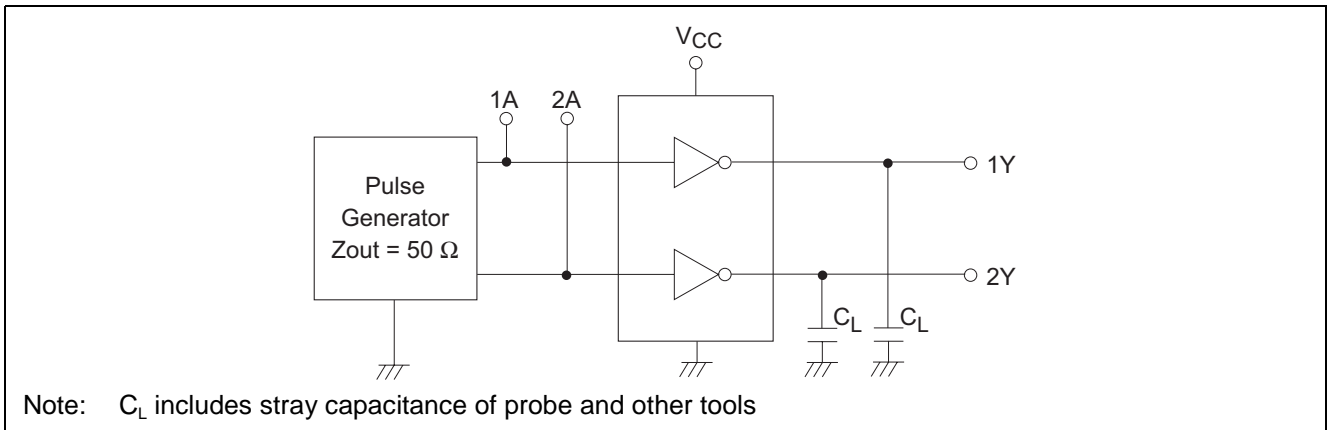
**Output Timing Characteristics (Ta = 25°C)**

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output wave cross point	V <sub>x</sub>	30	50	70	%	C <sub>L</sub> = 250 pF
		30	50	70		C <sub>L</sub> = 500 pF
		30	50	70		C <sub>L</sub> = 1000 pF

