

# HA13444

## Quad Solenoid Driver

### Description

HA13444 is a low-active quad driver IC, designed to act as a solenoid driver for motor vehicles.

### Functions

- 0.6-A × 4-channel output circuit
- Clamp diode
- Chip enable

### Features

- High voltage: 60 V
- Low saturation voltage
- Non-inverting input
- Small input current
- Compatible with TTL, LS-TTL, 5-V CMOS input

### Truth Table

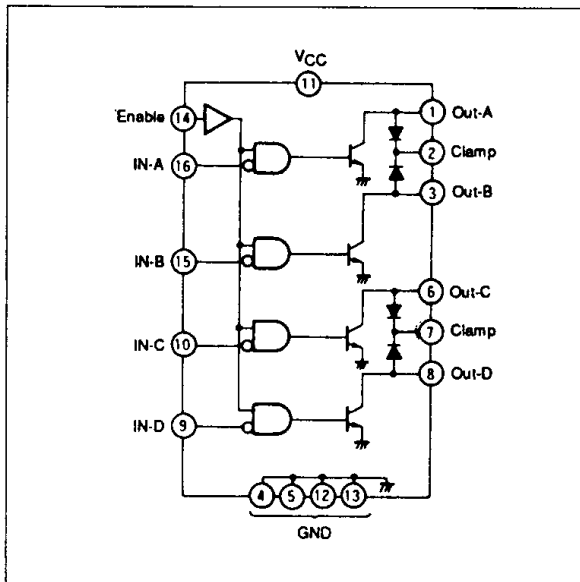
Enable	Input	Output
H	L	On
H	H	Off
L	X	Off

H : High level (2.0 V)

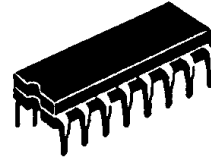
L : Low level (0.8 V)

X : High, low, or open

### Block Diagram

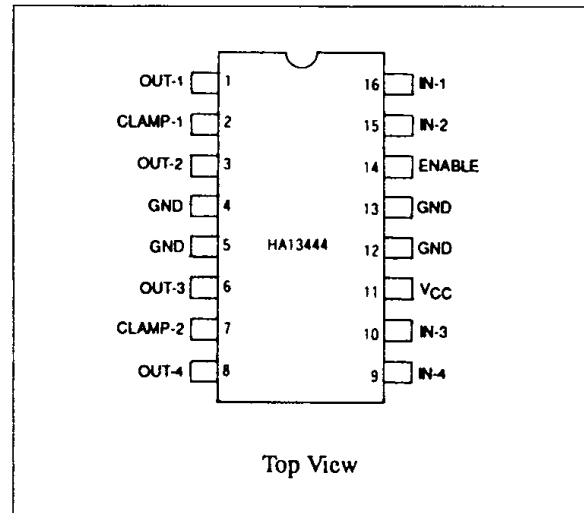


### HA13444



(DP-16C)

### Pin Assignment



Top View

# HA13444

## Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Rating	Unit	Note
Power supply voltage	V <sub>CC</sub>	7	V	1
Input voltage	V <sub>in</sub>	15	V	
Output voltage	V <sub>CEx</sub>	60	V	
Output current	I <sub>out</sub>	0.6	A	
Power dissipation	P <sub>T</sub>	1.85	W	2
Junction temperature	T <sub>j</sub>	150	°C	
Operating junction temperature	T <sub>jop</sub>	-40 to +125	°C	
Storage temperature	T <sub>stg</sub>	-55 to +150	°C	

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:

- Recommended operating temperature range is 4.5 to 5.5V.
- The following are thermal resistance values:
  - $\theta_{j-a1} \leq 60^\circ\text{C/W}$  (for printed circuit board patterning)
  - $\theta_{j-a2} \leq 35^\circ\text{C/W}$  (for printed circuit board with sufficient wiring density)
  - $\theta_{j-a3} \leq 15^\circ\text{C/W}$  (for assuming infinite heat sink at pins 4, 5, 12, 13)

## Electrical Characteristics (Ta = 25°C, V<sub>CC</sub> = 5.0V)

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions	Pins	Notes
Power supply current	I <sub>CC</sub>	—	60	80	mA	ENABLE = 2 V, V <sub>in</sub> = 0.8 V, I <sub>out</sub> = 0.6 A × 4 channels	11	
	I <sub>CCO</sub>	—	6	—	mA	ENABLE = 0.8 V		
Input low-level voltage	V <sub>IL</sub>	—	—	0.8	V		9, 10, 14,	
Input high-level voltage	V <sub>IH</sub>	2.0	—	—	V		15, 16	
Input low-level current	I <sub>IL</sub>	—	-1	±10	μA	V <sub>in</sub> = 0.4 V		
Input high-level current	I <sub>IH</sub>	—	0	±10	μA	V <sub>in</sub> = 5.5 V		
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	—	0.1	0.3	V	V <sub>CC</sub> = 4.75 V, I <sub>out</sub> = 0.1 A	1, 3, 6, 8	
		—	0.25	0.4	V	V <sub>in</sub> = 0.8 V, I <sub>out</sub> = 0.3 A		
		—	0.4	0.7	V	I <sub>out</sub> = 0.6 A		
Output leak current	I <sub>CEX</sub>	—	—	100	μA	V <sub>CEx</sub> = 60 V		
Output sustained voltage	V <sub>CE(sus)</sub>	60	—	—	V	V <sub>in</sub> = 2 V, I <sub>out</sub> = 0.1 A		1
Clamp diode forward voltage	V <sub>F</sub>	—	1.2	1.6	V	I <sub>F</sub> = 0.8 A	1, 3, 6, 8	
		—	1.5	2.0	V	I <sub>F</sub> = 1.5 A	2, 7	
Clamp diode leak current	I <sub>R</sub>	—	—	100	μA	V <sub>R</sub> = 60 V		
Propagation delay time	t <sub>pHL</sub>	—	0.2	0.5	μs	I <sub>out</sub> = 0.6 A	9, 10, 15, 16	
	t <sub>pLH</sub>	—	1.5	8.0	μs	I <sub>out</sub> = 0.6 A	1, 3, 6, 8	

### Note:

- See figure 1 for measurement.

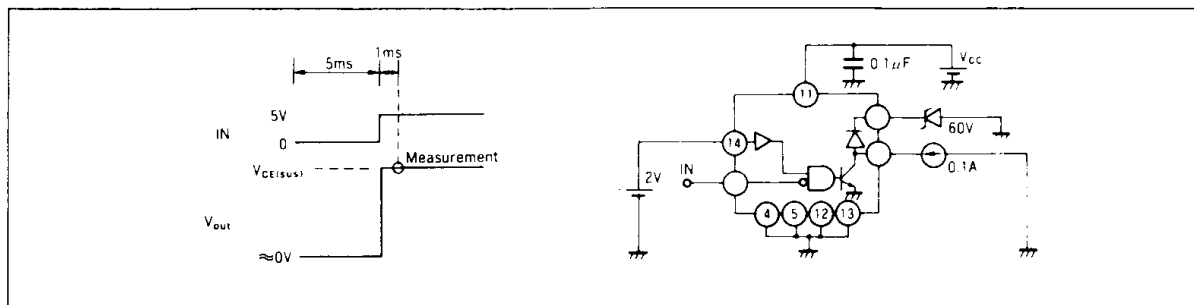


Figure 1 V<sub>CE(sus)</sub> Measurement Circuit