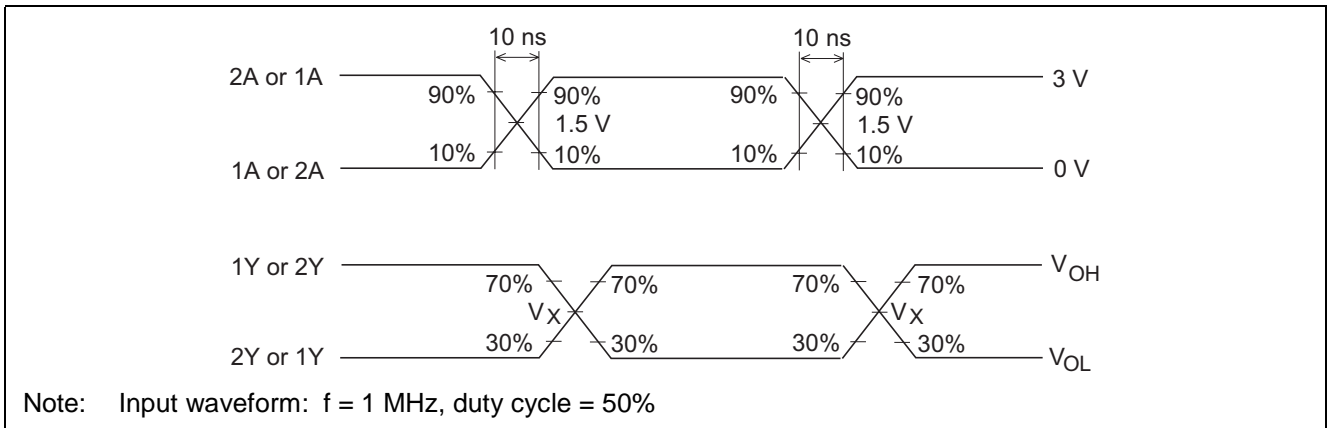
HD29027; V<sub>CC</sub> = 6 V

**Output Timing Characteristics Test Method (HD29027)**

**Test circuit**

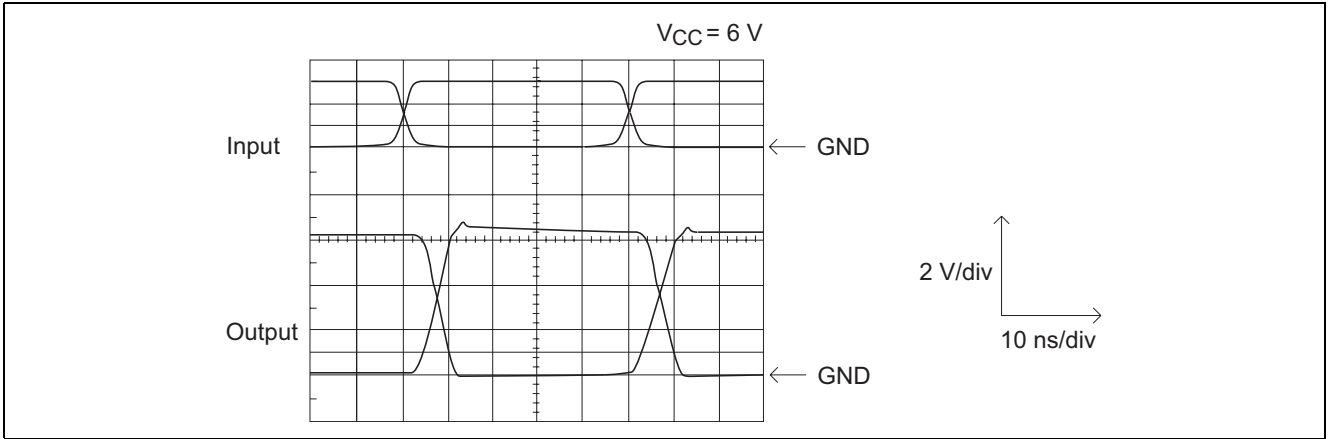


**Waveform**



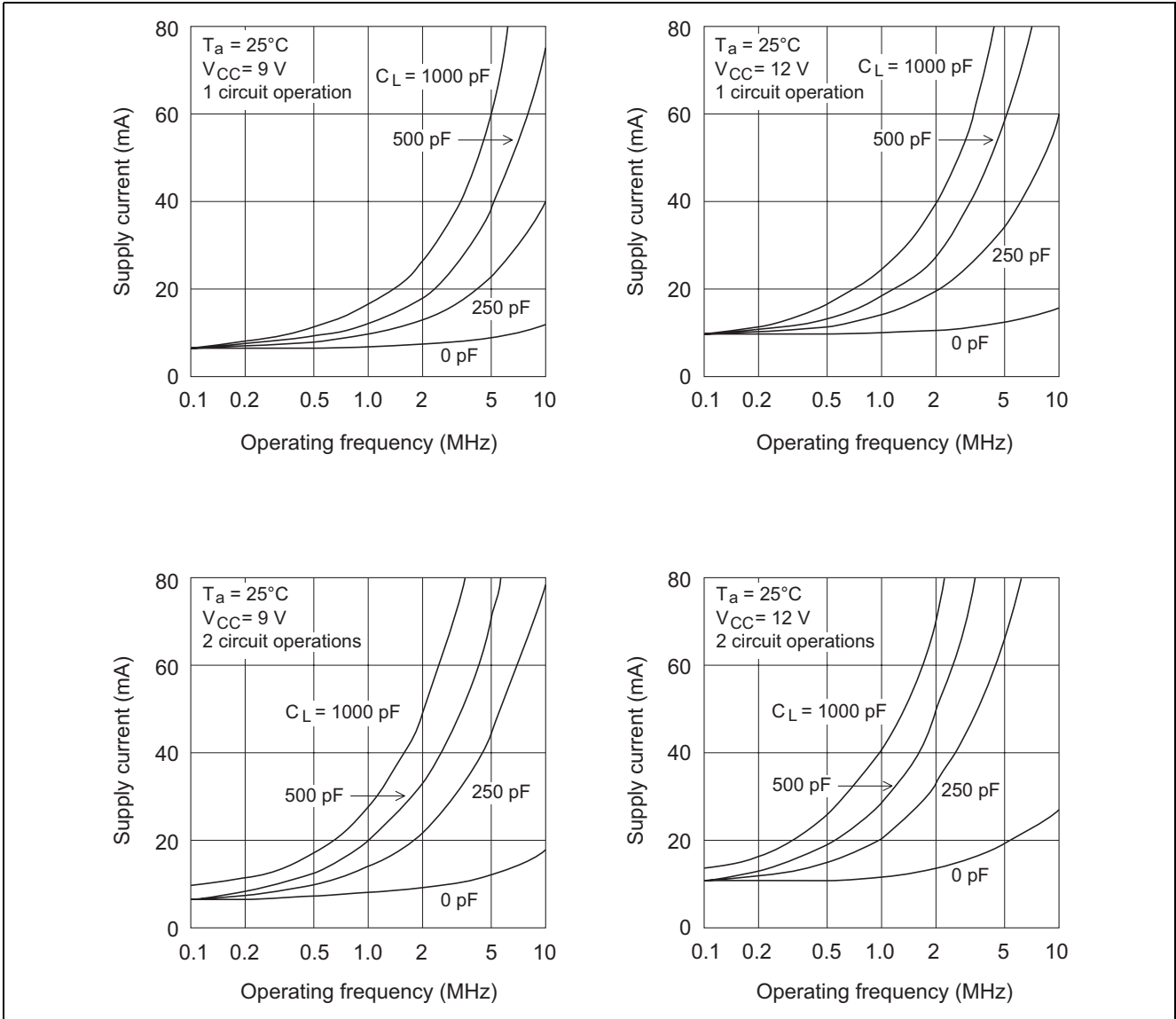
## Output Timing Characteristics

### HD29027



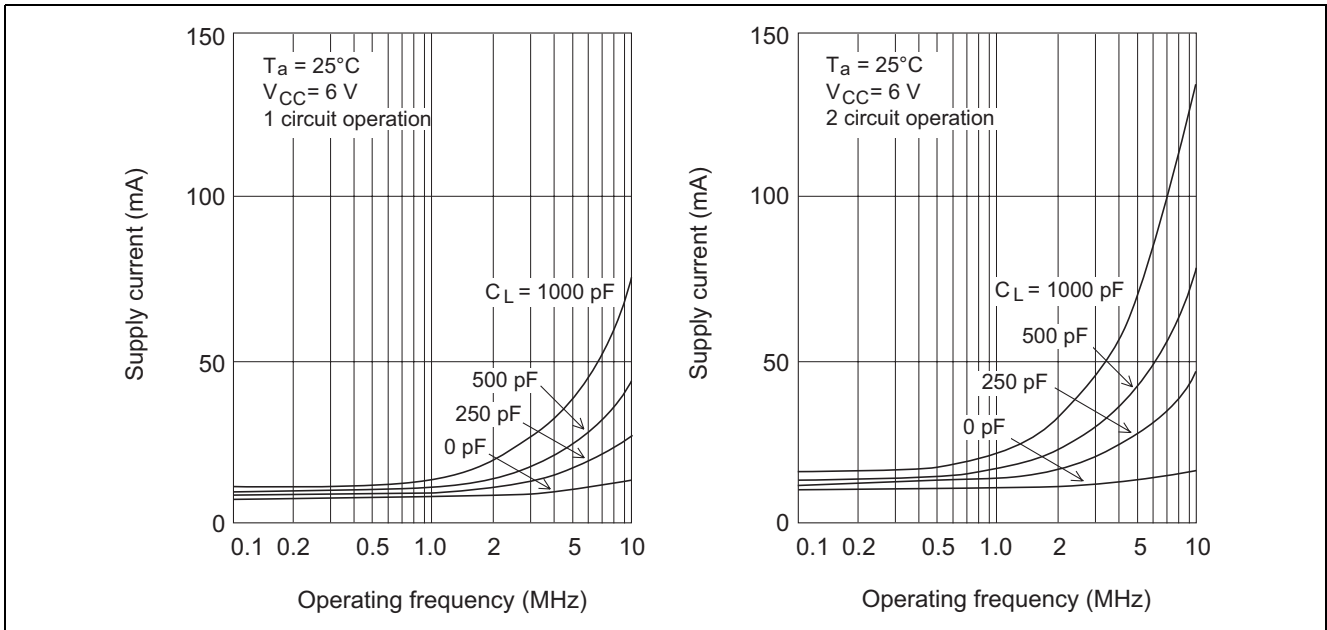
## Typical Characteristic Curves

### Supply current vs. operating frequency (HD29026A)





Supply current vs. operating frequency (HD29027)



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  $\Omega$  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  $\Omega$ .

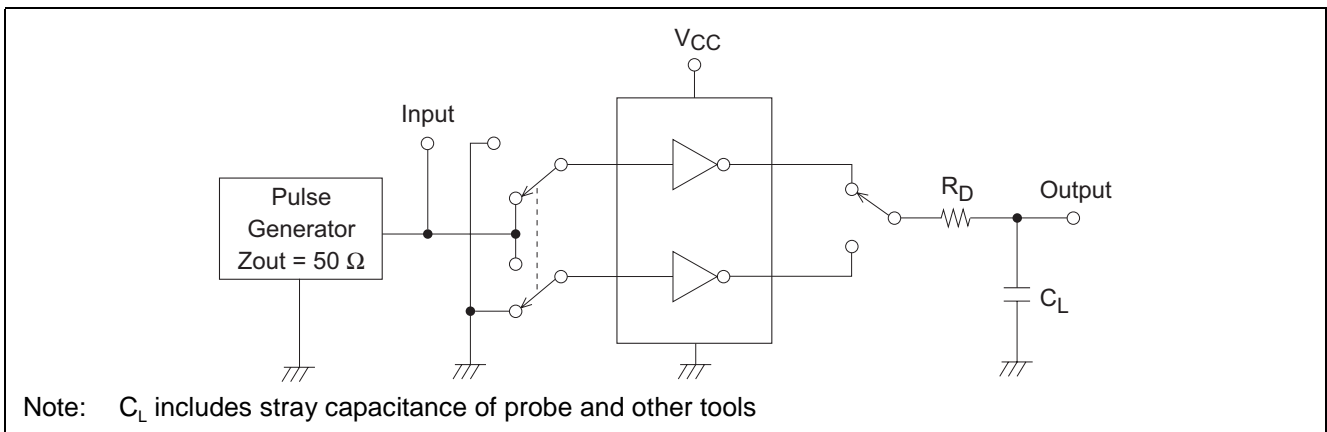


Figure 2

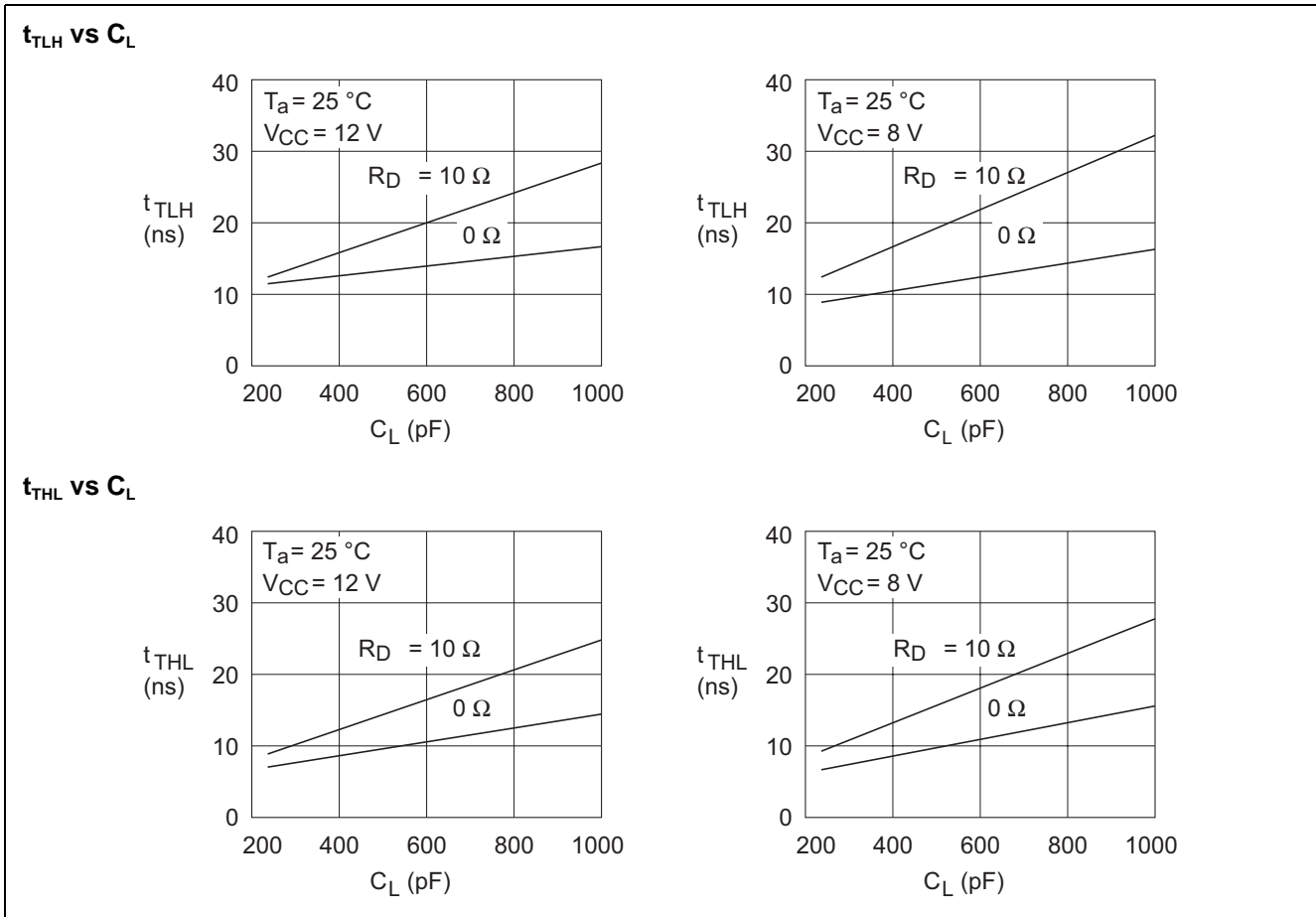
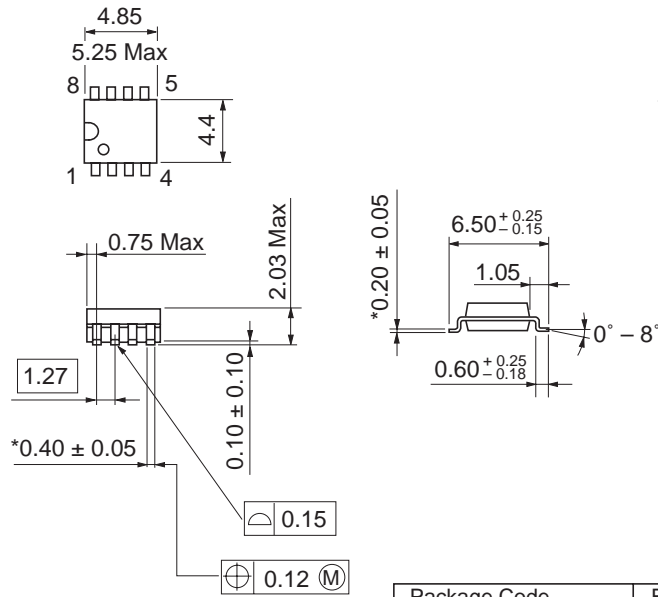


Figure 3

Package Dimensions

Unit: mm



Package Code	FP-8DGV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.10 g

\*This dimension include Pd plating

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